

MACHINERY TOOLS AND SUPPLIES

CATALOG NO. 80
LIST PRICES

H. Channon Company

Market and Randolph Streets

Chicago

Founded 1875.

H.Channon Company

Henry Channon, Pres. and Treas.
Benj. Berntsen, Vice-President

CARNEGIE LIBRARY
PITTSBURGH, PA.

C. D. Viehoff, 2nd Vice Pres.
John L. Hanley, Secretary

JUN 22 1917
Capital One Million Dollars



List Price Catalog No. 80.

Machinery, Tools *and*
General Supplies for the
Manufacturing Industries

Machine Shops, Foundries, Blacksmith
Shops, Automobile Repair Shops, Elevators,
Mines, Contractors, Bridgebuilders, Stone
Quarries, Coal Yards, Cement, Brick and
Tile Plants, Packers, Saw and Planing
Mills, Flour Mills, Railroads, Waterworks,
Electric Light Plants, Telephone Companies
and other Public Service Corporations



Market and Randolph Streets 10553

Chicago

Illinois, U. S. A.

Cable Address "Chanmark" Chicago • Western Union Code

Catalog No. 80

Copyrighted, 1916

by

H.Channon Company.

Market and Randolph Streets.

Chicago

Foreword—Catalog No. 80

This catalog contains Standard List Prices which are subject to discounts quoted in separate Discount Sheet which will be issued about every three months or sooner should fluctuations in prices demand it.

Order from this Catalog. All previous Catalogs are discontinued and should be destroyed, as Catalog 80 List Prices cancel and supersede all prices quoted in former catalogs.

This Catalog has been made with your convenience in view—the different classes of merchandise are arranged in perfect sequence—the size is standard—the matter is condensed and printed on light paper. The binding is strong and the book opens flat at any page—and stays there. The Catalog taken as a whole is just the right size and weight for easy handling.

When opening an account with us, we give you the benefit of large wholesale stocks—with the accompanying quick shipments—at prices that will prove advantageous to you.

The H. Channon Company does not handle the cheapest goods the market affords—quite the contrary—it deals in reputable supplies and machinery. It requires a longer time to build up trade along these lines, but we find that the number of our satisfied customers is increasing in greater proportion each year.

Over forty years of successful merchandising is silent proof that our policy is right.

Feb. 1st, 1917.

H.Channon Company.

Trade Customs, Terms, Etc.

All goods are billed at market prices prevailing the day order is received and F. O. B. cars Chicago.

Quotations are made for prompt acceptance, subject to change without notice and subject to delays occasioned by accidents, strikes, fires or other causes beyond our control and with the understanding that while goods proving defective will be replaced—no claims for damages or labor will be allowed. Right reserved to correct stenographic errors and reject orders without damage to ourselves should references and credit not be found satisfactory.

Terms are net cash in 30 days on approved credit unless otherwise agreed in writing. Where merchandise carries a discount for cash in 10 days—this discount will be found stated upon the invoice.

C. O. D. We do not ship C. O. D. unless accompanied by at least 25% of the order for standard stock goods—larger deposit on special material. We would be perfectly willing to ship C. O. D. were it not for the fact that some of the states offer no protection by this method.

Cash with Order. In most cases where we have not done business with you before and you know that you have no established credit rating—it will save considerable time in executing your order if all cash accompanies it—credit account can be established later. All export orders for shipment out of U. S. A. are invariably sold cash with order or cash against documents on a U. S. bank.

Parcel Post. With cash orders always allow sufficient to cover parcel post charges—weights can be taken from our catalog and charges computed from parcel post tables given in rear of catalog.

Freight and Express Rates. See rear of catalog.

Freight Shipments. Packages weighing 100 pounds or more we always ship by freight unless otherwise instructed—remember that freight charges on packages less than 100 pounds are for full 100 pounds and usually at 1st class rate even when goods take a lower classification when weighing over 100 pounds.

Damage Claims. A clear receipt from the transportation company places the responsibility for shortage or damage with the carrier and if there is any discrepancy or damage, do not pay the freight bill unless the damage or shortage is marked in ink on the face of the freight bill. This will enable you to recover on any legal claim, upon presentation of your bill for damage together with paid expense bill—or send the papers to us and we will collect for you at this end.

Shortage Claims or claims for defective material should be made immediately upon receipt of the goods or within a reasonable time. Transportation companies will not accept or pay claims unless filed within four months.

F. O. B. All prices, unless otherwise agreed in writing, are quoted F. O. B. cars Chicago. We can quote prices delivered anywhere—but with the weights given in catalog and

freight rates quoted in rear of catalog—you can arrive at the approximate charges without trouble.

Boxing. We charge for packing only in special cases such as packing for export shipment or mule back transportation—such packing is charged at actual cost for material and labor.

Addresses. Contractors, well drillers, dredgers and others who move from place to place—will please give home office address on all orders to save delays and trouble investigating credit.

Factory Shipments. Oftentimes, to keep our prices low, we find it necessary on machinery and other heavy goods to ship direct from factory, thus saving freight, cartage, double handling and other expenses.

Guarantee. We guarantee that every article in this catalog is exactly as described and represents full value for the price we ask. Such goods as prove defective, within a reasonable time, when properly used, we will replace free of charge at the factory, provided part claimed defective is returned to us for examination—under no circumstances will we be responsible for any damage beyond this.

Returned Goods. If stock goods are not found satisfactory after a reasonable time, they may be returned for credit or money refunded, provided we are notified in advance, giving cause for complaint, date of bill, and when returned we must have copy of bill of lading—without this notification goods may be refused at Chicago and held for storage at your expense. Goods are oftentimes sent in to us without instructions, in fact, without even the name of the shipper—making it impossible for us to locate charge or give credit.

We do not accept return of goods made to special order, nor Manila or wire rope after once cut off the coil or reel, except where mistake is our own. When returning by parcel post attach letter (with 2c stamp) to the package—giving reason for return.

Export Business. We have exported to foreign countries for many years and this trade is steadily growing. Our catalog, comprising, as it does, well selected lines—clearly described and illustrated, giving weights and other information very necessary to those at a great distance—is a hand book greatly appreciated and relied upon.

We are fully conversant with proper packing, marking, shipping and manifesting and we will quote F. O. S. vessel seaboard or C. I. F. to any known port. Correspondence in any language.

"Concentrate Your Purchases." While we still advocate the slogan of concentrating purchases—we do so, not only with the object of offering you an advantageous purchase on the whole order, but in conserving your time and effort as well. By this means, the material required for one or several of your orders, will reach you at the same time—at a considerable saving in freight, to those at a distance and especially to those in foreign countries.

Machinists' Supply Division

Occupying First Quarter of Catalog

Comprising High Grade Tools and Supplies for the Manufacturing Industries. For the Machinist—Blacksmith—Plumber
Electrician—Carpenter—Millwright—Steel Erector

Twist Drills
Taps
Reamers
Files
Hack Saws

Milling Cutters
Auger Bits
Wrenches
Hammers
Pliers

Saws
Rules
Micrometers
Lathe Dogs
Chucks

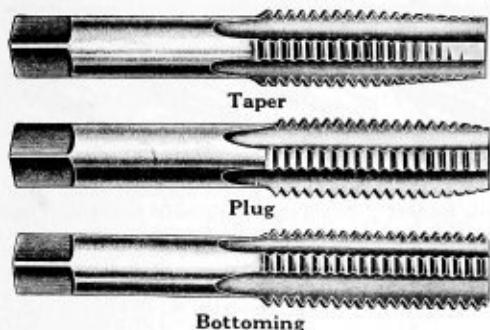
Vises
Tool Holders
Die Stocks
Emery Wheels
Drill Presses

Thread Cutting Tools
Fine Precision Tools Screw Machine Products

One of our largest departments which has taken immense strides and is still growing rapidly. The following pages describe this line in detail and show the great variety of tools we carry. Our stock is one of the largest in the middle west—if not in the whole country, as our aim is to carry in stock every item listed.

Channon Tools are specified exclusively by many of the leading industrial shops in this and in foreign countries

Machinists' Hand Taps—Bay State



Orders for Hand Taps to and including $\frac{1}{4}$ " will be filled with taps having shanks full diameter of thread. Taps $\frac{1}{4}$ " and larger will be furnished with shanks size of bottom of thread.

We will furnish at regular prices, hand taps with full size shanks from $\frac{1}{4}$ " to $\frac{1}{2}$ " inclusive, and also hand taps with shanks size of bottom of thread, $\frac{3}{8}$ " and larger.

We will furnish at regular prices Hand Taps from $\frac{1}{4}$ " to $\frac{3}{8}$ ", $\frac{1}{2}$ " oversize and from $\frac{1}{4}$ " to $1\frac{1}{2}$ " inclusive, $\frac{1}{2}$ " oversize, in standard pitches only, of the "V" form.

Whitworth hand taps with the British Standard Fine Thread, Set furnished at regular prices.

United States Standard form of thread will be furnished unless otherwise specified.

Sizes, lengths and threads not listed are subject to special prices. Left hand taps are special.

Until recently the Association of Licensed Automobile Manufacturers, commonly termed A. L. A. M., had under their jurisdiction, technical matters pertaining to motor construction. Their standard of thread is now referred to as the S. A. E. standard, all matters being handled by the Society of Automobile Engineers. It has been extended to comprise sizes up to $1\frac{1}{2}$ inches.

Dia. of Tap in Inches	Price per Set	Price Each	Length Over All, Inches	Number of Threads per Inch				Other Threads Furnished		Size Drill Recommended for Tapping	Approx. Weight per Set Lbs.
				U. S. Standard	S. A. E. Standard	V Standard	Whitworth S. U. D.	U. S. Form	V Form		
$\frac{1}{16}$	\$ 1.35	\$0.45	$2\frac{1}{4}$	20	28	20	20	24, 32	24, 27, 32	12	$\frac{3}{8}$
$\frac{1}{8}$	1.50	.50	$2\frac{3}{4}$	18	24	18	18	20, 32	20, 24, 27	C	$\frac{1}{4}$
$\frac{3}{16}$	1.65	.55	$2\frac{1}{2}$	16	24	16	16	20	20, 24, 27	M	$\frac{3}{8}$
$\frac{1}{4}$	1.80	.60	$3\frac{1}{2}$	14	20	14	14	24	20, 24, 27	S	$\frac{3}{8}$
$\frac{5}{16}$	2.10	.70	$3\frac{3}{8}$	13	20	12	12	12, 24	20, 24, 27	Y	$\frac{7}{8}$
$\frac{3}{8}$	2.40	.80	$3\frac{1}{2}$	12	18	12	12		27		$\frac{1}{2}$
$\frac{7}{16}$	2.70	.90	$3\frac{3}{8}$	11	18	11	11	12	12, 27		$\frac{5}{8}$
$\frac{1}{2}$	3.15	1.05	$4\frac{1}{2}$	11	16	11	11				$\frac{7}{8}$
$\frac{9}{16}$	3.60	1.20	$4\frac{1}{4}$	10	16	10	10	12	12, 27		1
$\frac{5}{8}$	4.20	1.40	$4\frac{1}{2}$	10		10	10				$1\frac{1}{4}$
$\frac{3}{4}$	4.80	1.60	$4\frac{1}{2}$	9	14, 18	9	9	12	12, 27		$1\frac{1}{2}$
$\frac{7}{8}$	5.40	1.80	$4\frac{3}{4}$	9		9	9				$1\frac{3}{4}$
1	6.00	2.00	$5\frac{1}{8}$	8	14	8	8	12	12, 27		$2\frac{1}{4}$
$1\frac{1}{8}$	6.75	2.25	$5\frac{1}{2}$	7	12	7	7				3
$1\frac{1}{4}$	7.80	2.60	$5\frac{3}{4}$	7	12	7	7			$1\frac{1}{4}$	$3\frac{1}{2}$
$1\frac{3}{8}$	9.00	3.00	$6\frac{1}{8}$	6	12	6	6			$1\frac{3}{8}$	$4\frac{1}{4}$
$1\frac{1}{2}$	10.50	3.50	$6\frac{3}{8}$	6	12	6	6			$1\frac{1}{2}$	$5\frac{1}{2}$
$1\frac{3}{4}$	12.60	4.20	$6\frac{1}{2}$	$5\frac{1}{2}$			5			$1\frac{3}{4}$	$6\frac{3}{4}$
$1\frac{7}{8}$	15.00	5.00	7	5			5			$1\frac{7}{8}$	8
$1\frac{9}{8}$	17.40	5.80	$7\frac{1}{8}$	5			$4\frac{1}{2}$			$1\frac{9}{8}$	$9\frac{1}{2}$
2	20.10	6.70	$7\frac{3}{8}$	$4\frac{1}{2}$			$4\frac{1}{2}$			$1\frac{9}{8}$	$11\frac{1}{2}$
$2\frac{1}{8}$	24.00	8.00	8	$4\frac{1}{2}$			$4\frac{1}{2}$				
$2\frac{1}{4}$	27.60	9.20	$8\frac{1}{4}$	$4\frac{1}{2}$			4				
$2\frac{3}{8}$	31.50	10.50	$8\frac{1}{2}$	4			4				
$2\frac{1}{2}$	34.50	11.50	$8\frac{3}{4}$	4			4				

Machinists' Hand Taps—Small Sizes

Std. Size, Inches...	$\frac{1}{16}$	$\frac{5}{64}$	$\frac{3}{32}$	$\frac{7}{64}$	$\frac{1}{8}$	$\frac{9}{64}$	$\frac{5}{32}$	$\frac{11}{64}$	$\frac{3}{8}$	$\frac{13}{64}$	$\frac{7}{16}$	$\frac{15}{64}$
Price, per set.....	\$2.10	\$1.80	\$1.50	\$1.20	\$1.05	\$1.05	\$1.05	\$1.05	\$1.05	\$1.05	\$1.05	\$1.05
Price, each.....	.70	.60	.50	.40	.35	.35	.35	.35	.35	.35	.35	.35
Threads Furnished.	64, 72	60, 72	50, 48, 56	48, 56	32, 40,	40,	32, 36,	32,	24, 30, 32	24,	24,	32, 24
Approx. wt. per set.	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$	1	1	1	$1\frac{1}{2}$	$1\frac{1}{2}$

Figures in heavy type in thread line indicate regular U. S. Standard thread.

Important Information on Ordering Taps

Owing to the greater demand for Taps and Dies with U. S. Standard Form Thread than for the V Standard, all orders will be filled, unless otherwise specified, with U. S. Standard Form Threads. Other Forms of Threads will be furnished only when so ordered. All Taps, excepting Common Pipe Taps, with left hand threads are special, and the price is governed by the quantity purchased. All sizes, lengths and threads, excepting standard sizes, not included in the list are special and are subject to special prices.

In compiling the lists and descriptions on the following pages, we have endeavored to arrange them in such a manner as to simplify ordering, thereby avoiding mistakes and saving delay in filling orders.

In ordering listed material, please use our terms when possible, that we may know exactly what you require. The observance of this request will facilitate filling orders and obviate disappointment. Orders for Taps and Dies, similar to listed goods, but special in some dimensions, must show the exact measurements of the special parts. When Taps or Dies differing widely from any shown in the following lists are ordered, a sketch showing all dimensions or a sample, should be sent.

Machine or Nut Taps



U. S. Standard Thread is always furnished unless otherwise specified. 32nd sizes, from $\frac{1}{4}$ " to 1" inclusive are also furnished in V thread only. Owing to their extra length, these taps are preferable in many places to the regular hand taps. The diameter of the shank is the same as the bottom of the thread which permits the shank to extend into the tapped hole. Left hand threads are special.

Diam. of Tap, Inches	Price Each	Length of Th'ds, Inches	Length Over All, Inches	Number of Threads to Inch			
				U. S. Std	V Std	S. A. E. Std	Whitworth Standard
$\frac{1}{16}$	\$0.60	$1\frac{1}{4}$	$4\frac{1}{2}$	32-24	24	24	24
$\frac{1}{8}$	.60	$1\frac{1}{2}$	5	20	20	28	20
$\frac{1}{4}$	.70	$1\frac{3}{4}$	$5\frac{1}{2}$	18	18	24	18
$\frac{3}{8}$	.80	2	6	16	16	24	16
$\frac{1}{2}$	.90	$2\frac{1}{4}$	$6\frac{1}{2}$	14	14	20	14
$\frac{5}{8}$	1.00	$2\frac{1}{2}$	7	12	12	20	12
$\frac{3}{4}$	1.15	$2\frac{3}{4}$	$7\frac{1}{2}$	12	12	18	12
$\frac{7}{8}$	1.30	3	8	11	11	18	11
1	1.45	$3\frac{1}{4}$	$8\frac{1}{2}$	11	11	16	11
$1\frac{1}{8}$	1.60	$3\frac{1}{2}$	9	10	10	16	10
$1\frac{1}{4}$	1.80	$3\frac{3}{4}$	$9\frac{1}{2}$	10	10	14-18	10
$1\frac{1}{2}$	2.10	3	10	9	9	14	9
$1\frac{3}{4}$	2.40	$3\frac{1}{4}$	$10\frac{1}{2}$	9	9	14	8
2	3.15	$4\frac{1}{4}$	11	8	8	12	7
$2\frac{1}{8}$	3.60	$4\frac{1}{2}$	$11\frac{1}{2}$	7	7	12	7
$2\frac{1}{4}$	4.25	$4\frac{3}{4}$	12	7	7	12	7
$2\frac{1}{2}$	4.80	5	$12\frac{1}{2}$	6	6	12	6
$2\frac{3}{4}$	5.65	$5\frac{1}{4}$	13	6	6	12	6
3	6.50	$5\frac{1}{2}$	$13\frac{1}{2}$	5	5	12	5
$3\frac{1}{8}$	7.20	$5\frac{3}{4}$	14	5	5	12	5
$3\frac{1}{4}$	8.25	$6\frac{1}{4}$	$14\frac{1}{2}$	5	5	12	5
$3\frac{1}{2}$	9.25	$6\frac{1}{2}$	15	4	4	12	5
$3\frac{3}{4}$	10.80	7	$15\frac{1}{2}$	4	4	12	5
4	12.25	$7\frac{1}{4}$	16	4	4	12	5
$4\frac{1}{8}$	13.80	$7\frac{1}{2}$	$16\frac{1}{2}$	4	4	12	5
$4\frac{1}{4}$	15.00	$7\frac{3}{4}$	17	4	4	12	5

Approximate Weights

Size, inches....	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2
Weight, ounces....	1	2	3	5	10	16	22	32
Size, inches....	$1\frac{3}{8}$	$1\frac{1}{2}$	$1\frac{3}{4}$	2	$2\frac{1}{4}$	$2\frac{3}{4}$	3	$3\frac{1}{2}$
Weight, pounds....	$1\frac{1}{8}$	$2\frac{1}{2}$	3	4	6	8	12	16

Tapper Taps



Round Square Acme / National

U. S. Standard thread is always furnished unless otherwise specified. Round shanks regularly furnished. Tapper Taps with shanks as shown furnished upon request. Left hand threads are special. The 12-inch lengths are carried in stock. In ordering specify kind of shank, style of thread and length overall desired. Tapper Taps are used mostly for tapping blank nuts.

Diam. Inches	Length Over All, Inches				Length of Th'd Inches	Number of Threads to Inch			
	15 Inches	14 Inches	12 Inches	11 Inches		U. S. Std	V Std	S. A. E. Std	Whitworth Std
$\frac{1}{16}$	\$0.90	\$0.80	\$0.75	\$0.70	$1\frac{1}{4}$	20	20	28	20
$\frac{1}{8}$	1.00	.90	.85	.80	2	18	18	24	18
$\frac{1}{4}$	1.10	1.00	.95	.90	2	16	16	24	16
$\frac{3}{8}$	1.25	1.15	1.05	1.00	$2\frac{1}{4}$	14	14	20	14
$\frac{1}{2}$	1.35	1.25	1.15	1.12	$2\frac{1}{2}$	*12	*12	20	12
$\frac{5}{8}$	1.55	1.45	1.35	1.30	$2\frac{3}{4}$	12	12	18	12
$\frac{3}{4}$	1.75	1.65	1.50	1.45	3	11	11	18	11
$\frac{7}{8}$	1.95	1.80	1.70	1.62	$3\frac{1}{4}$	11	11	16	11
1	2.10	2.00	1.85	1.80	$3\frac{1}{2}$	10	10	16	10
$1\frac{1}{8}$	2.35	2.25	2.10	2.05	$3\frac{3}{4}$	10	10	14-18	10
$1\frac{1}{4}$	2.75	2.60	2.45	2.35	4	9	9	14	9
$1\frac{1}{2}$	3.15	3.00	2.75	2.70	3	9	9	12	9
$1\frac{3}{4}$	3.65	3.50	3.20	3.15	$3\frac{1}{2}$	8	8	12	8
2	4.10	3.95	3.70	3.60	$3\frac{3}{4}$	7	7	12	7
$2\frac{1}{8}$	4.65	4.50	4.25	4.15	$3\frac{1}{2}$	7	7	12	7
$2\frac{1}{4}$	5.20	5.05	4.80	4.70	4	6	6	12	6
$2\frac{1}{2}$	5.80	5.65	5.40	5.30	4	6	6	12	6
$2\frac{3}{4}$	6.65	6.50	6.30	6.10	5	5	5	12	5
3	7.40	7.20	7.00	6.80	5	5	5	12	5
$3\frac{1}{8}$	8.35	8.25	8.00	7.80	5	5	5	12	5
$3\frac{1}{4}$	9.25	9.05	8.90	8.70	4	4	4	12	5

Approximate Weights—12-Inch Length

Size, inches.....	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2
Weight, ounces....	$1\frac{1}{2}$	4	7	10	15	21	28	32
Size, inches.....	$1\frac{3}{8}$	$1\frac{1}{2}$	$1\frac{3}{4}$	2	$2\frac{1}{4}$	$2\frac{3}{4}$	3	$3\frac{1}{2}$
Weight, pounds....	$1\frac{1}{8}$	$2\frac{1}{4}$	3	4	6	8	12	16

Pulley Taps



U. S. Standard thread furnished unless otherwise ordered. Left hand threads are special. Used largely for tapping set screw holes in cast iron pulleys. The diameter of the shank is the same as the diameter of the tap.

Diam. Inches	Number of Threads to the Inch		Whole Length, Price Each				
	U. S. Std	V Std	6 Inch	8 Inch	10 Inch	12 Inch	14 Inch
$\frac{1}{4}$	20	20	\$0.65	\$0.70	.....	.....	.....
$\frac{3}{8}$	18	18	.70	.75	.....	.....	.....
$\frac{1}{2}$	16	16	.80	.85	\$0.90	\$0.95	\$1.00
$\frac{5}{8}$	14	14	.90	.95	1.00	1.05	1.15
$\frac{3}{4}$	*13	*12	1.00	1.00	1.10	1.15	1.25
$\frac{7}{8}$	12	12	1.05	1.15	1.25	1.35	1.45
1	11	11	1.15	1.30	1.40	1.50	1.65
$1\frac{1}{8}$	11	11	.....	.....	1.50	1.70	1.80
$1\frac{1}{4}$	10	10	.....	.....	1.70	1.85	2.00

Inside and Outside Chasers

Cutting U. S. or V Std. Pitches



Inside Chaser



Outside Chaser

Specify form of thread required. Threads not given in the list below will be charged special prices.

Average length of chasers, 5 inches.	Price Each	Per Pair
Cutting 5, 6, 7, 8, 9, 10, 11, $11\frac{1}{2}$, 12, 13, 14, 15 and 16 threads to the inch.....	\$0.30	\$0.60
Cutting 18, 20, 22, 24, 25, 26, 27, 28, 30, 31, 32, 34, 36, 38, 40, 42, 44, 46 and 48 threads to inch.....	.25	.50

Machine Screw Taps



Less than six of a size and thread will be charged at prices for single taps. Sizes and threads not listed and left hand threads are special. These taps are made to figures recommended by the American Society of Mechanical Engineers.

Size of Screw Gauge	Price		Reg. Mach. Screw Sizes	Size of Drill for Com. Use Threads 1/2 Full	Threads Also Furnished
	Dozen	Each			
No. 1	\$8.40	\$0.84	...	53	56, 64, 72
No. 2	7.20	.72	...	49	64
No. 3	6.00	.60	48	45	56
No. 4	4.80	.48	36	43	32, 40, 48
No. 5	4.20	.42	...	38	40, 44
No. 6	4.20	.42	32	33	36, 40
No. 7	4.20	.42	...	30	30, 36
No. 8	4.20	.42	32	29	30, 36, 40
No. 9	4.20	.42	...	25	24, 32
No. 10	4.20	.42	24	23	28, 30, 32
No. 12	4.20	.42	24	15	32, 28
No. 14	5.40	.54	20	8	24
No. 16	5.40	.54	18	2	20, 22
No. 18	6.00	.60	18	D	20
No. 20	6.00	.60	18	I	16, 20
No. 22	6.60	.66	...	L	18, 16
No. 24	6.60	.66	16	O	18, 16
No. 26	6.60	.66	...	...	14, 16
No. 28	7.20	.72	...	...	16, 14
No. 30	7.20	.72	...	W	16, 14

*Thread numbers in bold face are S. A. E. Standard.
*These Threads conform to regular machine screws carried in stock.

Hob or Master Taps

For Cutting Solid Bolt Dies



U. S. Standard thread furnished unless otherwise ordered.

Diam. In.	Price Each	Number of Threads to the Inch				Length Over All, Inches
		U. S. Stand.	V. Stand.	S. A. E. Stand.	Whitworth Stand.	
1/4	\$0.75	20	20	28	20	3 1/2
5/16	.87	18	18	24	18	4
3/8	1.00	16	16	24	16	4 1/2
7/16	1.12	14	14	20	14	5
1/2	1.25	13	12	20	12	5 1/2
9/16	1.44	12	12	18	10	6
5/8	1.62	11	11	18	11	6 1/2
3/4	1.81	11	11	16	10	7
7/8	2.00	10	10	16	10	7 1/2
1	2.25	10	10	...	10	8
1 1/8	2.62	9	9	14, 18	9	8 1/2
1 1/4	3.00	9	9	...	9	8 3/4
1 1/2	3.50	8	8	14	8	9
1 3/8	4.00	7	7	12	7	9 1/4
1 1/2	4.62	7	7	12	7	9 1/2
1 3/4	5.25	6	6	12	6	9 3/4
1 7/8	5.87	6	6	12	6	10
2	6.62	5 1/2	5	...	5	10 1/4
2 1/8	7.50	5	5	...	5	10 1/2
2 1/4	8.50	5	4 1/2	...	4 1/2	10 3/4
2 1/2	9.62	4 1/2	4 1/2	...	4 1/2	11

Machine Screw Nut Taps



Sizes and threads not listed are special and subject to special prices. Left hand threads are special.

Size of Screw Gauge	Price Each	Standard No. of Threads to Inch	Length Over All, Inches	Approx. Weight, Ounce
No. 2	\$1.25	56	4	1/8
No. 3	1.25	48	4	1/8
No. 4	1.25	36	4	1/8
No. 6	1.25	32	5	1/8
No. 8	1.25	32	5	1/8
No. 10	1.25	24	5	1/8
No. 12	1.50	24	6	1/8
No. 14	1.50	20	6	1

Stove-Bolt Taps



These Taps correspond in sizes and threads to Regular Stove Bolts.

Sizes and threads not listed will be charged at special prices.

Less than six Taps of a size will be charged at prices for single Taps.

Diameter Inches	Per Dozen	Price Each	No. of Threads to Inch	Approx. Weight per Dozen, Ozs.
1/2	\$4.20	\$0.42	28	3
5/8	4.20	.42	24	4
3/4	4.20	.42	22	5
7/8	5.40	.54	18	6
1	6.00	.60	18	9
1 1/4	6.60	.66	16	12

Taps for Beaman & Smith's Holders



Used in Beaman & Smith Patent Safety Drill and Tap Holders. Prices of taps for holders Nos. 2 1/2 and 3 on application. Also used in Wizard Tap Holders. Sizes and threads not listed are special and subject to special prices.

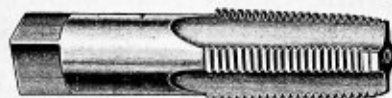
U. S. Standard thread furnished unless otherwise ordered, are furnished regularly in plug style only. Pipe Taps with these shanks quoted and furnished upon request.

No. 1 Holder					No. 2 Holder				
Dia. Inch	Price Each	Number of Thds. to In.			Dia. Inch	Price Each	Number of Thds. to In.		
		V. Std.	U. S. Std.	SAE			V. Std.	U. S. Std.	SAE
1/4	\$0.55	20	20	28	1/4	\$1.20	11	11	18
5/16	.55	18	18	24	5/16	1.20	11	11	16
3/8	.55	16	16	24	3/8	1.20	10	10	16
1/2	.70	14	14	20	1/2	1.40	10	10	...
5/8	.80	12	13	20	5/8	1.60	9	9	18-14
3/4	.80	12	12	18	3/4	1.80	9	9	...
7/8	.90	11	11	18	7/8	2.00	8	8	...
					1 1/8	2.25	7	7	12
					1 1/4	2.60	7	7	12

Diameters of shank No. 1 holders 1/4 inch to 1 1/4 inch inclusive, 1/2 inch to 3/4 inch, inclusive, 1/2 inch. All No. 2 holders have 1/4 inch diameter shank.

H. Channon Company Chicago

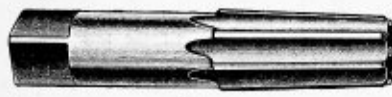
Pipe Taps, Hobs and Reamers



Tap



Hob



Reamer

Ordinary taps are used mostly for cleaning old threads and occasionally for cutting new threads. Our Extra Grade taps are made purposely for cutting new threads continually, and are made of such quality and with such accuracy that for manufacturing purposes they cannot be excelled. We highly recommend them for that purpose.

Pipe Taps will be furnished with right or left hand threads, but right hand threads are regularly furnished unless otherwise specified. Straight (Plug) Pipe Taps furnished at regular prices.

Extra grade furnished unless otherwise specified.

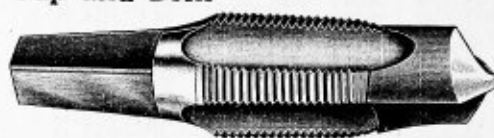
Size, Inches	Taps Hobs Price Each	Length Thread on Taps Inches	Length Thread on Hobs Inches	Length Over All, Inches	Number Threads per Inch	
					Briggs Stand.	Whitw/ht Stand.
1/8	\$ 1.12	3/4	1 1/4	2 1/8	27	28
1/4	1.25	1 1/4	1 1/2	2 3/8	18	19
3/8	1.50	1 3/4	1 3/4	2 7/8	18	19
1/2	1.87	2 1/4	2 1/2	3 1/4	14	14
3/4	2.50	2 3/4	2 3/4	3 3/4	11 1/2	11
1	3.12	3 1/4	3 1/2	4 1/4	11 1/2	11
1 1/4	3.75	4 1/4	4 1/2	5 1/4	11 1/2	11
1 1/2	4.62	5 1/4	5 1/2	6 1/4	8	11
2	6.25	6 1/4	6 1/2	7 1/4	8	11
2 1/2	10.50	7 1/4	7 1/2	8 1/4	8	11
3	15.00	8 1/4	8 1/2	9 1/4	8	11
3 1/2	22.00	9 1/4	9 1/2	10 1/4	8	11
4	33.00	10 1/4	10 1/2	11 1/4	8	11

Combined Pipe Tap and Drill

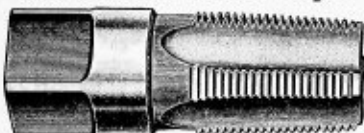
For tapping gas and water pipes. Shanks for sizes 1/4 to 1 1/2 inches are 3/8 inch by 1/2 inch and 1 1/4 inches long.

Shanks for sizes 2 and 2 1/2 inches are 1 inch by 3/4 inch and 2 inches long. By grinding the shanks down a trifle these taps may be used in regular ratchets.

Size ins. . . 1/4 3/8 1/2 3/4 1 1/4 1 1/2 2 2 1/2
 Light, ins. . 3 3/4 4 4 1/4 4 1/2 4 3/4 5 5 1/2 5 3/4 6 3/4
 Price each. 1.50 1.50 1.75 2.20 3.00 3.80 4.80 5.80 7.60 10.00



Short Patch-Bolt Taps



These Taps are made especially for boiler makers, tapered 3/8 inch to the foot, for the purpose of making the bolt a steam tight fit, and have 12 threads per inch. Diameter given is 1/2 inch from large end of thread. Furnished in U. S. or V form of thread.

Diameter Inches	Length Overall	Price Each	Diameter Inches	Length Overall	Price Each
1/2	3 1/2	\$0.70	1 1/4	3 1/2	\$1.80
3/4	3 3/4	.80	1 1/2	3 3/4	2.00
1	3 3/4	.90	1 3/4	3 3/4	2.15
1 1/4	3 3/4	1.05	2	3 3/4	2.25
1 1/2	3 3/4	1.20	2 1/4	3 3/4	2.45
2	3 3/4	1.40	2 1/2	3 3/4	2.60
2 1/2	3 3/4	1.60			

Size, inches. . . 1/2 3/4 1 1 1/4 1 1/2 2 2 1/2
 Weight, pounds. . . 1/2 1/2 1/2 1/2 1/2 1/2 1/2

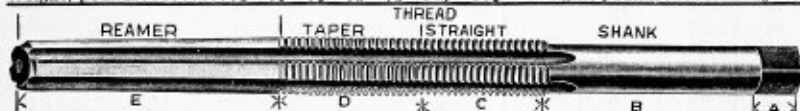
Straight and Taper Boiler Taps



These taps have a taper of 3/8 inch to the foot, and the diameter given is 1/2 inch from large end of thread. They all have 12 threads to the inch and U. S. Std. Thread unless otherwise ordered. "V" Std. Threads can be furnished.

Diameter Inches	Length Overall	Price Each	Diameter Inches	Length Overall	Price Each
1/2	3 1/2	\$1.00	1 1/4	5 1/2	\$3.40
3/4	3 3/4	1.15	1 1/2	5 3/4	3.70
1	3 3/4	1.30	1 3/4	5 3/4	4.00
1 1/4	4	1.45	2	6	4.30
1 1/2	4 1/4	1.60	2 1/4	6 1/2	4.60
2	4 1/2	1.80	2 1/2	6 1/2	4.90
2 1/4	4 3/4	2.10	2 3/4	6 1/2	5.10
2 1/2	5	2.25	3	6 1/2	5.40
2 3/4	5	2.40	3 1/4	6 1/2	5.70
3	5	2.60	3 1/2	6 1/2	6.00
3 1/4	5	3.00			
3 1/2	5 1/2	3.20			

Size, inches. . . 1/2 3/4 1 1 1/4 1 1/2 2 2 1/2
 Weight, pounds. . . 1/2 1/2 1/2 1/2 1/2 1/2 1/2



Stay Bolt Taps

When ordering give diameter at largest part, number of threads to inch, state whether V or U. S. form of thread and length over all. For taps of special specifications, give all measurements as indicated by letters on above cut. Blank order forms sent upon request.

Solid bolt dies are used for threading stay-bolts.

Stay-bolt Taps 18, 21 and 24 inches long in sizes from 3/4 to 1 1/2 inches diameter, 12 threads per inch, in the proportions given below are carried in stock. Sizes shorter than 16 inches will be charged as 16 inches long. U. S. Std. Thread furnished unless V Std. is ordered.

Diameter, Inches	Price per Inch of Length	Stock Sizes—Price Each			Approx. Weight of 21 Inch Length, Pounds	Dimensions in Inches			
		Length Overall, Inches				Length Overall, Inches	18	21	24
		18	21	24					
3/4, 1, 1 1/4	\$0.40	\$ 7.20	\$ 8.40	\$ 9.60	1 1/2, 1 3/4, 2 1/4	A	1	1	1
1 1/4, 1 1/2	.45	8.10	9.45	10.80	2 1/2, 3 1/4	B	5	6	7
1 3/4, 2	.50	9.00	10.50	12.00	3 1/2, 3 3/4	C	3	4	4
1 3/4, 2 1/4	.55	9.90	11.55	13.20	4 1/4, 4 3/4	D	3	3	4
1 3/4, 2 1/2	.60	10.80	12.60	14.40	5 1/2, 6 1/4	E	6	7	8
1 3/4, 2 3/4	.70	12.60	14.70	16.80	7 1/4, 9				

No. 219 A Mud Plug or Washout Taps



Used for Tapping Washout Holes in Locomotives

A set consists of four taps having $1\frac{1}{4}$ -inch taper in 12 inches, and having twelve threads to the inch.

Tap No. 1 is $1\frac{3}{4}$ inches in diameter at small end, and Tap No. 4 is 3 inches in diameter at large end.

The taps are marked as shown in the illustration and correspond with taper plugs bearing the same numbers as the twelve diameters shown in the four taps.

The taps are $6\frac{1}{2}$ inches long and all have the same size shank square.

All taps have 12 threads to the inch and can be furnished in U. S. Standard or V form of thread.

U. S. Standard form of thread furnished unless otherwise specified. Sizes, lengths and threads not listed, subject to special discount. Left hand taps are special.

Sizes and Prices per Set

No. 1— $1\frac{3}{4} \times 2\frac{1}{8}$ in. \$6.00 No. 2— $2\frac{1}{8} \times 2\frac{3}{8}$ in. \$7.50 No. 3— $2\frac{3}{8} \times 2\frac{1}{2}$ in. \$9.00 No. 4— $2\frac{1}{2} \times 3$ in. \$10.50

No. 236 Spindle Stay-Bolt Taps



All taps have 12 threads to the inch and can be furnished either U. S. Standard or V form of thread. U. S. Standard form furnished unless otherwise specified.

Taps shorter than 8 inches charged as if 8 inches long and fractions of an inch in length charged as full inch.

Spindle stay bolt taps are proportioned as follows length over all $7\frac{7}{8}$ inches, length fluted thread $3\frac{1}{4}$ inches, length unfluted thread $2\frac{3}{4}$ inches, diameter of spindle $\frac{3}{8}$ inches, length spindle 11 inches.

Diameter of Tap, Inches	Price		Diameter of Tap, Inches	Price	
	Tap $7\frac{7}{8}$ Inches Long	Per Inch for Greater Lengths		Tap $7\frac{7}{8}$ Inches Long	Per Inch for Greater Lengths
$\frac{3}{4}$	\$ 8.00	\$1.00	$1\frac{1}{8}$	\$11.20	\$1.35
$\frac{7}{8}$	8.40	1.05	$1\frac{1}{4}$	11.60	1.40
$\frac{1}{2}$	8.80	1.10	$1\frac{3}{8}$	12.00	1.45
$\frac{3}{4}$	9.20	1.15	$1\frac{1}{2}$	12.40	1.50
1	9.60	1.20	$1\frac{5}{8}$	12.80	1.55
$1\frac{1}{8}$	10.00	1.25	$1\frac{3}{4}$	13.20	1.60
$1\frac{1}{4}$	10.40	1.30			

Forms of Threads

U. S. Standard Thread



$$P = \text{pitch} = \frac{1}{\text{No. threads per inch}}$$

$$\text{Formula: } D = \text{depth} = P \times .64952$$

$$F = \text{flat} = \frac{P}{8}$$

Diameter	1/4	5/16	3/8	7/16	1/2	5/8	3/4	7/8
No. threads per in.	20	18	16	14	12	11	10	9
Diameter	1 1/2	1 3/4	1 7/8	1 15/16	1 1/2	1 3/4	1 7/8	2
No. threads per in.	8	7	6	5	4	3	2	1
Diameter	2 1/4	2 1/2	2 3/4	2 5/8	2 3/4	2 5/8	2 3/4	3
No. threads per in.	4	4	4	4	4	4	4	3
Diameter	3 1/4	3 3/8	3 1/2	3 5/8	3 3/4	3 7/8	4	
No. threads per in.	3 1/2	3 3/4	3 1/2	3 3/4	3	3	3	

Sharp V Standard Thread



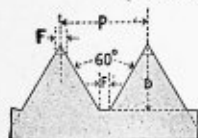
$$\text{Formula: } P = \text{pitch} = \frac{1}{\text{No. threads per inch}}$$

$$D = \text{depth} = P \times .8660$$

Diameter	1/4	5/16	3/8	7/16	1/2	5/8	3/4	7/8
No. threads per in.	20	18	16	14	12	11	10	9
Diameter	1 1/2	1 3/4	1 7/8	1 15/16	1 1/2	1 3/4	1 7/8	2
No. threads per in.	8	7	6	5	4	3	2	1
Diameter	2 1/4	2 1/2	2 3/4	2 5/8	2 3/4	2 5/8	2 3/4	3
No. threads per in.	4	4	4	4	4	4	4	3
Diameter	3 1/4	3 3/8	3 1/2	3 5/8	3 3/4	3 7/8	4	
No. threads per in.	3 1/2	3 3/4	3 1/2	3 3/4	3	3	3	

Society of Automobile Engineers' Standard Thread

(Formerly A. L. A. M.)



$$\text{Formula: } P = \text{pitch} = \frac{1}{\text{No. threads per inch}}$$

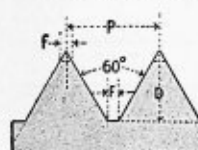
$$D = \text{depth} = P \times .64952$$

$$F = \text{flat} = \frac{P}{8}$$

Form of thread U.S. Std.

Diameter	1/4	5/16	3/8	7/16	1/2	5/8	3/4	7/8	1
No. thds. per in.	28	24	24	20	20	18	16	16	14

American Society of Mechanical Engineers' (A. S. M. E.) Standard Thread



$$\text{Formula: } P = \text{pitch} = \frac{1}{\text{No. threads per inch}}$$

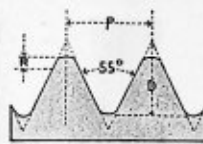
$$D = \text{depth} = P \times .64952$$

$$F = \text{flat} = \frac{P}{8}$$

Form of thread U.S. Std.

Size of screw gauge	0	1	2	3	4	5	6	7	8	9	10
No. threads per in.	80	72	64	56	48	44	40	36	32	30	
Size of screw gauge	12	14	16	18	20	22	24	26	28	30	
No. threads per in.	28	24	22	20	20	18	16	16	14	14	

Whitworth Standard Thread



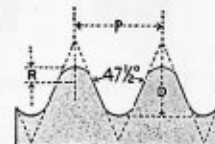
$$\text{Formula: } P = \text{pitch} = \frac{1}{\text{No. threads per inch}}$$

$$D = \text{depth} = P \times .64033$$

$$R = \text{radius} = P \times .1373$$

Diameter	1/4	5/16	3/8	7/16	1/2	5/8	3/4	7/8	1
No. threads per in.	20	18	16	14	12	11	10	9	8
Diameter	1 1/2	1 3/4	1 7/8	1 15/16	1 1/2	1 3/4	1 7/8	1 15/16	2
No. threads per in.	8	7	6	5	4	3	2	1	1
Diameter	2 1/4	2 1/2	2 3/4	2 5/8	2 3/4	2 5/8	2 3/4	2 5/8	3
No. threads per in.	4	4	4	4	4	4	4	4	3
Diameter	3 1/4	3 3/8	3 1/2	3 5/8	3 3/4	3 7/8	4		
No. threads per in.	3 1/2	3 3/4	3 1/2	3 3/4	3	3	3		

British Association Standard Thread



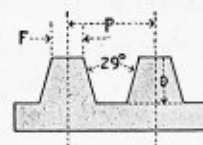
$$\text{Formula: } P = \text{pitch}$$

$$D = \text{depth} = P \times .6$$

$$R = \text{radius} = \frac{2 \times P}{11}$$

Number	0	1	2	3	4	5	6
Diameter, m/m.	6.0	5.3	4.7	4.1	3.64	3.2	2.8
Pitch (p), m/m.	1.00	0.90	0.81	0.73	0.66	0.59	0.53
Number	7	8	9	10	12	14	16
Diameter, m/m.	2.5	2.2	1.9	1.7	1.3	1.0	.79
Pitch (p), m/m.	0.48	0.43	0.39	0.35	0.28	0.23	0.19

The Acme Standard Thread



The Acme standard thread is an adaptation of the most commonly used style of worm thread and is intended to take the place of the square thread. It is a little shallower than the worm thread, but the same depth as the square thread and much stronger.

The various parts of the Acme standard thread are obtained as follows:

$$\text{Width of point of tool for screw or tap thread} = \frac{.3707}{\text{No. threads per inch}} - .0052$$

$$\text{Width of screw or nut thread} = \frac{.3707}{\text{No. threads per inch}}$$

$$\text{Diameter of tap} = \text{diameter of screw} + .020$$

$$\text{Diameter of tap or screw at root} = \frac{1}{\text{No. threads per inch}} + .020$$

$$\text{Diameter of screw} = \frac{1}{\text{No. threads per inch}} + .020$$

$$\text{Depth of thread} = \frac{1}{2 \times \text{No. threads per inch}} + .010$$

Table of Thread Parts

No. of Threads per inch	Depth of Thread	Width at Top of Thread	Width at Bottom of Thread	Space at Top of Thread	Thickness at Root of Thread
1	.5100	.3707	.3655	.6293	.6345
1 1/2	.3850	.2780	.2728	.4720	.4772
2	.2900	.1853	.1801	.3147	.3199
3	.1767	.1235	.1183	.2098	.2150
4	.1350	.0927	.0875	.1573	.1625
5	.1100	.0741	.0689	.1259	.1311
6	.0933	.0618	.0566	.1049	.1101
7	.0814	.0529	.0478	.0899	.0951
8	.0725	.0463	.0411	.0787	.0839
9	.0655	.0413	.0361	.0697	.0751
10	.0600	.0371	.0319	.0629	.0681

Taps and dies to this standard are made only to order, and prices will be given on application.

Size of Twist Drills for Taps

Drill List for Taps with U. S. Standard Threads

Size of Tap In.	Threads per In.	Size of Drill In.	Size of Tap In.	Threads per In.	Size of Drill In.	Size of Tap In.	Threads per In.	Size of Drill In.
1/4	20	3/8	7/8	9	1 1/2	1 1/4	5	1 3/8
3/8	18	C	1 1/8	8	1 3/4	2	4 1/2	1 1/2
1/2	16	N	1 1/4	7	1 7/8	2 1/4	4 1/2	1 3/4
5/8	14	S	1 1/2	6	2	2 1/2	4 1/2	1 7/8
3/4	13		1 3/4	6	2 1/4	2 3/4	4	2
7/8	12		2	5 1/2	2 1/2	3	4	2 1/4
1	11		2 1/4	5	2 3/4	3 1/4	4	2 1/2
1 1/8	10		2 1/2	5	2 3/4	3 1/2	4	2 3/4

For Machine Screw Taps

Size of Tap	Size of Drill for Outside Diam. of Screw	Size of Drill for Tapping Hole	Size of Tap	Size of Drill for Outside Diam. of Screw	Size of Drill for Tapping Hole	Size of Tap	Size of Drill for Outside Diam. of Screw	Size of Drill for Tapping Hole
2x48	50	9x24	30	17x16	L	8	4	3
2x56	44	9x28	28	17x18				
2x64	48	9x30	28	17x20				
3x40	49	9x32	26	18x16				
3x48	39	10x24	26	18x18				
3x56	45	10x30	24	18x20				
4x32	46	11x24	21	19x16				
4x36	33	11x28	20	19x18				
4x40	43	11x30	19	19x20				
5x30	43	12x20	20	20x16				
5x32	3/4	12x22	19	20x18				
5x36	42	12x24	18	20x20				
5x40	38	13x20	17	22x16				
6x30	38	13x22	15	22x18				
6x32	28	13x24	15	24x14				
6x36	36	14x20	11	24x16				
6x40	35	14x22	10	24x18				
7x28	24	15x18	12	26x14				
7x30	33	15x20	10	26x16				
7x32	32	15x22	8	28x14				
8x24	21	16x16	12	28x16				
8x30	19	31	8	30x14				
8x32	30	16x20	7	30x16				

Drill List for Pipe Taps

Diameter of Tap or Size of Pipe	Diameter of Drill	Diameter of Tap or Size of Pipe	Diameter of Drill
1/4	1 1/4	1 1/4	1 1/4
1/2	1 1/2	1 1/2	1 1/2
3/4	2	2	2
1	2 1/2	2 1/2	2 1/2
1 1/4	3	3	3
1 1/2	3 1/4	3 1/4	3 1/4
1 3/4	3 1/2	3 1/2	3 1/2
2	3 3/4	3 3/4	3 3/4
2 1/4	4	4	4
2 1/2	4 1/4	4 1/4	4 1/4
2 3/4	4 1/2	4 1/2	4 1/2
3	4 3/4	4 3/4	4 3/4
3 1/4	5	5	5
3 1/2	5 1/4	5 1/4	5 1/4
3 3/4	5 1/2	5 1/2	5 1/2
4	5 3/4	5 3/4	5 3/4
4 1/4	6	6	6
4 1/2	6 1/4	6 1/4	6 1/4
4 3/4	6 1/2	6 1/2	6 1/2
5	6 3/4	6 3/4	6 3/4
5 1/4	7	7	7
5 1/2	7 1/4	7 1/4	7 1/4
5 3/4	7 1/2	7 1/2	7 1/2
6	7 3/4	7 3/4	7 3/4
6 1/4	8	8	8
6 1/2	8 1/4	8 1/4	8 1/4
6 3/4	8 1/2	8 1/2	8 1/2
7	8 3/4	8 3/4	8 3/4
7 1/4	9	9	9
7 1/2	9 1/4	9 1/4	9 1/4
7 3/4	9 1/2	9 1/2	9 1/2
8	9 3/4	9 3/4	9 3/4
8 1/4	10	10	10
8 1/2	10 1/4	10 1/4	10 1/4
8 3/4	10 1/2	10 1/2	10 1/2
9	10 3/4	10 3/4	10 3/4
9 1/4	11	11	11
9 1/2	11 1/4	11 1/4	11 1/4
9 3/4	11 1/2	11 1/2	11 1/2
10	11 3/4	11 3/4	11 3/4
10 1/4	12	12	12
10 1/2	12 1/4	12 1/4	12 1/4
10 3/4	12 1/2	12 1/2	12 1/2
11	12 3/4	12 3/4	12 3/4
11 1/4	13	13	13
11 1/2	13 1/4	13 1/4	13 1/4
11 3/4	13 1/2	13 1/2	13 1/2
12	13 3/4	13 3/4	13 3/4
12 1/4	14	14	14
12 1/2	14 1/4	14 1/4	14 1/4
12 3/4	14 1/2	14 1/2	14 1/2
13	14 3/4	14 3/4	14 3/4
13 1/4	15	15	15
13 1/2	15 1/4	15 1/4	15 1/4
13 3/4	15 1/2	15 1/2	15 1/2
14	15 3/4	15 3/4	15 3/4
14 1/4	16	16	16
14 1/2	16 1/4	16 1/4	16 1/4
14 3/4	16 1/2	16 1/2	16 1/2
15	16 3/4	16 3/4	16 3/4
15 1/4	17	17	17
15 1/2	17 1/4	17 1/4	17 1/4
15 3/4	17 1/2	17 1/2	17 1/2
16	17 3/4	17 3/4	17 3/4
16 1/4	18	18	18
16 1/2	18 1/4	18 1/4	18 1/4
16 3/4	18 1/2	18 1/2	18 1/2
17	18 3/4	18 3/4	18 3/4
17 1/4	19	19	19
17 1/2	19 1/4	19 1/4	19 1/4
17 3/4	19 1/2	19 1/2	19 1/2
18	19 3/4	19 3/4	19 3/4
18 1/4	20	20	20
18 1/2	20 1/4	20 1/4	20 1/4
18 3/4	20 1/2	20 1/2	20 1/2
19	20 3/4	20 3/4	20 3/4
19 1/4	21	21	21
19 1/2	21 1/4	21 1/4	21 1/4
19 3/4	21 1/2	21 1/2	21 1/2
20	21 3/4	21 3/4	21 3/4
20 1/4	22	22	22
20 1/2	22 1/4	22 1/4	22 1/4
20 3/4	22 1/2	22 1/2	22 1/2
21	22 3/4	22 3/4	22 3/4
21 1/4	23	23	23
21 1/2	23 1/4	23 1/4	23 1/4
21 3/4	23 1/2	23 1/2	23 1/2
22	23 3/4	23 3/4	23 3/4
22 1/4	24	24	24
22 1/2	24 1/4	24 1/4	24 1/4
22 3/4	24 1/2	24 1/2	24 1/2
23	24 3/4	24 3/4	24 3/4
23 1/4	25	25	25
23 1/2	25 1/4	25 1/4	25 1/4
23 3/4	25 1/2	25 1/2	25 1/2
24	25 3/4	25 3/4	25 3/4
24 1/4	26	26	26
24 1/2	26 1/4	26 1/4	26 1/4
24 3/4	26 1/2	26 1/2	26 1/2
25	26 3/4	26 3/4	26 3/4
25 1/4	27	27	27
25 1/2	27 1/4	27 1/4	27 1/4
25 3/4	27 1/2	27 1/2	27 1/2
26	27 3/4	27 3/4	27 3/4
26 1/4	28	28	28
26 1/2	28 1/4	28 1/4	28 1/4
26 3/4	28 1/2	28 1/2	28 1/2
27	28 3/4	28 3/4	28 3/4
27 1/4	29	29	29
27 1/2	29 1/4	29 1/4	29 1/4
27 3/4	29 1/2	29 1/2	29 1/2
28	29 3/4	29 3/4	29 3/4
28 1/4	30	30	30
28 1/2	30 1/4	30 1/4	30 1/4
28 3/4	30 1/2	30 1/2	30 1/2
29	30 3/4	30 3/4	30 3/4
29 1/4	31	31	31
29 1/2	31 1/4	31 1/4	31 1/4
29 3/4	31 1/2	31 1/2	31 1/2
30	31 3/4	31 3/4	31 3/4
30 1/4	32	32	32
30 1/2	32 1/4	32 1/4	32 1/4
30 3/4	32 1/2	32 1/2	32 1/2
31	32 3/4	32 3/4	32 3/4
31 1/4	33	33	33
31 1/2	33 1/4	33 1/4	33 1/4
31 3/4	33 1/2	33 1/2	33 1/2
32	33 3/4	33 3/4	33 3/4
32 1/4	34	34	34
32 1/2	34 1/4	34 1/4	34 1/4
32 3/4	34 1/2	34 1/2	34 1/2
33	34 3/4	34 3/4	34 3/4
33 1/4	35	35	35
33 1/2	35 1/4	35 1/4	35 1/4
33 3/4	35 1/2	35 1/2	35 1/2
34	35 3/4	35 3/4	35 3/4
34 1/4	36	36	36
34 1/2	36 1/4	36 1/4	36 1/4
34 3/4	36 1/2	36 1/2	36 1/2
35	36 3/4	36 3/4	36 3/4
35 1/4	37	37	37
35 1/2	37 1/4	37 1/4	37 1/4
35 3/4	37 1/2	37 1/2	37 1/2
36	37 3/4	37 3/4	37 3/4
36 1/4	38	38	38
36 1/2	38 1/4	38 1/4	38 1/4
36 3/4	38 1/2	38 1/2	38 1/2
37	38 3/4	38 3/4	38 3/4
37 1/4	39	39	39
37 1/2	39 1/4	39 1/4	39 1/4
37 3/4	39 1/2	39 1/2	39 1/2
38	39 3/4	39 3/4	39 3/4
38 1/4	40	40	40
38 1/2	40 1/4	40 1/4	40 1/4
38 3/4	40 1/2	40 1/2	40 1/2
39	40 3/4	40 3/4	40 3/4
39 1/4	41	41	41
39 1/2	41 1/4	41 1/4	41 1/4
39 3/4	41 1/2	41 1/2	41 1/2
40	41 3/4	41 3/4	41 3/4
40 1/4	42	42	42
40 1/2	42 1/4	42 1/4	42 1/4
40 3/4	42 1/2	42 1/2	42 1/2
41	42 3/4	42 3/4	42 3/4
41 1/4	43	43	43
41 1/2	43 1/4	43 1/4	43 1/4
41 3/4	43 1/2	43 1/2	43 1/2
42	43 3/4	43 3/4	43 3/4
42 1/4	44	44	44
42 1/2	44 1/4	44 1/4	44 1/4
42 3/4	44 1/2	44 1/2	44 1/2
43	44 3/4	44 3/4	44 3/4
43 1/4	45	45	45
43 1/2	45 1/4	45 1/4	45 1/4
43 3/4	45 1/2	45 1/2	45 1/2
44	45 3/4	45 3/4	45 3/4
44 1/4	46	46	46
44 1/2	46 1/4	46 1/4	46 1/4
44 3/4	46 1/2	46 1/2	46 1/2
45	46 3/4	46 3/4	46 3/4
45 1/4	47	47	47
45 1/2	47 1/4	47 1/4	47 1/4
45 3/4	47 1/2	47 1/2	47 1/2
46	47 3/4	47 3/4	47 3/4
46 1/4	48	48	48
46 1/2	48 1/4	48 1/4	48 1/4
46 3/4	48 1/2	48 1/2	48 1/2
47	48 3/4	48 3/4	48 3/4
47 1/4	49	49	49
47 1/2	49 1/4	49 1/4	49 1/4
47 3/4	49 1/2	49 1/2	49 1/2
48	49 3/4	49 3/4	49 3/4
48 1/4	50	50	50
48 1/2	50 1/4	50 1/4	50 1/4
48 3/4	50 1/2	50 1/2	50 1/2
49	50 3/4	50 3/4	50 3/4
49 1/4	51	51	51
49 1/2	51 1/4	51 1/4	51 1/4
49 3/4	51 1/2	51 1/2	51 1/2
50	51 3/4	51 3/4	51 3/4
50 1/4	52	52	52
50 1/2	52 1/4	52 1/4	52 1/4
50 3/4	52 1/2	52 1/2	52 1/2
51	52 3/4	52 3/4	52 3/4
51 1/4	53	53	53
51 1/2	53 1/4	53 1/4	53 1/4
51 3/4	53 1/2	53 1/2	53 1/2
52	53 3/4	53 3/4	53 3/4
52 1/4	54	54	54
52 1/2	54 1/4	54 1/4	54 1/4
52 3/4	54 1/2	54 1/2	54 1/2
53	54 3/4	54 3/4	54 3/4
53 1/4	55	55	55
53 1/2	55 1/4	55 1/4	55 1/4
53 3/4	55 1/2	55 1/2	55 1/2
54	55 3/4	55 3/4	55 3/4
54 1/4	56	56	56
54 1/2	56 1/4	56 1/4	56 1/4
54 3/4	56 1/2	56 1/2	56 1/2
55	56 3/4	56 3/4	56 3/4
55 1/4	57	57	57
55 1/2	57 1/4	57 1/4	57 1/4
55 3/4	57 1/2	57 1/2	57 1/2
56	57 3/4	57 3/4	57 3/4
56 1/4	58	58	58
56 1/2	58 1/4	58 1/4	58 1/4
56 3/4	58 1/2	58 1/2	58 1/2
57	58 3/4	58 3/4	58 3/4
57 1/4	59	59	59
57 1/2	59 1/4	59 1/4	59 1/4
57 3/4	59 1/2	59 1/2	59 1/2
58	59 3/4	59 3/4	59 3/4
58 1/4	60	60	60
58 1/2	60 1/4	60 1/4	60 1/4
58 3/4	60 1/2	60 1/2	60 1/2
59	60 3/4	60 3/4	60 3/4
59 1/4	61	61	61
59 1/2	61 1/4	61 1/4	61 1/4
59 3/4	61 1/2	61 1/2	61 1/2
60	61 3/4	61 3/4	61 3/4
60 1/4	62	62	62
60 1/2	62 1/4	62 1/4	62 1/4
60 3/4	62 1/2	62 1/2	62 1/2
61	62 3/4	62 3/4	62 3/4
61 1/4	63	63	63
61 1/2	63 1/4	63 1/4	63 1/4
61 3/4	63 1/2	63 1/2	63 1/2
62	63 3/4	63 3/4	63 3/4
62 1/4	64	64	64
62 1/2	64 1/4	64 1/4	64 1/4
62 3/4	64 1/2	64 1/2	64 1/2
63	64 3/4	64 3/4	64 3/4
63 1/4	65	65	65
63 1/2	65 1/4	65 1/4	65 1/4
63 3/4	65 1/2	65 1/2	65 1/2
64	65 3/4	65 3/4	65 3/4
64 1/4	66	66	66
64 1/2	66 1/4	66 1/4	66 1/4
64 3/4	66 1/2	66 1/2	66 1/2
65	66 3/4	66 3/4	66 3/4
65 1/4	67	67	67
65 1/2	67 1/4	67 1/4	67 1/4
65 3/4	67 1/2	67 1/2	67 1/2
66	67 3/4	67 3/4	67 3/4
66 1/4	68	68	68
66 1/2	68 1/4	68 1/4	68 1/4
66 3/4	68 1/2	68 1/2	68 1/2
67	68 3/4	68 3/4	68 3/4
67 1/4	69	69	69
67 1/2	69 1/4	69 1/4	69 1/4
67 3/4	69 1/2	69 1/2	69 1/2
68	69 3/4	69 3/4	69 3/4
68 1/4	70	70	70
68 1/2	70 1/4	70 1/4	70 1/4
68 3/4	70 1/2	70 1/2	70 1/2
69	70 3/4	70 3/4	70 3/4
69 1/4	71	71	71
69 1/2	71 1/4	71 1/4	71 1/4
69 3/4	71 1/2	71 1/2	71 1/2
70	71 3/4	71 3/4	71 3/4
70 1/4	72	72	72
70 1/2	72 1/4	72 1/4	72 1/4
70 3/4	72 1/2	72 1/2	72 1/2
71	72 3/4	72 3/	

St. Louis Reversing Tapping Chuck



A strong and simple device for use in drill press or lathe. To operate, feed the drill press down in the ordinary manner until the desired depth is reached. The chuck is reversed by returning the drill press spindle, or chuck may be thrown out of gear when tap reaches required depth by setting stop collar on drill spindle one quarter inch higher than depth of hole when tap is resting on surface of work.

By the use of this machine a man can tap two perfectly true holes in less than three minutes; without it, fifteen minutes' time is necessary. On heavy work a drill may be put in chuck and hole drilled and tapped without moving. Where considerable tapping is done the investment in one of these machines will pay a high rate of interest in saving of labor.

Price includes any size Morse Taper Mandrel and Horton or Skinner Tap Holding Chuck, fitted ready for use.

No. 1. Capacity $\frac{3}{8}$ inch machine taps, $\frac{1}{2}$ inch pipe taps, Morse Taper Arbor No. 1 or No. 2. Price each..... \$30.00

No. 2. Capacity $\frac{1}{2}$ inch machine taps, $\frac{1}{2}$ inch pipe taps, Morse Taper Arbor No. 2, 3 or 4. Price each..... 34.00

No. 3. Capacity $\frac{5}{8}$ inch machine taps, $\frac{3}{4}$ inch pipe taps, Morse Taper Arbor No. 2, 3 or 4. Price each..... 40.00

No. 4. Capacity $\frac{3}{4}$ inch machine taps, $\frac{1}{2}$ inch pipe taps, Morse Taper Arbor No. 3 or 4. Price each..... 48.00

*Sent unless otherwise ordered.

Bench Tapping Machine



These little machines are very convenient tools for any machine shop doing a limited amount of tapping. Made with reverse mitre gears, which are formed from solid bar steel and cut on a gear cutter. Clutch is hardened tool steel and bearings are babbitted. Base is provided with 4 holes for bolting or screwing down machine to bench.

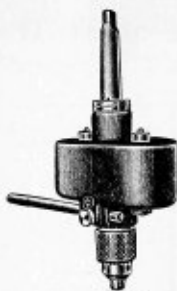
No. 11. Capacity 0 to $\frac{1}{4}$ inch. Tight and loose pulleys $3\frac{3}{4} \times 1\frac{1}{2}$ inch face for 1 inch belt. Width over all, 11 inches. Base $5\frac{1}{4}$ inches in diameter. Height over all, $8\frac{3}{4}$ inches. Weight 10 pounds. Price each..... \$12.00

No. 12. Capacity 0 to $\frac{3}{8}$ inch. Single pulley for use with countershaft $8 \times 1\frac{3}{4}$ inch face. Width over all 14 inches. Diameter of base, 7 inches. Height over all 13 inches. Weight about 20 pounds. Price each..... 18.00

Drill Speeder

or

High Speed Drilling Attachment



These machines increase the speed of small drills while being used in the larger class of drill presses—say from twenty inch to largest radial.

All sizes increase the speed three times. No. 2-L has a sensitive feed lever giving rack traverse of $1\frac{1}{4}$ inch, and is intended for rather light drilling such as Template making. Tool-maker's use, dowel pins, oil holes, etc. All others are operated by the feed mechanism of the main machine.

Dimensions and Prices

- No. 2.** With chuck for drills up to $\frac{1}{2}$ inch; Shank No. 2 Morse, length without shank and chuck $5\frac{1}{2}$ inches. Net, 8 pounds. Boxed, 14 pounds..... \$50.00
- No. 3.** With chuck for drills up to $\frac{3}{8}$ inch; shank No. 3 Morse, length without shank and chuck 6 inches. Net, 14 pounds. Boxed, 21 pounds..... 55.00
- No. 3B.** With No. 1 Morse hole in spindle instead of chuck; shank No. 3 Morse, length without shank and spindle taper, 6 inches. Net, 14 pounds. Boxed, 21 pounds..... 55.00
- No. 4.** With chuck for drills up to $\frac{1}{2}$ inch; shank No. 4 Morse, length without shank and chuck, $6\frac{3}{4}$ inches. Net, 19 pounds. Boxed, 28 pounds..... 80.00
- No. 4B.** With No. 2 Morse hole in spindle instead of chuck; shank No. 4 Morse, length without shank and spindle taper, $6\frac{3}{4}$ inches. Net, 17 pounds. Boxed, 26 pounds..... 66.00
- No. 2L.** With chuck for drills up to $\frac{1}{2}$ inch; shank No. 3 Morse, length without shank and chuck, $5\frac{1}{4}$ inches. Net, 14 pounds. Boxed, 21 pounds. (See page 2 in Circulars)..... 66.00

Without the use of sleeves Nos. 2, 2L, 3 and 3B cannot have over No. 3 Morse taper shank. Nos. 4 and 4B cannot have over No. 4 Morse taper shank.

St. Louis Tapping Machine No. 14



This machine is so constructed that the operator has every facility for handling work rapidly, and the number of holes that may be tapped is limited only by the speed of the operator.

The work is brought up to the tap by the foot treadle, leaving both hands free to handle and hold the work firmly. It is unnecessary to reach up to a handle at every operation.

The platen stem works in a long sleeve, and the work comes up to the tap true, insuring straight holes and avoids breaking taps.

All gears are made of steel. Cone pulleys are turned inside and out.

Height, inches..... 60

Height to Platen, inches..... 44

Distance from Platen to spindle, inches..... 10

Distance from column, to center of spindle, inches..... $5\frac{1}{4}$

Size of tight and loose pulleys..... $4 \times 1\frac{1}{4}$ in.

Both cone pulleys..... 6 and $4\frac{3}{4} \times 1\frac{1}{4}$ in.

Speed recommended by tap manufacturers (many run them faster)..... 300 to 600

Capacity $\frac{3}{8}$ inch machine taps

$\frac{1}{2}$ inch pipe taps.

Weight..... 120 lbs.

Price..... \$80.00

Price with tap holding chuck..... 92.80



5/8 Inch



1/2 Inch

Adjustable Round Split Dies

Used in hand stocks and also extensively in automatic screw machines. Our dies are ground accurately on the outside and therefore the periphery is in perfect alignment with the cutting edges. We especially recommend them for manufacturing purposes. Stocks holding these dies are shown on another page. All orders filled with U. S. Standard thread unless otherwise specified. V. S. A. E. or Whitworth threads also furnished in fractional sizes. Left-hand threads and threads not listed are special.



1 Inch

Machine Screw Sizes

Fractional Sizes

Cutting Size	Regular Machine Screw Sizes	A.S.M.E. Standard	Also Furnished	Price Each			Cutting Size, Inches	V Standard	U. S. Standard	Also Furnished	Price Each		
				5/8 Inch	3/4 Inch	1 Inch					5/8 Inch	3/4 Inch	1 Inch
0		80		\$0.80	\$0.90		1/16		64	72	\$0.80	\$0.90	
1		72	64	.80	.90		3/64		60	72	.70	.80	
2	56	64		.70	.80		3/32		50	56	.60	.70	
3	48	56		.60	.70		1/8		48	56	.50	.60	
4	36	48	40	.50	.60		5/64		40	32	.40	.50	\$0.75
5		44	36, 40	.40	.50		3/32		40		.40	.50	.75
6	32	40	36	.40	.50	\$0.75	1/4		36		.40	.50	.75
7		36	30	.40	.50	.75	5/16		32		.40	.50	.75
8	32	36	30	.40	.50	.75	3/8	24	24	30, 32	.40	.50	.75
9		32	24, 30	.40	.50	.75	7/16		24		.40	.50	.75
10	24, 32	30		.40	.50	.75	1/2	24	24	32	.40	.50	.75
12	24	28		.40	.50	.75	5/8		24		.40	.50	.75
14	20	24		.40	.50	.75	3/4	20	20, 24	24, 27, 32	.40	.50	.75
16	18	22	20		.50	.75	7/8	18	18, 20	20, 27, 32		.50	.75
18	18	20			.50	.75		16	16, 20	20, 27, 32			.75
20	16, 18	20			.50	.75		14	14, 20	24, 27			.75
22		18	16			.75							
24	16	16	18			.75							
26		16	14			.75							
28		14	16			.75							
30		14	16			.75							

Sizes in circles are S. A. E. standard.

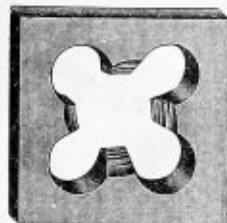


Round Split Dies

These dies are furnished as regular in all sizes and threads under which hand taps are shown, which will be found on another page.

All orders will be filled with U. S. Standard thread unless otherwise specified. V form, S. A. E. or Whitworth form of thread furnished at regular prices. Left-hand threads are special.

Cutting Size, Inches	Outside Diameter of Die, Inches, Price Each							
	1 1/2	1 1/2	1 3/4	1 3/4	2	2 1/4	2 1/2	3
1/4	\$1.00	\$1.00	\$1.25	\$1.25	\$1.25	\$1.50		
5/16	1.00	1.00	1.25	1.25	1.25	1.50		
3/8	1.00	1.00	1.25	1.25	1.25	1.50		
7/16	1.00	1.00	1.25	1.25	1.25	1.50		
1/2	1.00	1.00	1.25	1.25	1.25	1.50		
5/8		1.00	1.25	1.25	1.25	1.50	\$1.50	
3/4		1.00	1.25	1.50	1.50	1.75	1.75	
7/8			1.25	1.50	1.50	1.75	1.75	
1				1.75	1.75	2.00	2.00	
1 1/8				1.75	2.00	2.25	2.25	
1 1/4					2.00	2.25	2.25	\$5.00
1 3/8						2.50	2.50	5.00
1 1/2						2.50	2.50	5.00



Solid bolt dies are furnished in U. S. Standard and V form of thread. All orders filled with U. S. Standard unless otherwise specified. These dies are used principally in lathes and bolt machines and for general repair work. All sizes from $\frac{1}{4}$ inch to $1\frac{3}{8}$ inch, $2\frac{1}{8}$ inches square will fit the No. 1 Channon Pipe Stock.

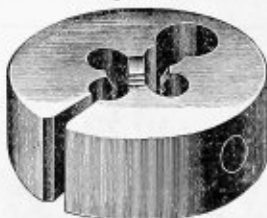
Standard Cutting Size	Price Each	Number of Threads to Inch		Dimensions		Standard Cutting Size	Price Each	Number of Threads to Inch		Dimensions	
		United States Standard	V Standard	Size of Square	Thick- ness			United States Standard	V Standard	Size of Square	Thick- ness
$\frac{1}{4}$	\$1.80	20	20	$2\frac{1}{2}$	$\frac{1}{2}$	$\frac{5}{8}$	\$2.55	9	9	$2\frac{1}{2}$	$\frac{3}{4}$
$\frac{3}{8}$	1.80	18	18	$2\frac{1}{2}$	$\frac{1}{2}$	1	2.70	8	8	$2\frac{1}{2}$	1
$\frac{1}{2}$	1.80	16	16	$2\frac{1}{2}$	$\frac{1}{2}$	$1\frac{1}{8}$	3.00	7	7	$2\frac{1}{2}$	1
$\frac{5}{8}$	1.80	14	14	$2\frac{1}{2}$	$\frac{1}{2}$	$1\frac{1}{4}$	3.30	7	7	$2\frac{1}{2}$	1
$\frac{3}{4}$	1.80	13	12	$2\frac{1}{2}$	$\frac{1}{2}$	$1\frac{3}{8}$	3.60	6	6	$2\frac{1}{2}$	1
$\frac{7}{8}$	1.90	12	12	$2\frac{1}{2}$	$\frac{1}{2}$	$1\frac{1}{2}$	3.90	6	6	3	1
1	2.00	11	11	$2\frac{1}{2}$	$\frac{1}{2}$	$1\frac{5}{8}$	4.20	5 $\frac{1}{2}$	3	1
$1\frac{1}{8}$	2.15	11	11	$2\frac{1}{2}$	$\frac{1}{2}$	$1\frac{3}{4}$	5.40	5	3	$1\frac{1}{4}$
$1\frac{1}{4}$	2.25	10	10	$2\frac{1}{2}$	$\frac{1}{2}$	$1\frac{7}{8}$	6.50	5	3 $\frac{1}{2}$	$1\frac{1}{2}$
$1\frac{1}{2}$	2.30	10	10	$2\frac{1}{2}$	$\frac{1}{2}$	2	7.50	4 $\frac{1}{2}$	3 $\frac{3}{4}$	2
$1\frac{3}{4}$	2.40	9	9	$2\frac{1}{2}$	$\frac{1}{2}$						

Approximate weights: $\frac{1}{4}$ lb., $\frac{3}{8}$ lb.; $\frac{3}{8}$ in., $\frac{3}{8}$ lb.; $\frac{1}{2}$ in., $1\frac{1}{4}$ lb.; $\frac{5}{8}$ in., $1\frac{1}{4}$ lb.; $\frac{3}{4}$ in., $1\frac{1}{2}$ lb.; $\frac{7}{8}$ in., 1 lb.; 1 in., $1\frac{3}{4}$ lb.; $1\frac{1}{2}$ in., $1\frac{1}{2}$ lb.; $1\frac{3}{4}$ in., 1 lb.; $1\frac{1}{2}$ in., $1\frac{1}{2}$ lb.; $1\frac{1}{2}$ in., $1\frac{3}{4}$ lb.; $1\frac{3}{4}$ in., $1\frac{1}{2}$ lb.; $1\frac{3}{4}$ in., $2\frac{1}{2}$ lb.; 1 $\frac{1}{2}$ in., $3\frac{1}{4}$ lb.; 2 in., 5 lb.

These dies are regularly furnished in Briggs standard right-hand thread. The diameter of thread at small end is such that the Briggs standard plug gauge will screw flush with face of the die.

Round Adjustable Pipe Dies

Cutting Size, Inches	Thread	1 Inch Diam.	1½ Inch Diam.	1¾ Inch Diam.	1¾ Inch Diam.	2 Inch Diam.	2¼ Inch Diam.	2½ Inch Diam.
		¾ Inch Thick	¾ Inch Thick	¾ Inch Thick	¾ Inch Thick	¾ Inch Thick	¾ Inch Thick	¾ Inch Thick
1½	27	\$0.75	\$1.00	\$1.00	\$1.25	\$1.25	\$1.50	\$1.50
1½	18	1.00	1.00	1.25	1.50	1.75	1.75	1.75
1½	18	1.00	1.00	1.25	1.75	2.00	2.00	2.00
1½	14			1.25	2.00	2.25	2.25	2.25
1½	14					2.50	2.50	2.50
1	11½					2.50	2.50	2.50
Weight each		1½ Oz.	2 Oz.	3½ Oz.	4 Oz.	6 Oz.	10 Oz.	12 Oz.



Used principally for repair work and for dressing over bruised or rusty threads and will fill no more space than a hexagon nut. Not recommended for cutting a new thread. Accurate and durable, and can be used with bit-brace sockets, ratchets, or wrenches. U. S. Standard threads recommended and furnished unless otherwise ordered. V or S. A. E. threads also furnished.

Size	Price Each	Threads per Inch			Size of Die	
		U. S. Std.	S. A. E. Std.	V	Across Flats	Thickness
$\frac{1}{16}$	\$0.65	20	28	20	$\frac{3}{16}$	$\frac{1}{8}$
$\frac{1}{8}$	.65	18	24	18	$\frac{1}{4}$	$\frac{3}{8}$
$\frac{3}{16}$	.70	16	24	16	$\frac{3}{8}$	$\frac{1}{2}$
$\frac{1}{2}$	.75	14	20	14	$\frac{1}{2}$	$\frac{3}{4}$
$\frac{5}{8}$	.80	13	20	12	$\frac{5}{8}$	$\frac{7}{8}$
$\frac{3}{4}$	.85	12	18	12	$1\frac{1}{8}$	$1\frac{1}{2}$
$\frac{7}{8}$	.90	11	18	11	$1\frac{1}{4}$	$1\frac{3}{4}$
$1\frac{1}{8}$	.95	11	16	11	$1\frac{3}{8}$	$1\frac{7}{8}$
$1\frac{1}{4}$	1.00	10	16	10	$1\frac{1}{2}$	$2\frac{1}{8}$
$1\frac{3}{8}$	1.10	9	14	9	$1\frac{5}{8}$	$2\frac{1}{4}$
$1\frac{1}{2}$	1.20	8	14	8	$1\frac{3}{4}$	$2\frac{1}{2}$
$1\frac{3}{4}$	1.40	7	12	7	2	3
2	1.60	7	12	7	$2\frac{1}{8}$	$3\frac{1}{2}$
$2\frac{1}{4}$	1.80	6	12	6	$2\frac{3}{8}$	4
$2\frac{1}{2}$	2.00	6	12	6	$2\frac{1}{2}$	$4\frac{1}{2}$

No. 225. Spring Screw Threading Dies

No. 225A. Clamp Collars



These dies are adjustable by means of a clamp collar which is not furnished unless so ordered.

U. S. Standard form of thread furnished unless otherwise specified.

Sizes, lengths and threads not listed are subject to special discount. Left hand dies are specials.



Machine Screw Sizes

Sizes and Prices

Screw Gauge No.	Outside Diam., Inches	Length Over All, Inches	Price Each		Threads per Inch		Screw Gauge No.	Outside Diam., Inches	Length Over All, Inches	Price Each		Threads per Inch	
			Die	Clamp Collar	Old Style	A. S. M. E. Standard				Die	Clamp Collar	Old Style	A. S. M. E. Standard
2	1/2	1 1/4	\$1.50	\$0.50	56	64	8	1/2	1 1/4	\$1.50	\$0.50	32	36
3	1/2	1 1/4	1.50	.50	48	56	8	3/4	1 3/4	1.75	.60	32	36
4	1/2	1 1/4	1.50	.50	36	48	10	3/4	1 3/4	1.75	.60	24	30
5	1/2	1 1/4	1.50	.50	36	44	12	3/4	1 3/4	1.75	.60	24	28
6	1/2	1 1/4	1.50	.50	32	40	14	3/4	1 3/4	1.75	.60	20	24

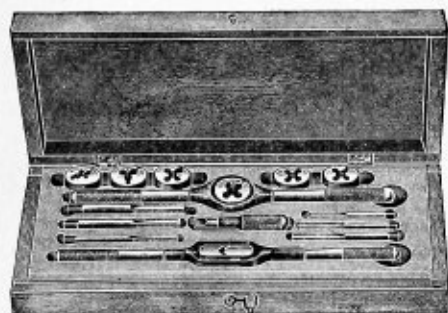
Spring Screw-Threading Dies

Fractional Sizes

Sizes and Prices

Cutting Size, In.	Outside Dia., In.	Length Over All, Inches	Price Each		No. of Threads to Inch				Cutting Size, In.	Outside Dia., In.	Length Over All, Inches	Price Each		No. of Threads to Inch			
			Die	Clamp Collar	U. S. Std.	S. A. E. Std.	Whit. Std.	"V" Form				Die	Clamp Collar	U. S. Std.	S. A. E. Std.	Whit. Std.	"V" Form
1/8	1/8	1 1/4	\$1.50	\$0.50	40	..	40	..	1/8	1/8	2 1/4	\$2.40	\$1.00	13	20	12	12
1/8	1/8	1 1/4	1.50	.50	24	..	24	24	1/8	1/8	2 1/4	2.40	1.00	12	18	12	12
1/8	1/8	1 1/4	1.50	.50	20	28	20	20	1/8	1/8	2 1/4	2.40	1.00	11	18	11	11
1/8	1/8	1 1/4	1.75	.60	20	28	20	20	1/8	1/8	2 1/4	2.40	1.00	10	16	10	10
1/8	1/8	1 1/4	1.75	.60	18	24	18	18	1/8	1/8	2 1/4	2.75	1.00	11	18	11	11
1/8	1/8	1 1/4	1.75	.60	16	24	16	16	1/8	1/8	2 1/4	2.75	1.00	10	16	10	10
1/8	1/8	1 1/4	2.00	.70	18	24	18	18	1/8	1/8	2 1/4	2.75	1.00	9	14, 18	9	9
1/8	1/8	1 1/4	2.00	.70	16	24	16	16	1/8	1/8	2 1/4	2.75	1.00	8	14	8	8
1/8	1/8	1 1/4	2.00	.70	14	20	14	14	1/8	1/8	2 1/4	3.50	1.25	10	16	10	10
1/8	1/8	1 1/4	2.00	.70	13	20	12	12	1/8	1/8	2 1/4	3.50	1.25	9	14, 18	9	9
1/8	1/8	2 1/4	2.00	.80	11	18	11	11	1/8	1/8	2 1/4	3.50	1.25	8	14	8	8
1/8	1/8	2 1/4	2.00	.80	11	16	11	11	1/8	1/8	2 1/4	3.50	1.25	7	12	7	7
1/8	1/8	2 1/4	2.00	.80	10	16	10	10	1/8	1/8	2 1/4	3.50	1.25	7	12	7	7
1/8	1/8	2 1/4	2.00	.80	16	24	16	16	1/8	1/8	2 1/4	6.00	2.00	8	14	8	8
1/8	1/8	2 1/4	2.00	.80	14	20	14	14	1/8	1/8	2 1/4	6.00	2.00	7	12	7	7
1/8	1/8	2 1/4	2.00	.80	13	20	12	12	1/8	1/8	2 1/4	6.00	2.00	7	12	7	7
1/8	1/8	2 1/4	2.00	.80	12	18	12	12	1/8	1/8	2 1/4	6.00	2.00	6	12	6	6
1/8	1/8	2 1/4	2.00	.80	11	18	11	11	1/8	1/8	2 1/4	6.00	2.00	6	12	6	6
1/8	1/8	2 1/4	2.00	.80	10	16	10	10	1/8	1/8	2 1/4	6.00	2.00	6	12	6	6

Screw Plates—Bay State Make



Regular Machine Screw and Small Fractional Sizes

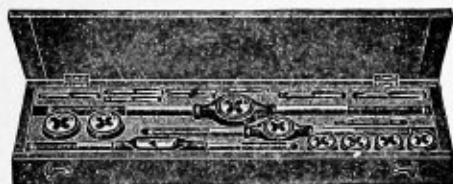
These sets are very popular for threading small precision work. The dies furnished are of the round adjustable type which can be adjusted for over or undersize thread cutting. Screw plates containing dies $\frac{1}{8}$ -inch diameter are furnished without guides. Those containing dies $\frac{1}{4}$ to 1-inch diameter are furnished with and without guides as indicated in the list below. When guide is used, it is only necessary to drop it into the stock. The die holds it in place and in perfect alignment. Tap wrenches are included only where designated by a number in the list below. A screw driver is included with each set. The entire set is packed in a handsome hardwood box with separate compartments for each item.

If desired, we can substitute any regularly listed sizes or pitches in place of those regularly furnished with the set.

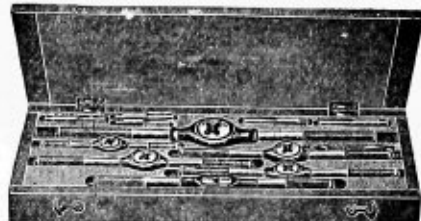
No.	Price per Set	Cutting Sizes	Diam. Dies, Inches	Diam. Guides, Inches	Length of Stocks, Inches	No. of Tap Wrench	Approx. Weight, Pounds
25A	\$ 4.40	4-36, 6-32, 8-32, 10-24, 12-24, 14-20	$\frac{1}{8}$		5		
26A	4.90	4-36, 6-32, 8-32, 10-24, 12-24, 14-20	$\frac{1}{8}$		5	10	$\frac{1}{2}$
25D	5.75	2-56, 3-48, 4-36, 6-32, 8-32, 10-24, 12-24, 14-20	$\frac{1}{8}$		5		
26D	6.20	2-56, 3-48, 4-36, 6-32, 8-32, 10-24, 12-24, 14-20	$\frac{1}{8}$		5	10	1
37H	5.35	4-36, 6-32, 8-32, 10-24, 12-24, 14-20	$\frac{3}{16}$		7		
38H	6.25	4-36, 6-32, 8-32, 10-24, 12-24, 14-20	$\frac{3}{16}$		7	10	
39H	7.50	4-36, 6-32, 8-32, 10-24, 12-24, 14-20	$\frac{3}{16}$	$\frac{3}{16}$	7		
40H	8.50	4-36, 6-32, 8-32, 10-24, 12-24, 14-20	$\frac{3}{16}$	$\frac{3}{16}$	7	10	$1\frac{1}{4}$
37E	6.50	4-36, 6-32, 8-32, 10-24, 12-24, 14-20, 16-18, 18-18	$\frac{3}{16}$		7		
38E	7.25	4-36, 6-32, 8-32, 10-24, 12-24, 14-20, 16-18, 18-18	$\frac{3}{16}$		7	10	
39E	9.00	4-36, 6-32, 8-32, 10-24, 12-24, 14-20, 16-18, 18-18	$\frac{3}{16}$	$\frac{3}{16}$	7		
40E	10.00	4-36, 6-32, 8-32, 10-24, 12-24, 14-20, 16-18, 18-18	$\frac{3}{16}$	$\frac{3}{16}$	7	10	$1\frac{1}{8}$
37A	8.25	$\frac{1}{8}$ -56, $\frac{1}{4}$ -40, $\frac{3}{8}$ -32, $\frac{1}{2}$ -24, $\frac{5}{8}$ -24, $\frac{3}{4}$ -24, $\frac{7}{8}$ -24, $\frac{1}{2}$ -24, $\frac{1}{4}$ -20	$\frac{3}{16}$		7		
38A	9.25	$\frac{1}{8}$ -56, $\frac{1}{4}$ -40, $\frac{3}{8}$ -32, $\frac{1}{2}$ -24, $\frac{5}{8}$ -24, $\frac{3}{4}$ -24, $\frac{7}{8}$ -24, $\frac{1}{2}$ -24, $\frac{1}{4}$ -20	$\frac{3}{16}$		7	10	
39A	10.25	$\frac{1}{8}$ -56, $\frac{1}{4}$ -40, $\frac{3}{8}$ -32, $\frac{1}{2}$ -24, $\frac{5}{8}$ -24, $\frac{3}{4}$ -24, $\frac{7}{8}$ -24, $\frac{1}{2}$ -24, $\frac{1}{4}$ -20	$\frac{3}{16}$	$\frac{3}{16}$	7		
40A	11.25	$\frac{1}{8}$ -56, $\frac{1}{4}$ -40, $\frac{3}{8}$ -32, $\frac{1}{2}$ -24, $\frac{5}{8}$ -24, $\frac{3}{4}$ -24, $\frac{7}{8}$ -24, $\frac{1}{2}$ -24, $\frac{1}{4}$ -20	$\frac{3}{16}$	$\frac{3}{16}$	7	10	$1\frac{1}{8}$
47G	10.00	6-32, 8-32, 10-24, 12-24, 14-20, 16-18, 18-18, 20-16, 24-16	1		$10\frac{1}{2}$		
48G	11.25	6-32, 8-32, 10-24, 12-24, 14-20, 16-18, 18-18, 20-16, 24-16	1		$10\frac{1}{2}$	15	
49G	12.80	6-32, 8-32, 10-24, 12-24, 14-20, 16-18, 18-18, 20-16, 24-16	1	1	$10\frac{1}{2}$		
50G	14.05	6-32, 8-32, 10-24, 12-24, 14-20, 16-18, 18-18, 20-16, 24-16	1	1	$10\frac{1}{2}$	15	2
47H	6.75	12-24, 14-20, 16-18, 18-18, 20-16, 24-16	1		$10\frac{1}{2}$		
48H	8.00	12-24, 14-20, 16-18, 18-18, 20-16, 24-16	1		$10\frac{1}{2}$	15	
49H	8.25	12-24, 14-20, 16-18, 18-18, 20-16, 24-16	1	1	$10\frac{1}{2}$		
50H	9.50	12-24, 14-20, 16-18, 18-18, 20-16, 24-16	1	1	$10\frac{1}{2}$	15	$2\frac{1}{8}$
47B	8.75	$\frac{1}{8}$ -40, $\frac{3}{8}$ -32, $\frac{1}{2}$ -24, $\frac{5}{8}$ -24, $\frac{3}{4}$ -20, $\frac{7}{8}$ -18, $\frac{1}{2}$ -16	1		$10\frac{1}{2}$		
48B	10.00	$\frac{1}{8}$ -40, $\frac{3}{8}$ -32, $\frac{1}{2}$ -24, $\frac{5}{8}$ -24, $\frac{3}{4}$ -20, $\frac{7}{8}$ -18, $\frac{1}{2}$ -16	1		$10\frac{1}{2}$	15	
49B	10.50	$\frac{1}{8}$ -40, $\frac{3}{8}$ -32, $\frac{1}{2}$ -24, $\frac{5}{8}$ -24, $\frac{3}{4}$ -20, $\frac{7}{8}$ -18, $\frac{1}{2}$ -16	1	1	$10\frac{1}{2}$		
50B	11.75	$\frac{1}{8}$ -40, $\frac{3}{8}$ -32, $\frac{1}{2}$ -24, $\frac{5}{8}$ -24, $\frac{3}{4}$ -20, $\frac{7}{8}$ -18, $\frac{1}{2}$ -16	1	1	$10\frac{1}{2}$	15	$1\frac{1}{4}$
47C	6.75	$\frac{1}{8}$ -40, $\frac{3}{8}$ -24, $\frac{1}{2}$ -20, $\frac{5}{8}$ -18, $\frac{3}{4}$ -16, $\frac{7}{8}$ -14	1		$10\frac{1}{2}$		
48C	8.00	$\frac{1}{8}$ -40, $\frac{3}{8}$ -24, $\frac{1}{2}$ -20, $\frac{5}{8}$ -18, $\frac{3}{4}$ -16, $\frac{7}{8}$ -14	1		$10\frac{1}{2}$	15	
49C	8.25	$\frac{1}{8}$ -40, $\frac{3}{8}$ -24, $\frac{1}{2}$ -20, $\frac{5}{8}$ -18, $\frac{3}{4}$ -16, $\frac{7}{8}$ -14	1	1	$10\frac{1}{2}$		
50C	9.50	$\frac{1}{8}$ -40, $\frac{3}{8}$ -24, $\frac{1}{2}$ -20, $\frac{5}{8}$ -18, $\frac{3}{4}$ -16, $\frac{7}{8}$ -14	1	1	$10\frac{1}{2}$	15	2
47E	5.75	$\frac{1}{8}$ -24, $\frac{1}{4}$ -20, $\frac{3}{8}$ -18, $\frac{1}{2}$ -16, $\frac{5}{8}$ -14	1		$10\frac{1}{2}$		
48E	7.00	$\frac{1}{8}$ -24, $\frac{1}{4}$ -20, $\frac{3}{8}$ -18, $\frac{1}{2}$ -16, $\frac{5}{8}$ -14	1		$10\frac{1}{2}$	15	
49E	6.75	$\frac{1}{8}$ -24, $\frac{1}{4}$ -20, $\frac{3}{8}$ -18, $\frac{1}{2}$ -16, $\frac{5}{8}$ -14	1		$10\frac{1}{2}$		
50E	8.00	$\frac{1}{8}$ -24, $\frac{1}{4}$ -20, $\frac{3}{8}$ -18, $\frac{1}{2}$ -16, $\frac{5}{8}$ -14	1	1	$10\frac{1}{2}$	15	

Screw Plates—(Continued) Bay State

Regular Sets



Full Mounted Sets



Screw plates listed below are for cutting fractional sizes only, from $\frac{1}{8}$ to $1\frac{1}{2}$ inches, and furnished with U. S. standard form of thread unless otherwise ordered. "V" or S. A. E. standard form furnished at same price when so ordered. Sets contain dies in collets with guides, taps and adjustable tap wrenches.

These plates will finish the work at one cut, making screws equal to lathe work, without raising burrs above the true size. Nuts and bolts threaded with them need not be matched; they always correspond. Dies are adjustable for wear, under and over size cutting, by means of the screws in the collets, one of which engages the slot in the die, and having a cone point, adjusts the cutting size by forcing the sides of the die apart or allowing them to come together as the screw is moved in or out. The other screws hold the die solidly in place. The guide being a part of the collet, and the dies being always adjusted to the proper size in the collet, it is only necessary to drop the entire unit into the stock when it is desired to change the size. One handle of stock is threaded and screws into a slot in the collet holding it rigidly in place.

Specify Size and Style of Thread

Set Nos.	Price per Set	Cutting Sizes	Diameter of Dies	Diameter of Collets	Length of Stocks	No. of Tap Wrench	Weight, Pounds
60A	\$12.00	$\frac{1}{8}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{5}{8}$, $\frac{3}{4}$, 1 , $1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$	16	15	9
70A	19.00	$\frac{1}{8}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{5}{8}$, $\frac{3}{4}$, 1 , $1\frac{1}{2}$	$1\frac{1}{2}$, $1\frac{3}{4}$	$1\frac{3}{4}$, $2\frac{1}{4}$	16, 23	16	20
70B	18.50	$\frac{1}{8}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{5}{8}$, $\frac{3}{4}$, 1 , $1\frac{1}{2}$	$1\frac{3}{4}$	$2\frac{1}{4}$	23	16	22
70C	16.50	$\frac{1}{8}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{5}{8}$, $\frac{3}{4}$, 1 , $1\frac{1}{2}$	$1\frac{1}{2}$, $1\frac{3}{4}$	$1\frac{3}{4}$, $2\frac{1}{4}$	16, 23	16	20
70D	16.00	$\frac{1}{8}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{5}{8}$, $\frac{3}{4}$, 1 , $1\frac{1}{2}$	$1\frac{3}{4}$	$2\frac{1}{4}$	23	16	19
70E	14.00	$\frac{1}{8}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{5}{8}$, $\frac{3}{4}$, 1 , $1\frac{1}{2}$	$1\frac{1}{2}$, $1\frac{3}{4}$	$1\frac{3}{4}$, $2\frac{1}{4}$	16, 23	16	16
70F	13.50	$\frac{1}{8}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{5}{8}$, $\frac{3}{4}$, 1 , $1\frac{1}{2}$	$1\frac{3}{4}$	$2\frac{1}{4}$	23	16	19
80A	28.50	$\frac{1}{8}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{5}{8}$, $\frac{3}{4}$, 1 , $1\frac{1}{2}$	$1\frac{1}{2}$, $2\frac{1}{2}$	$1\frac{3}{4}$, $2\frac{3}{4}$	16, 29	15, 17	35
80C	26.00	$\frac{1}{8}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{5}{8}$, $\frac{3}{4}$, 1 , $1\frac{1}{2}$	$1\frac{1}{2}$, $2\frac{1}{2}$	$1\frac{3}{4}$, $2\frac{3}{4}$	16, 29	15, 17	35
80E	22.50	$\frac{1}{8}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{5}{8}$, $\frac{3}{4}$, 1 , $1\frac{1}{2}$	$1\frac{1}{2}$, $2\frac{1}{2}$	$1\frac{3}{4}$, $2\frac{3}{4}$	16, 29	17	30
80G	17.50	$\frac{1}{8}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{5}{8}$, $\frac{3}{4}$, 1 , $1\frac{1}{2}$	$2\frac{1}{2}$	$2\frac{3}{4}$	29	17	28
80H	16.00	$\frac{1}{8}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{5}{8}$, $\frac{3}{4}$, 1 , $1\frac{1}{2}$	$2\frac{1}{2}$	$2\frac{3}{4}$	29	17	28
90A	60.00	$\frac{1}{8}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{5}{8}$, $\frac{3}{4}$, 1 , $1\frac{1}{2}$, $1\frac{3}{4}$, $1\frac{1}{2}$	$1\frac{1}{2}$, $2\frac{1}{2}$, 3	$1\frac{3}{4}$, $2\frac{3}{4}$, $3\frac{1}{4}$	16, 29, 40	16, 18	85
90B	40.00	$\frac{1}{8}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{5}{8}$, $\frac{3}{4}$, 1 , $1\frac{1}{2}$, $1\frac{3}{4}$	$1\frac{1}{2}$, $2\frac{1}{2}$, 3	$1\frac{3}{4}$, $2\frac{3}{4}$, $3\frac{1}{4}$	16, 29, 40	15, $17\frac{1}{2}$	75
90C	45.00	$\frac{1}{8}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{5}{8}$, $\frac{3}{4}$, 1 , $1\frac{1}{2}$, $1\frac{3}{4}$	3	$3\frac{1}{4}$	40	18	60
90D	35.00	$\frac{1}{8}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{5}{8}$, $\frac{3}{4}$, 1 , $1\frac{1}{2}$, $1\frac{3}{4}$	$2\frac{1}{2}$, 3	$2\frac{3}{4}$, $3\frac{1}{4}$	29, 40	$17\frac{1}{2}$	50
90E	38.00	$\frac{1}{8}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{5}{8}$, $\frac{3}{4}$, 1 , $1\frac{1}{2}$, $1\frac{3}{4}$	$2\frac{1}{2}$, 3	$2\frac{3}{4}$, $3\frac{1}{4}$	29, 40	18	55
90F	37.00	$\frac{1}{8}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{5}{8}$, $\frac{3}{4}$, 1 , $1\frac{1}{2}$, $1\frac{3}{4}$	3	$3\frac{1}{4}$	40	18	40

Screw drivers to fit adjusting screws in dies furnished with each of the above sets.

Full Mounted Screw Plates

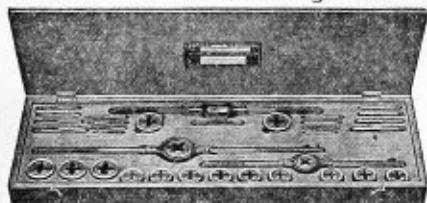
Sets Containing Stock, Guide and Die for Each Size, and Adjustable Tap Wrenches

These sets are the same quality and will do the same high class work as the regular sets described above. One stock is furnished with each die, so that it is never necessary to change the size of the die in the stock, but each size is always ready for instant use.

Set Nos.	Price per Set	Cutting Sizes	No. of Tap Wrench	Weight, Pounds
71A	\$20.50	$\frac{1}{8}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{5}{8}$, $\frac{3}{4}$, 1 , $1\frac{1}{2}$	16	24
71C	18.00	$\frac{1}{8}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{5}{8}$, $\frac{3}{4}$, 1 , $1\frac{1}{2}$	16	21
71E	15.50	$\frac{1}{8}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{5}{8}$, $\frac{3}{4}$, 1 , $1\frac{1}{2}$	16	18
81A	32.00	$\frac{1}{8}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{5}{8}$, $\frac{3}{4}$, 1 , $1\frac{1}{2}$, $1\frac{3}{4}$	15, 17	42
81C	29.50	$\frac{1}{8}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{5}{8}$, $\frac{3}{4}$, 1 , $1\frac{1}{2}$, $1\frac{3}{4}$	15, 17	38
81G	19.50	$\frac{1}{8}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{5}{8}$, $\frac{3}{4}$, 1 , $1\frac{1}{2}$, $1\frac{3}{4}$	17	38
91A	67.00	$\frac{1}{8}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{5}{8}$, $\frac{3}{4}$, 1 , $1\frac{1}{2}$, $1\frac{3}{4}$, $1\frac{1}{2}$	16, 18	50
91B	47.00	$\frac{1}{8}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{5}{8}$, $\frac{3}{4}$, 1 , $1\frac{1}{2}$, $1\frac{3}{4}$	15, $17\frac{1}{2}$	47
91D	40.00	$\frac{1}{8}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{5}{8}$, $\frac{3}{4}$, 1 , $1\frac{1}{2}$, $1\frac{3}{4}$	$17\frac{1}{2}$	40
91F	43.50	$\frac{1}{8}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{5}{8}$, $\frac{3}{4}$, 1 , $1\frac{1}{2}$, $1\frac{3}{4}$	18	45

Other regular sizes and pitches will be substituted for those listed when so ordered.

Screw Plates for Garage Use



These sets are arranged especially for garage use. Sets Nos. 66A and 77A contain both U. S. S. and S. A. E. sizes. Sets Nos. 60A, 70A and 80A contain S. A. E. sizes only.

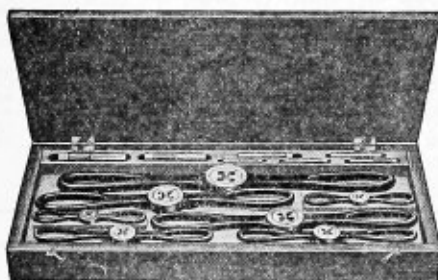
Set No. 66A. Cutting $\frac{1}{4}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{5}{8}$, $\frac{3}{4}$. Dies $1\frac{1}{2}$ inch diam. Collets $1\frac{1}{4}$ inch diam. U. S. S. Taper Taps. S. A. E. Plug Tap. No. 17 Stock. Both U. S. S. and S. A. E. No. 15 Adjustable Tap Wrench. Price per set. \$18.00

Set No. 77A. Cutting $\frac{1}{4}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{5}{8}$, $\frac{3}{4}$. Dies $1\frac{1}{2}$ inch diam. Collets $1\frac{1}{4}$ inch diam. U. S. S. Taper Taps. S. A. E. Plug Taps. Nos. 17 and 18 Stocks. No. 16 Adjustable Tap Wrench. Price per set. 27.00

Set No. 60A. Cutting $\frac{1}{4}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{5}{8}$, $\frac{3}{4}$. Dies $1\frac{1}{2}$ inch diam. Collets $1\frac{1}{4}$ inch diam. Plug Taps No. 17 Stock. No. 15 Adjustable Wrench. 12.00

Set No. 70A. Cutting $\frac{1}{4}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{5}{8}$, $\frac{3}{4}$. Dies cutting $\frac{1}{4}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{5}{8}$, $1\frac{1}{2}$ inch diam. Dies cutting $\frac{1}{4}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{5}{8}$, $1\frac{1}{4}$ inch diam. Collets $1\frac{1}{4}$ inch and $2\frac{1}{4}$ inch diam. Plug taps. Nos. 17 and 18 stocks. No. 16 Adjustable Wrench. Price per set. \$19.00

Set No. 80A. Cutting $\frac{1}{4}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{5}{8}$, $\frac{3}{4}$, $\frac{1}{2}$, $\frac{5}{8}$, $\frac{3}{4}$, $\frac{1}{2}$. Dies cutting $\frac{1}{4}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{5}{8}$, $1\frac{1}{2}$ inch diam. Collets $1\frac{1}{4}$ and $2\frac{1}{4}$ inch diam. Plug Taps. Nos. 17 and 19 Stocks. Nos. 15 and 17 Tap Wrenches. Price per set. \$28.50

Full Mounted Screw Plates
Bull Dog

This line of screw plates will be found serviceable and reliable, and the price is very reasonable. They are so constructed that the guides can be removed in an instant for cutting close to head. A separate stock is provided for each die, and the handle of the stock is open so that each one may be hung up when not in use. If desired. Stocks will hold standard round adjustable dies, which can be furnished in all forms of pitches and cutting sizes.

No. of Set	16-A	18-A	20-A	22-A	24-A	Outside Diam. of Dies	Length of Stocks, Inches
Price per set	\$8.00	\$11.00	\$12.00	\$16.00	\$20.00		
Cut'ng Sizes, Inches	$\frac{1}{4}$ - $\frac{3}{8}$ $\frac{3}{8}$ - $\frac{1}{2}$ $\frac{1}{2}$	$\frac{1}{4}$ $\frac{3}{8}$ - $\frac{1}{2}$ $\frac{1}{2}$	$\frac{1}{4}$ - $\frac{3}{8}$ $\frac{3}{8}$ - $\frac{1}{2}$ $\frac{1}{2}$	$\frac{3}{8}$ - $\frac{1}{2}$ $\frac{1}{2}$ - $\frac{5}{8}$ $\frac{5}{8}$ - $\frac{3}{4}$	$\frac{1}{4}$ - $\frac{3}{8}$ $\frac{3}{8}$ - $\frac{1}{2}$ $\frac{1}{2}$ - $\frac{5}{8}$ $\frac{5}{8}$ - $\frac{3}{4}$ $\frac{3}{4}$ - $\frac{1}{2}$	$\frac{1}{4}$ $\frac{1}{2}$ $1\frac{1}{2}$ $2\frac{1}{2}$ $2\frac{1}{2}$	$8\frac{3}{4}$ $10\frac{3}{4}$ $15\frac{1}{2}$ $20\frac{1}{2}$ 25

U. S. Standard form of thread furnished unless otherwise specified.
S. A. E. or "V" standard form of threads and pitches furnished at regular prices.

Automobile Screw Plates
In Leather Roll

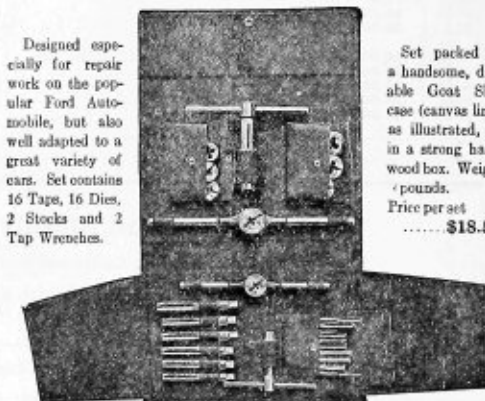
No. 1470. $\frac{1}{4}$ to $\frac{3}{4}$. 7 sizes. In leather roll, per set. \$13.50

Stock 14 inches long. Round Adjustable Dies $1\frac{1}{2}$ in diam.; and Plug Taps cutting $\frac{1}{4}$ -28, $\frac{3}{8}$ -24, $\frac{1}{2}$ -20, $\frac{5}{8}$ -18, $\frac{3}{4}$ -18, S. A. E. Standard. Weight 4 pounds.

No. 1475. 5 sizes. $\frac{1}{4}$ -28, $\frac{3}{8}$ -24, $\frac{1}{2}$ -20, $\frac{5}{8}$ -18, $\frac{3}{4}$ -20. Price per set. \$10.00

Contained in leather case as illustrated above. Plug taps; round Dies 1 inch outside diameter; Stock 9 inches long; adjustable Tap Wrench, "T" Style. Above set furnished in hardwood case at same price. Weight 4 pounds.

All Taps and Dies furnished with S. A. E. Standard Pitches unless otherwise specified. U. S. Standard Pitches or "V" Standard Forms and Pitches furnished at regular prices.

No. 2500 Automobile Screw Plate
In Leather Case or Hardwood Box

Designed especially for repair work on the popular Ford Automobile, but also well adapted to a great variety of cars. Set contains 16 Tap, 16 Dies, 2 Stocks and 2 Tap Wrenches.

Set packed in a handsome, durable Goat Skin case (canvas lined as illustrated, or in a strong hardwood box. Weight 4 pounds. Price per set \$18.50

Contents

To fit $6\frac{1}{2}$ -inch Stock and 4-inch T Tap Wrench.
No. No. No. No.
Cutting sizes. 6 10 12 14 $\frac{1}{4}$ $\frac{3}{8}$ $\frac{1}{2}$
Threads per inch. 32 24&32 24 24 32 20 18&24

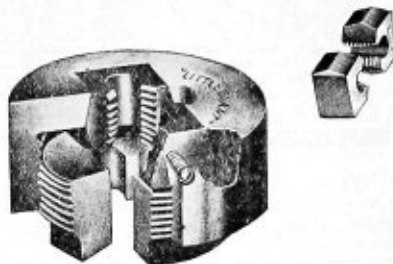
One Tap (plug), one Die ($\frac{1}{2}$ inch diameter) and one Guide for each cutting size.

To fit 9-inch Stock and $5\frac{1}{2}$ -inch T. Tap Wrench.
Cutting size. $\frac{1}{4}$ $\frac{1}{2}$ $\frac{3}{8}$ $\frac{1}{2}$ $\frac{5}{8}$ $\frac{3}{4}$
Threads per inch. 16&24 16 14&20 20 Pipe

One Tap (plug), one Die (1 inch diameter) and one Guide for each cutting size.

"Little Giant" Screw Plates

These dies are beveled on all sides, which makes them reversible so that the same die can be used for either plate or machine. They will cut clean-cut threads and are adjustable for over or under sizes not to exceed 1-32 inch over or under the even size. The dies are inserted in collet together with a correct guide as shown in illustration. U. S., "V" or S. A. E. Standard Form threads furnished. U. S. Standard Form furnished regularly. Set includes adjustable tap wrench.



Die and Collet

Set No.	Price per Set	Cutting Capacity, Fractional Sizes	Stock Length, Inches	Collets Diam., Inches	Set No.	Price per Set	Cutting Capacity, Fractional Sizes	Stock Length, Inches	Collets Diam., Inches
1	\$12.00	$\frac{1}{4}, \frac{3}{8}, \frac{1}{2}, \frac{5}{8}, \frac{3}{4}, 1$	14 $\frac{1}{2}$	2	8	\$18.00	$\frac{1}{4}, \frac{3}{8}, \frac{1}{2}, \frac{5}{8}, \frac{3}{4}, 1$	14 $\frac{1}{2}$	2
2	13.50	$\frac{1}{4}, \frac{3}{8}, \frac{1}{2}, \frac{5}{8}, \frac{3}{4}, 1$	23	2 $\frac{3}{4}$	9	27.50	$\frac{1}{4}, \frac{3}{8}, \frac{1}{2}, \frac{5}{8}, \frac{3}{4}, 1$	14 $\frac{1}{2}$	2
3	16.50	$\frac{1}{4}, \frac{3}{8}, \frac{1}{2}, \frac{5}{8}, \frac{3}{4}, 1$	26	2 $\frac{3}{4}$	20	35.00	$\frac{1}{4}, \frac{3}{8}, \frac{1}{2}, \frac{5}{8}, \frac{3}{4}, 1$	40	2
4	17.50	$\frac{1}{4}, \frac{3}{8}, \frac{1}{2}, \frac{5}{8}, \frac{3}{4}, 1$	26	2 $\frac{3}{4}$	25	45.00	$\frac{1}{4}, \frac{3}{8}, \frac{1}{2}, \frac{5}{8}, \frac{3}{4}, 1$	52	2
5	16.00	$\frac{1}{4}, \frac{3}{8}, \frac{1}{2}, \frac{5}{8}, \frac{3}{4}, 1$	23	2 $\frac{3}{4}$	30	37.50	$\frac{1}{4}, \frac{3}{8}, \frac{1}{2}, \frac{5}{8}, \frac{3}{4}, 1$	52	2
5 $\frac{1}{2}$	18.50	$\frac{1}{4}, \frac{3}{8}, \frac{1}{2}, \frac{5}{8}, \frac{3}{4}, 1$	23	2 $\frac{3}{4}$	40	40.00	$\frac{1}{4}, \frac{3}{8}, \frac{1}{2}, \frac{5}{8}, \frac{3}{4}, 1$	23	40
6	22.00	$\frac{1}{4}, \frac{3}{8}, \frac{1}{2}, \frac{5}{8}, \frac{3}{4}, 1$	26	2 $\frac{3}{4}$	50	60.00	$\frac{1}{4}, \frac{3}{8}, \frac{1}{2}, \frac{5}{8}, \frac{3}{4}, 1$	26	52
7	25.50	$\frac{1}{4}, \frac{3}{8}, \frac{1}{2}, \frac{5}{8}, \frac{3}{4}, 1$	26	2 $\frac{3}{4}$					
7 $\frac{1}{2}$	28.00	$\frac{1}{4}, \frac{3}{8}, \frac{1}{2}, \frac{5}{8}, \frac{3}{4}, 1$	26	2 $\frac{3}{4}$					

Extra parts are listed on another page.

Lightning Screw Plates



Regular Sets

No. 1193. $\frac{1}{4}$ to $\frac{3}{4}$ inch. 7 sizes. In case.....\$15.25
Stock 23 inches long. Adjustable Tap Wrench. Taper Taps, Dies and Collets cutting $\frac{1}{4}$ -20, $\frac{3}{8}$ -18, $\frac{1}{2}$ -16, $\frac{5}{8}$ -14, $\frac{3}{4}$ -13, $\frac{1}{2}$ -11, $\frac{3}{4}$ -10. Weight 17 pounds.
No. 1199. $\frac{1}{4}$ to 1 inch. 9 sizes. In case.....\$24.25
Stock 29 inches long. Adjustable Tap Wrench. Taper Taps, Dies and Collets cutting $\frac{1}{4}$ -20, $\frac{3}{8}$ -18, $\frac{1}{2}$ -16, $\frac{5}{8}$ -14, $\frac{3}{4}$ -13, $\frac{1}{2}$ -11, $\frac{3}{4}$ -10, $\frac{1}{2}$ -9, 1 inch-8. Weight 23 pounds.

Full Mounted Sets

(Not Illustrated.)

No. 1223. $\frac{1}{4}$ to $\frac{3}{4}$ inch. 7 sizes. In case.....\$17.00
A stock to each Die. Adjustable Tap Wrench. Taper Taps, Dies and Stocks cutting $\frac{1}{4}$ -20, $\frac{3}{8}$ -18, $\frac{1}{2}$ -16, $\frac{5}{8}$ -14, $\frac{3}{4}$ -13, $\frac{1}{2}$ -11, $\frac{3}{4}$ -10. Weight 27 pounds.
No. 1225. $\frac{1}{4}$ to 1 inch. 9 sizes. In case.....\$27.50
A stock to each Die. Adjustable Tap Wrench. Taper Taps, Dies and Stocks cutting $\frac{1}{4}$ -20, $\frac{3}{8}$ -18, $\frac{1}{2}$ -16, $\frac{5}{8}$ -14, $\frac{3}{4}$ -13, $\frac{1}{2}$ -11, $\frac{3}{4}$ -10, $\frac{1}{2}$ -9, 1 inch-8. Weight 38 pounds.
Always furnished with U. S. Standard Thread unless otherwise specified. "V" standard or S. A. E. standard furnished if desired at regular prices.

Little Giant Full Mounted Screw Plates

Has a stock for each die. Each set complete with adjustable tap wrench, stocks, dies and taps put up in a neatly finished wooden case. Handles of stocks are knurled.
U. S. "V" or S. A. E. standard form and pitches of thread optional. U. S. standard form always furnished unless otherwise ordered. Extra parts are listed on another page. Set includes tap wrench.

Set No.	Price per Set	Cutting Capacity, Fractional Sizes
61	\$12.00	$\frac{1}{4}, \frac{3}{8}, \frac{1}{2}, \frac{5}{8}, \frac{3}{4}, 1$
62	15.50	$\frac{1}{4}, \frac{3}{8}, \frac{1}{2}, \frac{5}{8}, \frac{3}{4}, 1$
64	19.50	$\frac{1}{4}, \frac{3}{8}, \frac{1}{2}, \frac{5}{8}, \frac{3}{4}, 1$
65	18.00	$\frac{1}{4}, \frac{3}{8}, \frac{1}{2}, \frac{5}{8}, \frac{3}{4}, 1$
65 $\frac{1}{2}$	20.50	$\frac{1}{4}, \frac{3}{8}, \frac{1}{2}, \frac{5}{8}, \frac{3}{4}, 1$
66	24.00	$\frac{1}{4}, \frac{3}{8}, \frac{1}{2}, \frac{5}{8}, \frac{3}{4}, 1$
67	29.50	$\frac{1}{4}, \frac{3}{8}, \frac{1}{2}, \frac{5}{8}, \frac{3}{4}, 1$
67 $\frac{1}{2}$	32.00	$\frac{1}{4}, \frac{3}{8}, \frac{1}{2}, \frac{5}{8}, \frac{3}{4}, 1$
640	47.00	$\frac{1}{4}, \frac{3}{8}, \frac{1}{2}, \frac{5}{8}, \frac{3}{4}, 1$
650	67.00	$\frac{1}{4}, \frac{3}{8}, \frac{1}{2}, \frac{5}{8}, \frac{3}{4}, 1$

Boiler Makers' Screw Plates

This assortment has been made up specially to meet a demand for a screw plate for boiler makers. It consists of a stock and three dies, all cutting 12 threads to the inch.
The stock is very strong but light in weight, handsomely mottled and has handles of steel tubing, knurled.

The assortment is packed in small space in a fine wooden case, and we recommend it to give splendid service to boiler makers, for whom it was designed. Assortment consists of one 26-inch stock and three dies. Collets $2\frac{3}{4}$ inches in diameter. Cuts 12 threads to the inch in the following sizes: $\frac{1}{4}, \frac{3}{8}$ and 1.
Price each.....\$11.00
Extra dies and collets to fit this stock can be furnished in the following sizes:
 $\frac{1}{4}$ and $\frac{3}{8}$ inch, each.....\$1.50
 $\frac{1}{2}$ and $\frac{3}{4}$ inch, each.....1.75
Collets, price each......50

Green River Screw Plates

Set in Case



Sectional



Exterior



The two right-hand cuts represent a die and guide complete. The cup-headed screw on the left holds the halves firmly together, acting as a hinge, while the size is regulated by the wedge-shaped, taper-head screw on the right. Limit of adjustment of dies is $\frac{1}{2}$ -inch over or under even size. U. S. "V" or S. A. E. Standard Thread forms are optional. U. S. Standard Form furnished unless otherwise ordered.

No. of Set	Price of Set with Tap Wrench	Range, Inches	Cutting Capacity, Fractional Sizes, Inches	Diameter of Dies, Inches	Length of Stock, Inches
150	\$ 5.50	$\frac{1}{8}$ to $\frac{1}{4}$	$\frac{1}{8}, \frac{3}{8}, \frac{1}{2}, \frac{5}{8}, \frac{3}{4}$	$\frac{7}{8}$	6
1124	11.25	$\frac{1}{4}$ to $\frac{3}{4}$	$\frac{1}{4}, \frac{3}{8}, \frac{1}{2}, \frac{5}{8}, \frac{3}{4}$	$2\frac{3}{8}$	22
1104	14.00	$\frac{1}{4}$ to $\frac{3}{4}$	$\frac{1}{4}, \frac{3}{8}, \frac{1}{2}, \frac{5}{8}, \frac{3}{4}$	$2\frac{3}{8}$	22
1125	16.25	$\frac{1}{4}$ to $\frac{3}{4}$	$\frac{1}{4}, \frac{3}{8}, \frac{1}{2}, \frac{5}{8}, \frac{3}{4}$	$2\frac{3}{8}$	22
1108	16.75	$\frac{1}{2}$ to 1	$\frac{1}{2}, \frac{3}{4}, \frac{1}{2}, \frac{5}{8}, \frac{3}{4}$	$2\frac{3}{4}$	29
1112	24.00	$\frac{1}{2}$ to 1	$\frac{1}{2}, \frac{3}{4}, \frac{1}{2}, \frac{5}{8}, \frac{3}{4}$	$2\frac{3}{4}$	29
1118	26.00	$\frac{1}{2}$ to 1	$\frac{1}{2}, \frac{3}{4}, \frac{1}{2}, \frac{5}{8}, \frac{3}{4}$	$2\frac{3}{4}$	18-29
1119	40.00	$\frac{1}{2}$ to $1\frac{1}{4}$	$\frac{1}{2}, \frac{3}{4}, \frac{1}{2}, \frac{5}{8}, \frac{3}{4}$	$2\frac{3}{4}$	35
1116	45.00	$\frac{1}{2}$ to $1\frac{1}{2}$	$\frac{1}{2}, \frac{3}{4}, \frac{1}{2}, \frac{5}{8}, \frac{3}{4}$	$3\frac{1}{2}$	53
1120	60.00	$\frac{1}{2}$ to $1\frac{1}{2}$	$\frac{1}{2}, \frac{3}{4}, \frac{1}{2}, \frac{5}{8}, \frac{3}{4}$	$2\frac{3}{4}-3\frac{1}{8}$	22-53

Oster Patent Adjustable Screw Plates

With Adjustable Dies and Guides. United States Standard Form Thread



Provided with adjustable self-centering guides which fit the rod or bolt perfectly; straight threads are sure to result. Guides are detachable to allow cutting thread close to work. After thread is cut, dies are instantly opened; no backing over the finished threads. Dies can be sharpened on an ordinary grindstone. Dies can be quickly adjusted for over or under size. Two cuts may be taken when operator chooses. Duplication of threads is accomplished by gauge which sets the dies repeatedly to exact size. U. S. standard thread regularly furnished, but V or S. A. E. standard furnished when required. Each set is complete with taps and packed in a handsome hardwood box.

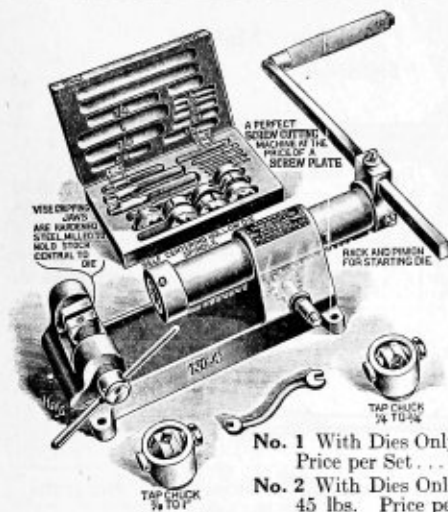
Machinists' Screw Plates

Set No.	Price per Set	Extra Dies per Single Set 4 Pcs.	Cutting Sizes, Inches and Threads per Inch	No. of Dies	No. of Taps
020	\$15.00	\$1.00	$\frac{3}{16}$ -24, $\frac{1}{4}$ -20, $\frac{5}{16}$ -18, $\frac{3}{8}$ -16, $\frac{7}{16}$ -14, $\frac{1}{2}$ -13	6	6
021	20.00	1.25	$\frac{1}{4}$ -20, $\frac{5}{16}$ -18, $\frac{3}{8}$ -16, $\frac{7}{16}$ -14, $\frac{1}{2}$ -13, $\frac{5}{8}$ -11, $\frac{3}{4}$ -10	7	7
032	30.00	1.50	$\frac{1}{4}$ -20, $\frac{5}{16}$ -18, $\frac{3}{8}$ -16, $\frac{7}{16}$ -14, $\frac{1}{2}$ -13, $\frac{5}{8}$ -11, $\frac{3}{4}$ -10, $\frac{7}{8}$ -9, 1-8	9	9
037 $\frac{1}{2}$	48.00	1.75	$\frac{1}{4}$ -20, $\frac{5}{16}$ -18, $\frac{3}{8}$ -16, $\frac{7}{16}$ -14, $\frac{1}{2}$ -13, $\frac{5}{8}$ -11, $\frac{3}{4}$ -10, $\frac{7}{8}$ -9, 1-8, $1\frac{1}{8}$ -7, $1\frac{1}{4}$ -7, $1\frac{3}{8}$ -6, $1\frac{1}{2}$ -6	9	9

Automobile Screw Plates with Adjustable Dies and Guides

Set No.	Price per Set	Extra Dies per Single Set 4 Pcs.	Cutting Sizes, Inches and Threads per Inch	No. of Dies	No. of Taps
071A	\$22.00	\$1.25	$\frac{1}{4}$ -28, $\frac{5}{16}$ -24, $\frac{3}{8}$ -24, $\frac{7}{16}$ -20, $\frac{1}{2}$ -20, $\frac{5}{8}$ -18, $\frac{3}{4}$ -18, $\frac{7}{8}$ -16	5	9
024A	33.00	1.50	$\frac{1}{4}$ -28, $\frac{5}{16}$ -24, $\frac{3}{8}$ -24, $\frac{7}{16}$ -20, $\frac{1}{2}$ -20, $\frac{5}{8}$ -18, $\frac{3}{4}$ -18, $\frac{7}{8}$ -16, $1\frac{1}{4}$ -14, 1-14	6	11

*Sets with American "V" Standard Form of Thread are furnished with $\frac{1}{2} \times 12$ thread.



The Channon Thread Cutting Machine

A Thread Cutter to do Quantity Jobs Equal to Machines Costing Several Times the Price

Furnished with Dies Only or with Dies, Taps and Tap Chucks

The Channon Thread Cutting Machine is a new and practical tool for cutting threads on bolts or bars of any length. Very serviceable for the Machine shop, Blacksmith shop, etc. Contractors find this tool very practical for re-threading bolts used in connection with concrete forms.

It is furnished with dies complete as illustrated or with dies, taps and tap chucks complete at a very moderate price.

The illustration accurately portrays the machine. It has a rack for starting the thread on the bolt instantly and with the long levered crank, which can be shortened or lengthened according to the work.

No. 1 With Dies Only cutting $\frac{1}{4}$, $\frac{5}{16}$, $\frac{3}{8}$, $\frac{7}{16}$, $\frac{1}{2}$, $\frac{5}{8}$ and $\frac{3}{4}$ inch. Weight 40 lbs.

Price per Set.....\$18.00

No. 2 With Dies Only cutting $\frac{1}{4}$, $\frac{5}{16}$, $\frac{3}{8}$, $\frac{7}{16}$, $\frac{1}{2}$, $\frac{5}{8}$, $\frac{3}{4}$, $\frac{7}{8}$ and 1 inch. Weight 45 lbs. Price per Set.....22.00

No. 3 With Dies, Taps and Tap Chuck, complete, cutting $\frac{1}{4}$, $\frac{5}{16}$, $\frac{3}{8}$, $\frac{7}{16}$, $\frac{1}{2}$, $\frac{5}{8}$ and $\frac{3}{4}$ inch. Weight 45 lbs. Price per Set.....24.00

No. 4 With Dies, Taps and two Tap Chucks, complete, cutting $\frac{1}{4}$, $\frac{5}{16}$, $\frac{3}{8}$, $\frac{7}{16}$, $\frac{1}{2}$, $\frac{5}{8}$, $\frac{3}{4}$, $\frac{7}{8}$ and 1 inch. Weight 55 lbs. Price per Set.....30.00

Furnished with U. S. Standard Thread unless otherwise ordered. If desired we will furnish "V" Standard Thread or S. A. E. Standard at regular prices.

Parts for Little Giant Full Mounted Plates

Diam., Inches	Dies, Price Each	Price of Full Mtd. Stocks Only	Diam., Inches	Dies, Price Each	Price of Full Mtd. Stocks Only
$\frac{3}{8}$	\$1.00	\$0.50	$\frac{3}{4}$	\$2.00	\$0.75
$\frac{7}{8}$	1.00	.50	1.00	2.00	1.00
$\frac{1}{2}$	1.00	.50	$\frac{1}{2}$	2.75	1.00
$\frac{1}{4}$	1.25	.50	$\frac{1}{4}$	2.75	1.00
$\frac{1}{8}$	1.25	.75	1	2.75	1.00
$\frac{1}{16}$	1.50	.75	$\frac{1}{16}$	4.00	1.75
$\frac{1}{32}$	1.50	.75	$\frac{1}{32}$	4.00	1.75
$\frac{1}{64}$	1.75	.75	$\frac{1}{64}$	5.00	2.25
$\frac{1}{128}$	1.75	.75	$\frac{1}{128}$	5.00	2.25

Extra Dies and Guides for Green River Screw Plates

Size, Inches	Outside Diameter, Inches			*Guides, Price Each
	2 1/2 Each	2 3/4 Each	3 1/2 Each	
$\frac{1}{8}$	\$1.25	\$1.25		\$0.50
$\frac{1}{4}$	1.25	1.25		.50
$\frac{3}{8}$	1.25	1.25		.50
$\frac{1}{2}$	1.50	1.50		.50
$\frac{5}{8}$	1.50	1.50		.50
$\frac{3}{4}$	1.50	1.50		.50
$\frac{7}{8}$	1.60	1.60		.50
$\frac{1}{2}$	1.75	1.75		.50
$\frac{3}{4}$	1.90	1.90		.50
$\frac{1}{2}$	2.00	2.00		.50
$\frac{3}{4}$	2.25	2.25		.50
$\frac{1}{2}$	2.50	2.50	\$2.50	.50
$\frac{3}{4}$	2.75	2.75	2.75	.50
$\frac{1}{2}$	3.00	3.00	3.00	.50
$\frac{3}{4}$	3.50	3.50	3.50	.50
$\frac{1}{2}$	4.00	4.00	4.00	.50
$\frac{3}{4}$	4.50	4.50	4.50	.50
$\frac{1}{2}$	5.00	5.00	5.00	.50

When ordering Dies and Guides be sure to state Sizes and Outside Diameter.
 Dies and Guides 2 1/2 inch Diameter furnished for sizes 1/8 inch to 1/2 inch only.
 Dies and Guides 2 3/4 inch Diameter furnished for sizes 1/4 inch to 3/4 inch only.
 Dies and Guides 3 1/2 inch Diameter furnished for sizes 1/2 inch to 1 1/2 inch only.

Extra Parts for Little Giant Screw Plates

Stocks			Collets		Dies	
Length, Inches	For Collets, Diam.	Price Each	Diam., Inches	Price Each	Diam., Inches	Price Each
7 1/2	1 1/4	\$0.70	1 1/4	\$0.40	1/2	\$1.70
13 1/2	1 3/8	1.25	1 3/8	.50	3/4	1.70
14 1/2	2	1.50	2	.50	5/8	1.70
23	2 1/4	2.00	2 1/4	.50	3/8	1.95
26	2 3/4	2.00	4	1.50	1/2	2.20
29	2 3/4	2.00	4 1/2	1.50	3/4	2.45
40	4	6.00			5/8	2.45
52	4 1/2	8.00			3/8	2.70
					1/2	2.70
					3/4	2.95
					5/8	3.20
					1	3.95
					1 1/4	3.95
					1 1/2	6.25
					1 3/4	6.25
					1 5/8	7.75
					1 7/8	7.75

Extra Parts for Lightning Screw Plates

Sizes	Dies			Collets, Each	F. M. Stocks, Each
	Price Each	Outside Dia., In.	Thick-ness, In.		
$\frac{1}{8}$	\$1.00	1 1/2	3/8	\$0.75	\$0.50
$\frac{1}{4}$	1.00	1 1/2	3/8	.75	.50
$\frac{3}{8}$	1.00	1 1/2	3/8	.75	.50
$\frac{1}{2}$	1.15	1 1/2	3/8	.75	.55
$\frac{3}{4}$	1.30	1 1/2	3/8	.75	.60
$\frac{1}{2}$	1.50	1 1/2	3/8	.75	.70
$\frac{3}{4}$	1.60	1 1/2	3/8	.75	.80
$\frac{1}{2}$	1.75	1 1/2	3/8	.75	.85
$\frac{3}{4}$	1.90	2	3/8	.75	.90
$\frac{1}{2}$	2.00	2	3/8	.75	.90
$\frac{3}{4}$	2.25	2 1/2	3/8	.75	1.10
$\frac{1}{2}$	2.50	2 1/2	3/8	.75	1.10
$\frac{3}{4}$	2.75	2 1/2	3/8	.75	1.25
$\frac{1}{2}$	3.00	2 1/2	1	.75	1.25
$\frac{3}{4}$	3.50	2 1/2	1 1/4	1.50	1.75
$\frac{1}{2}$	4.00	2 1/2	1 1/4	1.50	1.75
$\frac{3}{4}$	4.50	2 1/2	1 1/4	1.50	2.50
$\frac{1}{2}$	5.00	2 1/2	1 1/4	1.50	2.50

H.Channon Company Chicago

Extra Parts for Bay State Screw Plates Die Stocks Holding Collets



These stocks have handles made of steel tubing with knurled grips. Centers have oxidized or onyx finish.

No.	Price Each	Length inches	Outside Diameter of Collet inches	Diam. of Dies
17	\$2.00	16	1 3/4	1 1/2
18	2.50	23	2 1/4	1 3/4
19	3.00	29	2 3/4	2 1/2
20	5.00	40	3 1/2	3

Patent Elastic Stock

For Lightning and Green River Screw Plates



Length, inches	Diameter of Socket, inches	Price Each	Length, inches	Diameter of Socket, inches	Price Each
6	7/8	\$0.75	23	2 3/4	\$2.00
10	1 1/8	1.50	29	2 3/4	2.00
18	2 1/8	2.00	35	2 3/4	4.00
22	2 1/8	2.00	50	3 3/8	6.00

Pump Makers

Lightning Dies and Stocks



No. 900. Double stock, with one die each 3/4-14 and 5/8-12. \$3.00
No. 900. Stock only. Price each. .85

Extra Dies Only

Sizes, inches	Price	Threads	Diameter, inches	Thickness, inches
3/8	\$1.15	14	1 1/8	1/2
1/2	1.30	12	1 1/4	3/4

Single Stock



Number	Complete	Stock Only	Size of Die
910	\$1.70	\$0.55	3/4-14
912	1.90	.60	5/8-12
914	2.20	.70	1/2-12

Extra Dies Only

Size, inches	Price	Threads	Diameter, inches	Thickness, inches
3/8	\$1.15	14	1 1/8	1/2
1/2	1.30	12	1 1/4	3/4
3/4	1.50	12	1 1/2	1

In ordering dies state number of stock.

Solid Die Stocks

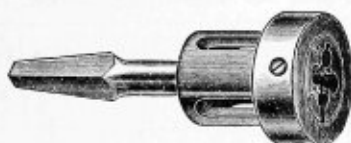
Handles
Are
Solid



Center
Enamelled
Black

Number	10	11	12	13	14	15	16
Length, inches	5	7	10 1/2	13	15	23	29
Outside diameter of die, inches	3/8	7/8	1	1 1/8	1 1/2	2	2 1/2
Price, each	\$0.40	\$0.50	\$1.00	\$1.25	\$1.25	\$1.50	\$1.75

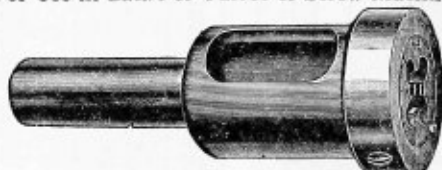
Bit-Brace Die Holders For Round Adjustable Split Dies



No.	Price Each	Holds Dies Diam., inches	Approximate Weight, Each
1	\$0.75	5/8	5 oz.
2	.75	3/4	7 oz.
3	1.00	1	7 oz.
1863	1.50	1 1/4	1 1/2 lb

The above prices are for Holders only.

Die Holders For Use in Lathe or Turret of Screw Machine



No.	Price Each	Diameter of Holder Shank, inches	Diam. of Round Adj. Dies, inches	Weight Approx.
1	\$0.75	1/2	5/8	3 oz.
2	.75	3/8, 5/8, 3/4	3/4	6 oz.
3	1.00	1/2, 3/4, 5/8	1	7 oz.
4	1.50	3/4, 5/8, 1	1 1/4	14 oz.
5	2.00	5/8, 1, 1 1/4	1 1/2	1 1/4 lb.
6	4.00	1 1/8, 1 1/4, 1 1/2	2 1/4	2 1/4 lb.

State size of shank wanted when ordering.

Tap Wrenches

Adjustable Tap and Reamer Wrenches



Drop forged from bar steel, with hardened tool steel jaws, properly tempered. The handles are made of steel tubing, thus eliminating all unnecessary weight, but with ample strength for any work. Ends are knurled, affording a secure grip. Center parts are mottled with an onyx finish. Well made and handsomely finished throughout. A very superior article.

Size number	10	15	16	17	17½	18
Length, inches	7	11	17	24	30	34
For hand taps, inches.....	Up to ¾	⅞ to ½	¾ to ¾	¾ to 1	¾ to 1¼	¾ to 1½
For mach. screw taps, Nos. 16 & sm'r		10 to 24				
For pipe taps, inches.....			¾ to ¾	¾ to ½	¾ to 1	¾ to 1½
Approx. weight, pounds....	½	1½	2	4¼	7½	12
Price each	\$1.50	\$2.00	\$2.50	\$3.50	\$6.50	\$7.00

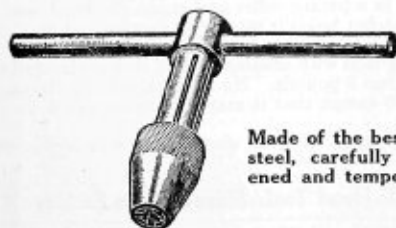
Standard Tap Wrenches



A well made tool, but does not have the range of capacity as the wrenches described above. Handles are plain and solid. Wrench is finished bright throughout.

No.	Price Each	Length Over All Ins.	Fitting Taps Ins.	Approx. Weight Pounds
1	\$1.00	6½	⅞ to ¾	½
2	2.00	12	¾ to ¾	1¼
3	3.00	14	½ to ¾	1½
4	4.00	19	¾ to 1½	4
5	5.25	24	¾ to 1½	6

Adjustable "T" Tap Wrench



Made of the best tool steel, carefully hardened and tempered

No. 1T will take machine screw taps Nos. 2 to 14, and hand taps ⅞ to ¼ inch.

Price, each\$0.50

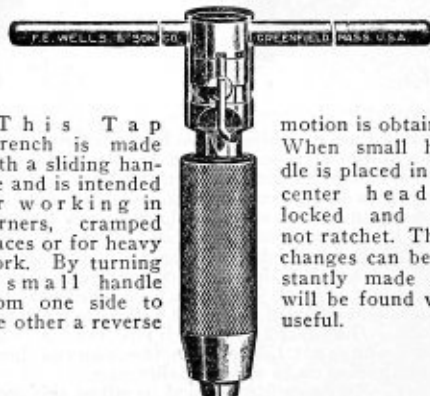
Approximate weight, each, ⅞ lbs.

No. 2T will take machine screw taps Nos. 14 to 24, and hand taps ½ to ½ inch.

Price, each\$1.00

Approximate weight, each, ⅞ lbs.

Ratchet "T" Tap Wrench



This Tap Wrench is made with a sliding handle and is intended for working in corners, cramped places or for heavy work. By turning a small handle from one side to the other a reverse

motion is obtained. When small handle is placed in the center head is locked and will not ratchet. These changes can be instantly made and will be found very useful.

No.	Price Each	Holds Machine Screw Taps	Holds Machinists' Hand Taps, ins.
1R	\$1.50	No. 1 to No. 16 incl.	⅞ to ½ incl.
2R	3.00	No. 14 to No. 24 incl.	¼ to ½ incl.

Large Size Tap Wrench

For Pipe Taps and Reamers



An adjustable wrench made up on the lines of those used for hand taps, having sufficient capacity for holding large pipe taps and reamers.

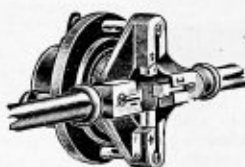
No.	Price Each	Length, Inches	Hold Pipes Taps, Inches	Approx. Weight, Pounds
20	\$ 7.00	40½	¾ to 1¼	8
22	15.00	55½	1 to 2	12
24	25.00	74	2 to 4	25

Toledo Adjustable Pipe Threading Devices

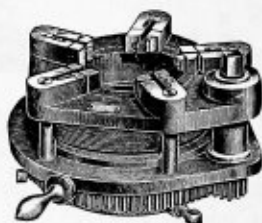
No. 00



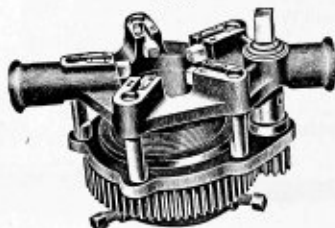
No. 1



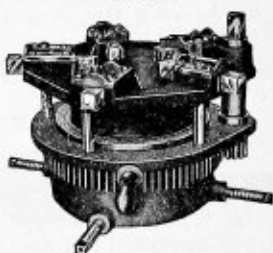
Nos. 3 and 4



No. 2



No. 25



No. 0



Toledo Pipe Threading Tools have revolutionized all previous ideas about threading pipe by hand. Provided with a Toledo Tool, one man can do with less labor, that which had previously required two to four men. Toledo Tools eliminate friction at the cutting edge, securing this result by using very narrow dies, and by mechanically giving these dies a receding motion while they are cutting the thread. Toledo Tools in all sizes work very easily, one man can cut any size thread, even up to 12 inch pipe.

No. 1. A boy or man can readily thread 2-inch pipe with this tool. By an ingenious arrangement, the dies recede as thread is cut, producing a clean cut thread of standard taper. No. 1-A is exactly like No. 1, but has in addition a ratchet, for use when working in close quarters.

No. 1½-R is for 2½ and 3 inch standard pipe, but is also made for 2, 2½ and 3 inch pipe with 11½ threads per inch, and intended for the oil well trade exclusively.

No. 2. Threading 2½ to 4 inch pipe, because of its wide range of capacity is the most popular Toledo Machine.

No. 3 weighs but 155 pounds. One man can thread 4½ to 8 inch pipe with it more rapidly than by any other method, and as easily as the smaller sizes.

No. 4. Two men are required to adjust this tool on the pipe, but one man can operate it. It is extremely simple and very light for its capacity.

No. 00 threads pipe ¼ inch to ¾ inch; each size die is held in separate collet and guide, die head simply drops into the handle and the frame which regulates left or right ratchet holds it intact; an exceptional tool for working into close quarters.

No. 0 will cut ¼ and ½ inch thread with one set of dies, ¾ and 1 inch with another and 1½ inch with another. It measures but 24 inches from tip to tip of handles and weighs less than 8 pounds. No. 10 is practically the same as No. 0, but differs in capacity. No. 10-A is identical with No. 10 except that it may also be operated with a ratchet.

No. 25. This tool uses but one set of dies for cutting the entire range of seven sizes. Two sets of dies are furnished with each tool.

Tools for Right Hand Threads Regularly Furnished. Left Hand Tools Shipped from Factory

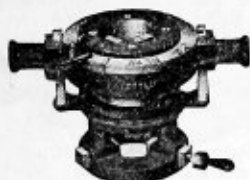
Number	Price Each	For Threading Pipe Sizes, Inches	Weight, Pounds		Extra Dies		
			Net	Gross	Number of Sets of Dies	Number of Pieces in Set	Price per Single Set
00	\$ 15.00	¼, ¾, 1½, 2	12	13	4	4	\$ 3.50
1	24.00	1, 1½, 1½, 2	16	25	4	4	2.50
*1-A	30.00	1, 1½, 1½, 2	20	30	4	4	2.50
*1½-R	50.00	2½, 3, 3½, 4	30	40	2	4	4.00
*2	100.00	4½, 5, 6, 7, 8	60	100	4	5	8.00
*3	300.00	9, 10, 12	155	240	5	5	12.00
*4	500.00	1½, ¾, ¾, 1½, ¾	250	350	3	5	20.00
0	16.00	1, 1½, 1½, 2	7	10	3	4	2.50
10	28.00	1, 1½, 1½, 2	16	25	1	4	2.75
*10-A	34.00	1, 1½, 1½, 2	22	32	1	4	2.75
*25	230.00	2½, 3, 3½, 4, 5, 6	115	145	2	5	8.00

*Ratchet tools.

Beaver Pipe Threading Tools

Beaver stocks have narrow, reeding dies which make pipe threading easy when they are used. The Beaver Die cuts easier with each turn because it is removing less metal all the time. At every turn a die cam is revolved, automatically reeeding the die. One set of dies will cut all size threads, except in the Nos. 61, 80 and 90. Over and undersize threads may be cut without manipulation. Crooked threads may be cut if so desired.

No. 25 Regular Stock
1 to 2-Inch



No. 26 Ratchet Stock



No. 41 Ratchet Stock



No. 25 and 26 are similar, except that No. 26 is a ratchet tool.

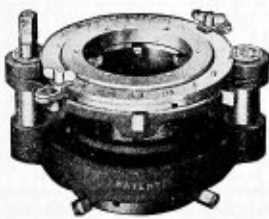
Both thread 1, 1¼, 1½ and 2-inch pipe, wrought iron or steel. They are easy workers, using the narrow reeding die which works easier as the thread progresses. Only one set of dies is used. This is instantly adjusted to any size by shifting control lever. A self-centering chuck makes bushings unnecessary. The vanadium steel dies may be resharpened on a grindstone. Both tools are compact, "one-piece" threaders with absolutely no loose parts. The No. 26 ratchet tool is preferred by many because it can be used in ditches, against walls and other confined places.

List Prices

Number.....	25	26
Threads pipe, inches.....	1, 1½, 1½ and 2	1, 1½, 1½ and 2
Price complete, each.....	\$30.00	\$35.00
Price, extra dies threading all sizes, per set.....	3.50	3.50
Net weight, pounds.....	22	25

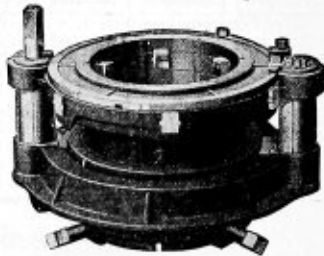
No. 61 2 $\frac{1}{2}$ -6 Inch Beaver Stock

It threads wrought-iron or steel pipe, 2½ to 6 inches. It has the same structural advantages as the No. 41. Each die is a separate unit, leaving the strain on its side wings, thus removing all strain from the adjusting plate and allowing it to move freely even on the largest sizes. Two sets of dies are required to cover the large range of sizes.



No. 80 4½-8 Inch and
No. 90 9-12 Inch Beaver Stock

Similar in construction to the No. 61, it requires to operate only 10 or 12 inches of space around the pipe. It is possible for one man to cut a perfect thread on 12-inch steel pipe using the No. 90. They will give more satisfactory all around service than a threading machine. Their light weight enables them to be transported from one job to another easily and quickly.



List Prices

Number.....	41	61	80	90
Threads pipe, inches.....	2½ to 4	2½ to 6	4½ to 8	9 to 12
Net weight, pounds.....	97	181	190	250
Shipping weight, pounds.....	100	200	230	300
Price, complete.....	\$110.00	\$220.00	\$300.00	\$500.00
Price, extra dies.....	9.00			
Price, extra dies, 2 sets (2½-3½) (4-6), each.....		14.00		
Price, extra dies, 2 sets (4½-6) (7-8), each.....			20.00	
Price, extra dies, 2 sets (9-10) (11-12), each.....				30.00

Beaverette Die Stocks



It threads $\frac{1}{4}$, $\frac{3}{8}$, $\frac{1}{2}$ and $\frac{3}{4}$ -inch pipe without changing dies. The two sets of dies (required because of different thread pitch between $\frac{3}{8}$ and $\frac{1}{2}$ -inch pipe) are held in one plate and instantly adjusted to thread any size. A strong and compact, "one-piece" threader—without any loose parts. A universal centering device does away with the loose bushings.

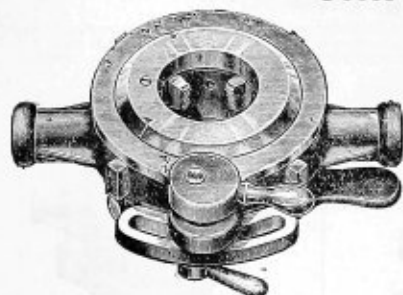
List Prices

Number	Range, Cutting Sizes, Inches	Price per Set	Net Weight, Pounds-	Extra Dies, Right or Left	Price per Set	Weight Each
6	1½, 2½, 3½, 4½	\$15.00	8	1½ or (1½—3½) or (3½—4½)	\$3.00	9 ounces

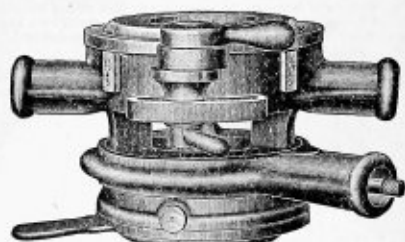
Shipping weight 10 pounds.

H. Channon Company Chicago

Oster Bull Dog Die Stocks



Regular Stock
Nos. 101 to 106



Ratchet Stock
Nos. 102R to 106R

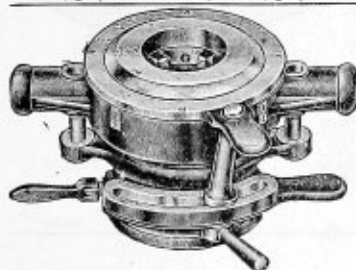
This line of stocks has Self-Locking and Adjustable Dies. The dies are controlled by the lever handle on top, as shown in the cut. By moving this handle to the right as far as it will go, the dies are set and held in place while cutting.

One movement of the top lever handle will open or close the dies. No resetting or backing off the threads.

The tool is equipped with Self-Locking and Centering Guides which do away with loose-bushings. These guides are operated on a scroll and can be set to all sizes the tool will thread. The more pressure on the end of the guides, the more solid the locking arrangement. Great pressure on the ends of the guides only tends to lock them more firmly in position.

Oster Bull Dog Die Stocks

Plain Stocks		Ratchet Stocks		Range of Sizes of Pipe				Extra Dies	Shipping Weight Complete, Pounds	
Catalog Number*	Price Complete	Catalog Number	Price Complete	One Set	One Set	One Set	One Set	Per Set (4 pcs.)	Plain	Ratchet
101	\$13.00			$\frac{1}{8}$	$\frac{1}{4}$ & $\frac{3}{8}$	$\frac{1}{2}$ & $\frac{3}{4}$		\$3.00	11	
102	17.00	102R	\$20.00	$\frac{1}{4}$ & $\frac{3}{8}$	$\frac{1}{2}$ & $\frac{3}{4}$	1 & $1\frac{1}{4}$		3.50	20	24
103	22.00	103R	27.00	1 & $1\frac{1}{4}$	$1\frac{1}{2}$ & 2			4.00	27	34
104	25.00	104R	30.00	$\frac{1}{2}$ & $\frac{3}{4}$	1 & $1\frac{1}{4}$	$1\frac{1}{2}$ & 2		4.00	29	35
104 $\frac{1}{2}$	28.00			$\frac{1}{4}$ & $\frac{3}{8}$	$\frac{1}{2}$ & $\frac{3}{4}$	1 & $1\frac{1}{4}$	$1\frac{1}{2}$ & 2	4.00	30	
105	40.00	105R	50.00	$1\frac{1}{2}$ & 2	$2\frac{1}{2}$ & 3			6.00	62	70
105 $\frac{1}{2}$	43.00	105 $\frac{1}{2}$ R	53.00	1 & $1\frac{1}{4}$	$1\frac{1}{2}$ & 2	$2\frac{1}{2}$ & 3		6.00	65	73
107	55.00	107R	60.00	$2\frac{1}{2}$ & 3	$3\frac{1}{2}$ & 4			7.00	94	138
107 $\frac{1}{2}$	58.50	107 $\frac{1}{2}$ R	63.50	$1\frac{1}{2}$ & 2	$2\frac{1}{2}$ & 3	$3\frac{1}{2}$ & 4		7.00	98	142



Bull Dog Die Stock No. 82

This tool has brand new features. The double end dies ($\frac{1}{4}$ inch and $\frac{3}{8}$ inch on one end— $\frac{1}{2}$ inch and $\frac{3}{4}$ inch on the other) are protected by a casing; hence teeth cannot cut user's hands or be damaged when stock is thrown about. The dies have a stop on each side so that they cannot be set beyond proper place in stock.

Price, Complete cutting, $\frac{1}{4}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{3}{4}$ inch, net..... \$13.00

Price, extra dies, right or left, per set (4 pieces), 4 sizes pipe, net 2.00

Extra for $\frac{1}{8}$ inch dies 2.00

Net weight 6 lbs., shipping weight 10 lbs.

3B Matchless Easy Cutting Die Stock

1 to 2-Inch Pipe, $2\frac{1}{4}$ to 4-Inch Pipe

The dies are narrow and recede by means of the biggest tapered post, which can be moved in the slot. The guides are adjustable for all sizes. One set of dies threads all sizes from 1 to 2-inch pipe, the other from $2\frac{1}{2}$ to 4-inch pipe.

The patent chip shield keeps the leader screw clean, thereby protecting the threads.

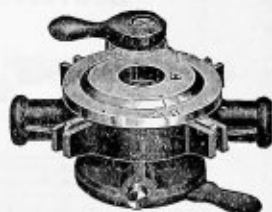
No. 3B, 1 to 2 inch, price each.....\$30.00 Shipping wt. 25 lbs.

No. 3BR with ratchet, price each..... 35.00 Shipping wt. 36 lbs.

No. 4BR with ratchet $2\frac{1}{2}$ to 4 inch, price each 80.00 Shipping wt. 120 lbs.

Extra dies Nos. 3B and 3BR, \$2.00 per set. No. 4BR \$5.00 per set.

No. 3B is exactly the same as No. 3BR excepting ratchet.



Oster Hand Pipe Threading Machine



No. 201
Front View

Oster Pipe and Nipple Machines meet the demand for a pipe machine which will perform every one of the many pipe threading jobs in ordinary use,—pieces long or short, straight or bent, over or under size, nipples of any length, and all threaded nipples. All this work can be performed on one machine without any complicated or difficult changes in equipment and with great rapidity. Oster Pipe Threading Machines will thread shorter pieces than can be handled by the ordinary pipe threading machine.

The No. 201, 204 and 206 machines listed below are strictly one man outfits. They are provided with a patent, adjustable, quick opening and closing device, instantly adjustable to all variations in fittings; the quickest and simplest method of changing the chasers which are inserted and removed through the shell of the head. The operator can clean out the chaser slots without taking the head apart. Dies are self locking with one movement of the setting handle. Throw it one way, and the pipe is released; throw it the other way and the dies are set to the same size. The dies thread two sizes without

change. They are easily set for any size thread by adjusting two screws. When the thread is finished, trip the die lever and open the dies right off the work. It is unnecessary to stop, reverse and back the machine off the finished threads.

Vise is self centering and straight threads are assured. It is of the open type, which enables the operator to change the work quickly and thereby increase the capacity of the machine. It is started by revolving the hand wheel at the side. The gripping jaws are tool steel, tempered tough and hard.

The No. 201 Hand Machine threads all pipe from $\frac{1}{4}$ to 2 inch. It is equipped with the lever opening die head and self centering pipe vise described above. It is double geared and can be operated with the least possible labor consistent with rapid work. It is not made with cutting off attachment.

Nos. 204 and 206 Machines are double geared, one speed for the small sizes or the first threads of larger pipe; the other speed for the larger sizes. The change from one speed to the other is quickly made while cutting a thread without removing the crank or any part; no wrench or tool of any kind is necessary.



Nos. 204 and 206

Number	Capacity Size of Pipe, Inches	Sets of Dies	Price Without Tripod	Extra Dies, per Set	Price of Tripod Stand and Pan	Shipping Weight, Pounds
201	$\frac{1}{4}$ to 2	4	\$ 90.00	\$4.50	\$15.00	275
204	1 to 4	4	210.00	6.00	15.00	575
206	1 to 6	6	337.50	7.50	37.50	975

Oster Light Hand Machines

With Adjustable Centering Chuck

For Threading $2\frac{1}{2}$ inch to 4 inch Pipe and $2\frac{1}{2}$ inch to 6 inch Pipe



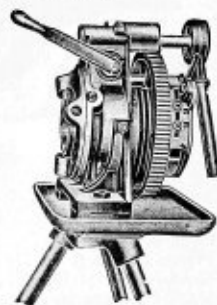
Nos. 16 and 17
From the Front

A light portable machine for threading pipe which requires only one man to operate. Used as a die stock, bench tool or complete with tripod.

Strictly a one man outfit and no pipe vise needed.

This tool has no leading screw, the die starting with a lever handle. One movement of the lever brings the head into position for the next cut without the time or trouble of backing over the newly cut threads.

Number	16	17
Threads, pipe, inches	$2\frac{1}{2}$ to 4	$2\frac{1}{2}$ to 6
Price with bench bracket	\$110.00	\$185.00
Price with tripod, complete	125.00	200.00
Price dies per set of four pieces	4.00	5.00
Shipping w/g't complete with tripod	275 lbs.	500 lbs.



Nos. 16 and 17
From the Side

H. Channon Company Chicago

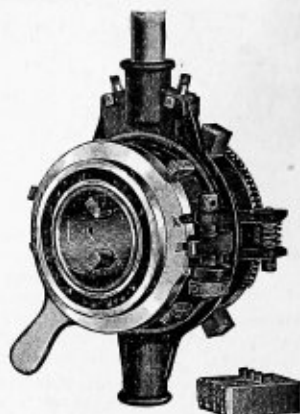
Duplex Die Stocks



New Pattern

The main feature of these tools is the arrangement for holding and adjusting the dies. The lug, shown in illustration, engages in notches in the face plate for the different sizes. The holding does not depend on any frictional clamps, screws or nuts, but on a positive lock. The releasing is accomplished instantly and avoids turning back over the finished thread.

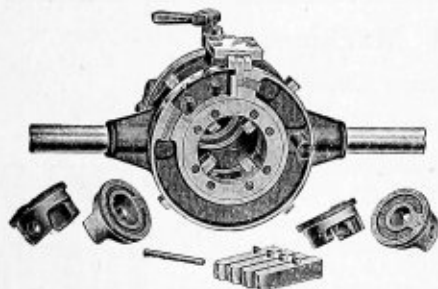
The Nos. 48, 48½ and 49 are the same as Nos. 43, 43½ and 45, except in a ratchet pattern, which is especially useful for work in confined space. This pattern is, however, suitable for all work, either in a ditch or at a bench, and can be operated by one or two handles.



Ratchet Pattern

No.	Price Per Set	Range of Sizes, Inches	No. of Sets of Dies	Price of Single Set, Right or Left Hand. 4 Pieces
*41	\$12.00	¼, ⅜, ½, ¾	2	\$2.60
*41½	14.00	⅜, ¼, ⅝, ½, ¾	3	2.60
*42	15.50	½, ¾, 1, 1¼	3	3.10
*42½	17.00	¾, ⅝, ⅞, ¾, 1, 1¼	3	3.10
43	22.00	1, 1¼, 1½, 2	2	3.70
43½	25.00	½, ¾, 1, 1¼, 1½, 2	3	3.70
44	40.00	1½, 2, 2½, 3	2	6.50
45	55.00	2½, 3, 3½, 4	2	7.50
48	25.00	1, 1¼, 1½, 2	2	3.70
48½	28.00	½, ¾, 1, 1¼, 1½, 2	3	3.70
49	60.00	2½, 3, 3½, 4	2	7.50

Buckeye Die Stocks

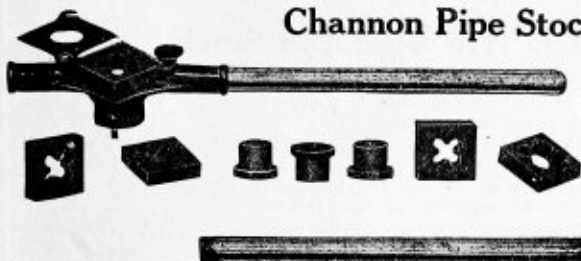


With expanding dies for ½ to 6-inch pipe. The dies are made to cut easily by being formed with a short cutting edge and by the automatically expanding movement which they have, as they are screwed onto the pipe, and which renders it possible, with such short edges, to produce threads having the taper essential for making tight joints. No leader screw is necessary. A wide range of diameters is covered by one set of dies, a single set being used for 1, 1¼, 1½ and 2-inch pipe, avoiding changing and care of additional parts. As soon as dies have been screwed onto pipe far enough to make a complete thread, they stop cutting and release themselves automatically, permitting immediate removal from the work.

Number	23	23½	24	25	26	26½	28	28½
Capacity, inches	1 to 2	1½ to 2	1½ to 3	2½ to 4	4½ to 6	2½ to 6	1 to 2	½ to 2
Price, per set	\$30.00	\$35.00	\$80.00	\$115.00	\$220.00	\$240.00	\$36.00	\$41.00
No. of Sets of Dies	1	2	2	1	1	2	1	2
No. of Pieces in Set	4	4	4	4	6	6	4	4
Dies, per single set	\$5.50	\$5.50	\$9.00	\$9.00	\$16.00	\$16.00	\$5.50	\$5.50

Nos. 28 and 28½ are the same as Nos. 23 and 23½, except with ratchet attachment.

Channon Pipe Stocks and Dies



Suitable for threading cast or wrought iron or steel pipe. Stocks are malleable iron. Handles are drawn steel tubing "Q & E" dies are furnished. They are made of an exceptionally high grade of tool steel and when in use are inclined toward the surface of the pipe, that thread is shaved or cut, rather than scraped.

Set includes stock, dies and bushings, all packed in a neat wooden box.

Number	Price of Set	Set contains Dies for cutting Pipe Sizes, Inches	Sizes of Dies Inches	Extra Parts Price Each					Other sizes of Dies Furnished	Approx. weight pounds
				Stock	Dies	Bushings	Die frames	Leader screw		
0	\$ 9.50	1/8, 1/4, 3/8, 1/2	2 x 1/2	\$3.50	\$1.50	\$0.25	.....	.....	3/4	7
1	15.00	1/4, 3/8, 1/2, 3/4, 1	2 1/2 x 3/4	5.00	2.00	.35	\$0.30	.....	1/8	13
1 1/2	13.50	3/4, 1, 1 1/4	3 x 3/4	6.00	2.50	.45	.40	.....	1/8, 1/4, 3/8, 1/2, 1 1/2	14
1 3/4	13.50	1, 1 1/4, 1 1/2	3 x 3/4	6.00	2.50	.45	.40	.....	1/8, 1/4, 3/8, 1/2, 3/4	13
1 3/4 spec'l	21.00	1/4, 3/8, 1/2, 3/4, 1, 1 1/4	3 x 3/4	6.00	2.50	.45	.40	.....	1/8, 1 1/2	22
2	20.00	1 1/4, 1 1/2, 2	4 x 3/8	9.50	3.50	.60	.80	\$2.50	1/2, 3/4, 1	24
3	43.00	2 1/2, 3	5 x 1 1/4	25.00	9.00	1.00	.....	7.00	.....	68
4	51.00	2 1/2, 3	5 x 1 1/4	33.00	9.00	1.00	.60	7.00	.....	84
2 spec'l	35.00	1/8, 1/4, 3/8, 1/2, 3/4, 1, 1 1/4, 1 1/2, 2	.....	Prices on parts for this set quoted on application					.....	45

*Capacity 1/8 to 2-in. pipe inclusive. A greater range than can be had in any regular set.
†Stock holds standard solid square bolt dies 2 1/2 square. ‡The stock with this set has 4 arms.

Miller's Reversible Ratchet Pipe Die Plate



This tool is similar to the one described above, and has in addition a reversible ratchet, convenient for cramped places.

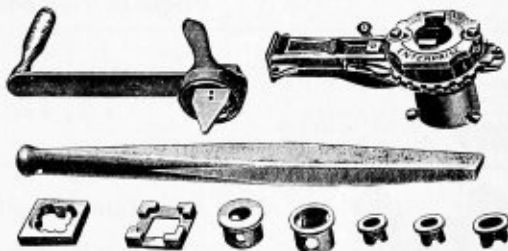
Number	Set Contains Dies for Cutting Pipe Sizes Inches	Dimensions of Dies Inches	Price Complete Each	Price Stocks Only Each	Price Extra Dies Each	Price Extra Bushings Each
B	1/4, 3/8, 1/2, 3/4, 1	2 1/2 x 3/4	\$15.00	\$ 7.50	\$ 2.00	\$0.35
C	1, 1 1/4, 1 1/2	3 x 3/4	18.50	13.00	2.50	.35
D	1 1/4, 1 1/2, 2	4 x 3/8	20.00	15.00	3.50	.45
E	2 1/2 and 3	5 x 1 1/4	44.50	29.00	10.00	.85

Enterprise Improved Ratchet Die Stock and Pipe Reamer

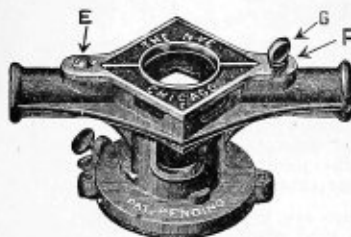
For Threading Pipe in Corners and Other Difficult Positions. Suitable for Bench Work as Well as All Outside Work.

Each stock has leader screw sleeve, insuring perfect threads, and chip channels which prevent clogging. Bushings with each stock and die frames with No. 1 & 2. A clearance of only 2 1/4 inches from center of pipe is required to operate.

Reamer is adjustable to ream any size pipe for which stock is adapted. Pipe can be reamed with die in or out of stock, before or after thread is cut, or while die is still on pipe and threads are being cut.



Size	Price with Dies and Reamer	Price with Reamer but without Dies	Price without Dies or Reamer	Cutting Capacity	Largest Die will take	Prices Extra Dies			
						For Set	Size	Dies for Pipe	Each
0	\$18.50	\$11.00	\$ 8.00	1/8 to 3/4	2x2	0	2x2	1/8, 1/4, 3/8, 1/2, 3/4	\$1.50
1	30.00	14.00	10.00	3/4 to 1 1/2	3x3	1	2x2	1/4, 3/8	1.50
						1	3x3	1/2, 3/4, 1, 1 1/4, 1 1/2	2.50
						2	3x3	1/2, 3/4, 1, 1 1/4	2.50
						2	4x4	1 1/2, 2	3.50



The Nye Solid Die Stock

These Die Stocks have automatic adjustable bushings which can be opened wide enough to clear a coupling, thereby making it possible to cut a close nipple. No separate bushings required.

The die plate is fastened on in such a way that it cannot become loose or opened while in operation, nor can it become separated from the body of the stock. All parts are permanently fastened and cannot be lost.

Has large openings for escapement of chips and oil.

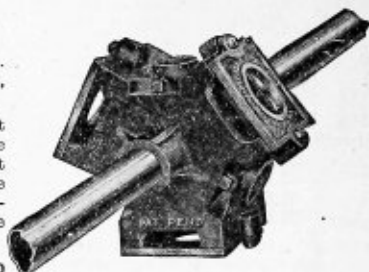
No. 1. Size of Block $2\frac{1}{2} \times 2\frac{1}{2} \times \frac{3}{4}$ inch. Price each.....\$4.00
No. 2. Size of Block $4 \times 4 \times \frac{3}{4}$ inch. Price each.....6.00

The Nye Three Way Stock

This stock holds $\frac{1}{2}$, $\frac{3}{4}$ and 1-inch solid dies, size of block $2\frac{3}{4}$ inches square. The tool is a one piece casting, containing three die boxes and three bushings, all of which are parts of the one casting.

Each die is equally distant from the center, thus distributing the weight evenly. The bushings are tapped into the stock body immediately opposite each die and corresponding in size to that die. There is nothing loose about this stock that can be lost, no separate parts are necessary. The dies are locked in each box, and there remain until they are worn out. A close nipple can be cut if desired. A reducer bushing can be used, allowing the use of a $\frac{3}{8}$ -inch die if desired.

Price complete without dies.....\$5.50



Nye "Skip Tooth" Dies

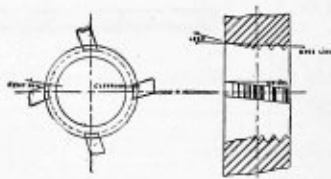


These dies are manufactured under the Nye Patent known to the trade as "intercepted thread" or "skip tooth" dies. They are made with a full set of teeth in pitch line in front, back of which every alternate tooth is removed on each chaser in such a way that the teeth on one chaser are staggered in relation to the teeth on the opposite chaser.

The removal of these back teeth reduces the friction in threading more than 70 per cent over the ordinary

thread cutting tool. It will also be noticed from the sketch shown above that the cutting teeth are not straight, but set at a decided angle, another important feature which makes thread cutting easy. One man can thread any 2-inch pipe with a Nye Die. They will operate successfully either on steel or wrought iron pipe.

The steel used in Nye Dies is an oil hardened Vanadium-Chrome Tungsten tool steel which is semi-high speed in character. Careful attention is given in the manufacture to the question of rake, throat angle, chaser angle, clearance, etc.



Prices of Nye Solid Square Dies

Cutting Size.....inches	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3
Price, 2 x $\frac{1}{4}$ for No. 0 stock.....each	\$2.00	\$2.50	\$3.00						
Price, 2 x $\frac{3}{8}$ for No. 1 stock.....each	2.00	2.50	3.00	\$3.00	\$3.50				
Price, 3 x $\frac{1}{2}$ for Nos. 1 $\frac{1}{2}$ & 1 $\frac{3}{4}$ stock.....each	2.50	3.00	3.50	3.50	4.00	\$4.00	\$4.50		
Price 4 x $\frac{3}{4}$ for No. 2 stock.....each			4.00	4.00	4.50	4.50	5.00	\$5.00	
Price, 5 x 1 for Nos. 3 and 4 stock.....each								\$13.00	\$14.00



Nye Adjustable Dies for Armstrong Stocks

These dies are exactly the same in construction and material as the solid square dies listed above, and differ only in being made to fit the Armstrong Adjustable Die Stocks.

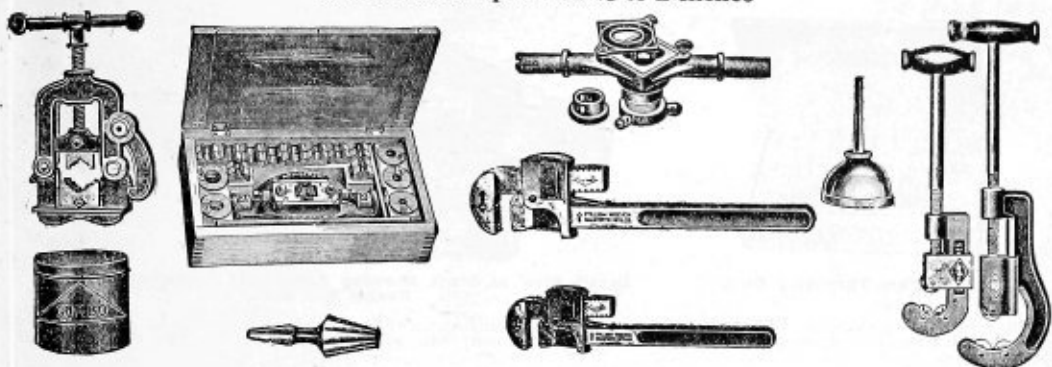


Cutting Size.....inches	$\frac{1}{8}$ to $\frac{1}{2}$	$\frac{1}{2}$ to 1	$\frac{1}{2}$ to $1\frac{1}{4}$	$\frac{1}{2}$ to $1\frac{1}{4}$	$\frac{1}{2}$ to 2	$\frac{1}{2}$ to 2	$\frac{1}{2}$ to 2	$\frac{1}{2}$ to 2	$\frac{1}{2}$ to 2
For Stock.....number	1	2	$2\frac{1}{2}$	$2\frac{1}{2}$	$2\frac{1}{2}$	3	6	7	
Price, per set (2 pieces).....	\$3.50	\$3.50	\$5.00	\$5.00	\$5.00	\$5.00	\$25.00	\$35.00	

*Double end.

Channon Special Pipe Cutting and Threading Outfits

For All Size Pipe from $\frac{1}{8}$ to 2 Inches



The tools which comprise these outfits are of standard make and first quality; and are not the inferior competitive tools often found in assortments.

The Vise is strong and well made, self locking, and is reversible.

The Dies in the Armstrong Adjustable Stock and Die Set are easily adjusted to over and under-size cutting. Each set is finely finished and packed in a box.

Three Wheel Pipe Cutters are made of malleable iron, pins and cutting wheels of oil tempered crucible steel.

Channon's Stocks and Dies are described fully on another page.

Gumbo Pipe Cement is a substitute for red and white lead, being convenient in form and very economical in use.

The burring reamer is used to take out the burr made when cutting pipe and allows the use of the full capacity of the pipe.

Outfit No. 1. A reliable outfit of first class tools. Low only in price:

- 1 No. 1 Channon Stock and Dies for $\frac{1}{4}$ to 1-inch pipe
- 1 No. 0 Pipe Vise for $\frac{1}{4}$ to 2-inch pipe
- 1 14-inch Stillson or Trimo Pipe Wrench
- 1 3-wheel Pipe Cutter for $\frac{1}{8}$ to 1-inch pipe
- 1 No. 2 Burring Reamer for 1-inch pipe and smaller
- 1 Copperized Oil Can
- 1 Can Gumbo Pipe Cement.

Complete as above described. No. 1 Outfit..... \$16.00

Outfit No. 2, a medium outfit with a wider range than No. 1:

- 1 No. 2 Channon Special Stock and Dies for $\frac{1}{8}$ to 2-inch pipe
- 1 No. 1 Pipe Vise for $\frac{1}{8}$ to 2 $\frac{1}{2}$ -inch pipe.
- 1 10-inch Stillson or Trimo Pipe Wrench for $\frac{1}{8}$ to 1-inch pipe
- 1 18-inch Stillson or Trimo Pipe Wrench for $\frac{1}{8}$ to 2-inch pipe
- 1 3-wheel Pipe Cutter for 2-inch pipe and smaller
- 1 Copperized Oil Can
- 1 Can Gumbo Pipe Cement

Complete as above described. No. 2 Outfit..... \$32.00

Outfit No. 3 for skilled mechanics desiring a first class outfit:

- 1 No. 2 set Armstrong Adjustable Stock and Dies for $\frac{1}{4}$ to 1-inch pipe
- 1 No. 3 set Armstrong Adjustable Stock and Dies for $1\frac{1}{4}$ to 2-inch pipe
- 1 No. 1 Pipe Vise for $\frac{1}{8}$ to 2 $\frac{1}{2}$ -inch pipe
- 1 3-wheel Pipe Cutter for 2-inch pipe and smaller
- 1 10-inch Stillson or Trimo Pipe Wrench for $\frac{1}{8}$ to 1-inch pipe
- 1 18-inch Stillson or Trimo Pipe Wrench for $\frac{1}{8}$ to 2-inch pipe
- 1 12-inch Knife Handle Monkey Wrench (not illustrated)
- 1 No. 2S Bit Brace Burring Reamer for $1\frac{1}{4}$ to 2-inch pipe
- 1 Copperized Oil Can
- 1 Can Gumbo Pipe Cement

Complete as described above. No. 3 Outfit..... \$38.50

H. Channon Company Chicago

Genuine Armstrong Adjustable Stocks and Dies



Complete Pipe Threading Outfit



Detail View of Stock Showing Adjustable Construction and Double End Dies.

Dies can be adjusted to the variations in the size of fittings and can be ground without drawing the temper. Both stock and dies have a small mark, and when both are brought into line the dies will cut standard size.

For Threading Pipe

Number of Stock	1	2	2A	2½	2½A	3	3A	3B	3C	6	7	7A	7B
No. of Dies and Guides.....	4	5	6	4	6	4	5	3	6	2	4	2	2
Cutting Pipe Sizes, inches.....	½-1½	½-1	½-1	½-1½	½-1½	1-2	¾-2	1¼-2	¾-2	2½-3	2½-4	2½-3	3½-4
Price, per set.....	\$5.00	\$12.00	\$14.00	\$12.00	\$18.00	\$24.00	\$28.50	\$20.00	\$33.00	\$40.00	\$50.00	\$45.00	\$45.00
Price each, stock only.....	3.25	4.00	4.00	4.50	4.50	7.00	7.00	7.00	7.00	25.00	30.00	30.00	30.00
R. or L. Hand Dies, each.....	1.25	1.50	1.50	3.25	3.25	4.00	4.00	4.00	4.00	15.00	16.00	16.00	16.00
Price, Guide only.....	.20	.25	.25	.40	.40	.50	.50	.50	.50	1.00	1.50	1.50	1.50

For Threading Bolts

These sets are exactly the same as the pipe threading sets listed above, except that the dies are made for cutting threads on bolts. The pitches regularly furnished are ¼-20, ⅜-18, ½-16, ⅝-14, ¾-12 or 13, ⅞-11, 1-10, 1¼-9, 1½-8, 1¾-7, 1½-6, 1½-6. Left Hand Bolt Dies are special. Adjustable feature allows for cutting over or undersize threads.

Furnished in U. S. S. V or S. A. E. form of thread. U. S. S. furnished unless otherwise specified.

Number of Stock	10	20	21	22	30	31
No. of Dies and Guides.....	7	9	7	11	6	9
Cutting Size, inches.....	¾ to 1½	¾ to 1	¾ to 1½	¾ to 1½	¾-1½	¾-1½
Price per set with Taps.....	\$20.00	\$35.00	\$32.00	\$45.00	\$54.00	\$75.00
Price each, stock only.....	3.25	4.00	4.00	4.00	7.00	7.00
Right Hand Dies, each.....	1.75	2.00	2.25	2.25	5.00	5.00
Price, Guide only.....	.20	.25	.25	.25	.50	.50

The Bard Adjustable Bushing

This Bushing is fitted with hardened jaws, which are moved to and from center by means of a cam plate, and, by fastening the plate with the thumb screw, the jaws are firmly held in any desired position. The adjustable jaws make a perfect center for the pipe fit closely around the pipe and insure the cutting of a straight thread. When necessary, a crooked or drunken thread can be cut with this bushing as easily as with a ring bushing. When once attached to the die stock it will always remain there. It does away with the necessity of carrying a number of loose ring bushings, and saves the time now lost in hunting for and changing the bushing for each size of pipe. This bushing only furnished with genuine Armstrong Stocks.

No. of bushing.....	1	2	2½	3
Fitting die stock.....	1	2	2½	3
from, inches.....	¼" down 1" down 1¼" down 2" down			
Price, each.....	\$4.50	\$5.00	\$6.00	\$8.00



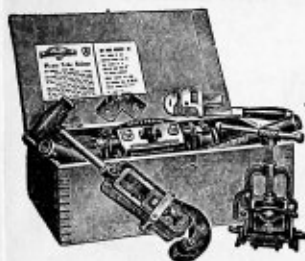
Model B Ratchet Attachment



This cut shows our new Model B Armstrong Ratchet Attachment. It is so constructed that only a small amount of energy is required to operate it. Can be used either right or left by reversing pawl without removing from stock. With this attachment any Armstrong Stock becomes a ratchet stock and die. It is not necessary to ratchet the die off the pipe. All that it requires is to make one or two turns back, when the pawl can be disengaged by lifting and making one-quarter turn of pawl, then turning the stock and the ratchet remains idle. This tool is made of malleable iron and is dust and chip proof. All parts interchangeable.

For Stock No.....	2	2½	3	6	7
Price, each.....	\$2.50	\$3.00	\$3.50	\$5.00	\$5.00

Armstrong Combination Pipe Kits



These are very complete assortments of small thread cutting tools and are composed of genuine Armstrong products. They will be found very convenient for repair work of all kinds. Packed in a neat hardwood box, as shown.

The stocks in these sets are all equipped with the Hard Adjustable Bushings, which are described on another page.

No.	CONTENTS	Capacity inches	Price Per Set
B	1 No. 2 Stock and R H Dies.....	$\frac{1}{4}$ - 1	\$23.00
	1 No. 1 B Pipe Cutter.....	$\frac{1}{4}$ - $1\frac{1}{2}$	
	1 Junior Hinged Pipe Vise.....	$\frac{1}{4}$ - $1\frac{1}{2}$	
C	1 10 inch Pipe Wrench.....	$\frac{1}{4}$ - 1	24.00
	1 No. 2 Stock and R H Dies.....	$\frac{1}{4}$ - $1\frac{1}{2}$	
	1 No. 1 B Pipe Cutter.....	$\frac{1}{4}$ - $1\frac{1}{2}$	
D	1 Junior Hinged Pipe Vise.....	$\frac{1}{4}$ - $1\frac{1}{2}$	25.00
	1 10 inch Pipe Wrench.....	$\frac{1}{4}$ - 1	
	1 No. 2 $\frac{1}{2}$ Stock and R H Dies.....	$\frac{1}{4}$ - $1\frac{1}{2}$	
E	1 No. 1 B Pipe Cutter.....	$\frac{1}{4}$ - $1\frac{1}{2}$	28.00
	1 Junior Hinged Pipe Vise.....	$\frac{1}{4}$ - $1\frac{1}{2}$	
	1 14 inch Pipe Wrench.....	$\frac{1}{4}$ - $1\frac{1}{2}$	

No. O Armstrong Machine

A light, strong, compact and durable machine threading pipe from $\frac{1}{4}$ to 2 inches and bolts from $\frac{1}{4}$ to $1\frac{1}{2}$ inch, using Armstrong Adjustable Dies. Dies are opened after cutting thread and after removing pipe, return to size without resetting.

It is provided with two speeds when used for hand; the operator can cut small pipe from $\frac{1}{4}$ to 1 inch very rapidly, avoiding the necessity of turning a great number of times, and by changing handle to other spindle cut $1\frac{1}{4}$ to 2 inches, not so quickly but as easily as on small pipe.

The machine can be quickly changed from hand to power, by the addition of the power attachment and countershaft. When ordering this machine for power, please state whether countershaft is wanted or not, as countershaft is furnished when not otherwise ordered. Weight of Machine and Dies 170 lbs. Weight of Stand 75 lbs. Weight of Power Attachment 30 lbs. Weight of Countershaft 100 lbs.

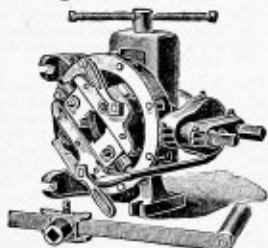
Unless otherwise specified this machine is shipped with Stand and Pipe Dies $\frac{1}{4}$ to 2 in. R. H. for Hand power.

No. O Hand Machine, with Stand, Pipe Dies	
$\frac{1}{4}$ to 2 in. Right Hand, Price.....	\$70.00
Power Attachment, Price.....	15.00
Countershaft, Price.....	28.00
Stand, Price.....	10.00

Dies

The Dies used in this machine are the same as used in the No. 2 and No. 3 Stock, viz: $\frac{1}{4}$ to 1 inch No. 2, $1\frac{1}{4}$ to 2 inch No. 3, for Pipe.

Bolt Dies for this machine same as the No. 2 and No. 3 Stock, viz: $\frac{1}{4}$ to $1\frac{1}{4}$ inch No. 2, $1\frac{1}{4}$ to $1\frac{1}{2}$ inch No. 3.



No. OO Armstrong Machine

This machine is like the No. O in general construction; is portable, strong, durable, and fast; can be used for either hand or power, and changes from one to the other are easily and quickly made. It takes Pipe Dies from 1 inch to 4 inches inclusive, which are quick opening and adjustable. The cutting-off attachment is absolutely automatic, and of great practical use. The parts are all interchangeable and numbered. All moving parts of the machine run in oil, in covered chambers, keeping them free from dust and chips. Die head will not wear loose and does not revolve on gear teeth.



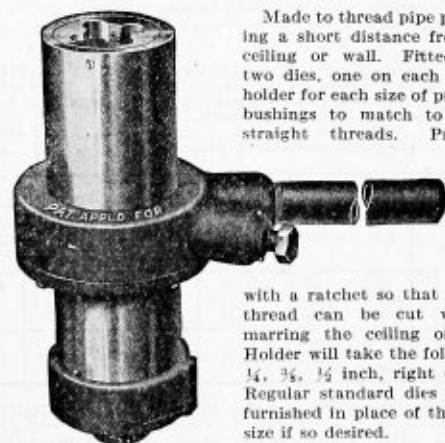
Countershaft 300 R. P. M. Weight of Hand Machine with Dies, Boxed, 475 lbs. Power Machine with Dies, Boxed, 580 lbs. Stand, 198 lbs. Power Attachment, 120 lbs. Countershaft 206 lbs.

When ordering this machine with power, state whether countershaft is wanted or not, as countershaft is always furnished except when otherwise ordered.

The Dies used in this machine are the same as used in the No. 3 and No. 6 Stock, viz: 1 to 2 inch. No. 3, $2\frac{1}{2}$ and 3 inch. No. 6, $3\frac{1}{2}$ and 4 inch are special dies for this machine. Bolt Dies same as used in No. 3 Stock from $\frac{1}{4}$ to 2 inch.

No. OO Hand Machine, with Stand, Pipe Dies	
1 to 4 inches, right, Price.....	\$160.00
No. OO Pipe Machine R. H. Dies 1 to 4 in. with Stand, Power Attachment and Countershaft, Price, complete.....	148.00
Power Attachment, Price.....	28.00
Countershaft, Price.....	45.00
Stand, Price.....	20.00

The Armstrong Ratchet Ceiling Nipple Threader

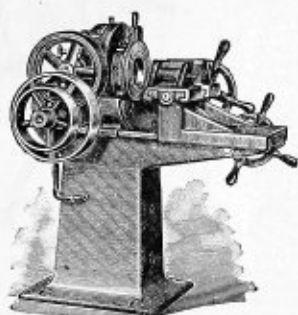


Made to thread pipe projecting a short distance from the ceiling or wall. Fitted with two dies, one on each end of holder for each size of pipe and bushings to match to insure straight threads. Provided

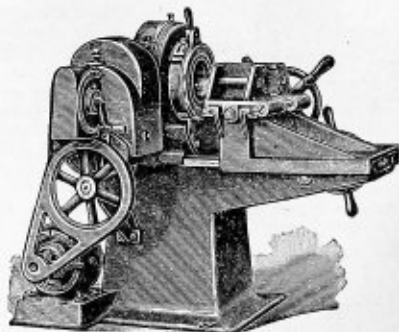
with a ratchet so that a close thread can be cut without marring the ceiling or wall. Holder will take the following, $\frac{1}{4}$, $\frac{3}{8}$, $\frac{1}{2}$ inch, right or left. Regular standard dies will be furnished in place of the over-size if so desired.

Price complete with 6 dies and 6 bushings.....	\$13.00
Price complete with 3 dies and 3 bushings.....	8.50
Extra dies, price each.....	1.50

"Oster" Power Pipe and Nipple Threading Machines and Bolt Cutters



No. 304 A Belted Machine



No. 306 B Motor Driven

Will handle all of the many pipe threading jobs in ordinary use—pieces long or short, straight or bent, over or under size, nipples any length and all thread nipples.

Every operating part is right under the hand, so that not a moment is wasted in useless action of the operator. Without changing his position, he sees the work of the threading dies at all times. A good thread can be cut without effort and the work can be changed quickly. Quick results are given by the lever controlled die head which is released and reset instantly after the thread is finished. The Vise grips the work by a single turn of the wheel, bringing it to an absolute center. All bearings are large and the vise has no chance of getting out of alignment with the center of the dies. The machines are back geared so they can be driven with the least power and can be connected with the shortest possible belts where the space is limited.

The best point in favor of these machines is the fact that they can be used for threading shorter pieces than can be handled in the ordinary pipe machine. With the No. 300A you can thread pieces as short as three and one-half inches without the use of any extra jaws or holders. The No. 304A

will thread a piece as short as four and one-half inches; the No. 306A as short as five and one-half inches. All of these machines will handle thread to thread nipples by means of the nipple holders.

An Automatic Die Release can be added to these machines, designed for cutting all threads equal length. It is recommended where a number of pieces of the same length must be threaded. When adjusted it will automatically open the dies and remove the work from the dies without any attention on the part of the operator. It can be set to cut any length thread desired.

The Automatic Oil Pump is shown in the above cut. It is out of the way of the operator. It is geared direct to the machine and runs constantly while the machine is in operation, thus insuring a constant and steady flow of oil to the dies all the time. The small valve on the vertical pipe to the left of the machine is used for regulating the flow of oil to suit all conditions.

Oster Nipple Jaws—With this attachment on the Nos. 300A, 304A and 306A machines close nipples can be cut. The nipple jaws are attached to the vise jaws and expand with them by means of the hand wheel. They will hold thread to thread nipples except the largest size within the range of the machine. One set will hold one size nipple only.

For machines.....**No. 300A**
Price per set (2 pieces).....**\$11.00**

No. 304A
\$11.00

No. 306A
\$15.00

Number and Style of Drive	Will Thread Pipe Size, Inches	Number of Sets of Dies Furnished	*Price Complete Machine	Approx. Shipping Weight, Pounds	EXTRAS				DEDUCT	
					Pipe Dies Set (4 pc.) R. or L. H.	Cutting Off Blades	Bolt Dies Set (4 pc.) R. or L. H.	Will Thread Bolts All Sizes and Number Sets Dies	For Auto Die Release	For Cut-Off Attachment
300 A Belt	1/4 to 2, incl.	4 R. H.	\$315.00	800	\$4.50	\$1.00	\$4.50	1/8 to 1 1/4 - 8 sets	\$15.00	\$37.50
304 A Belt	1 to 4, incl.	4 R. H.	475.00	1,360	6.00	1.00	6.00	1/2 to 1 3/4 - 10 sets	22.50	37.50
306 A Belt	1 1/4 to 6, incl.	6 R. H.	660.00	2,240	7.50	1.00	7.50	3/4 to 2 - 11 sets	22.50	.....
300 B Motor	1/4 to 2, incl.	4 R. H.	465.00	1,000	4.50	1.00	4.50	1/8 to 1 1/4 - 8 sets	15.00	37.50
304 B Motor	1 to 4, incl.	4 R. H.	700.00	1,550	6.00	1.00	6.00	1/2 to 1 3/4 - 10 sets	22.50	37.50
306 B Motor	1 1/4 to 6, incl.	6 R. H.	925.00	2,600	7.50	1.00	7.50	3/4 to 2 - 11 sets	22.50	.....

*Machine Complete includes Countershaft (on Belted), Oil Pump, Automatic Cut-off, number of sets of dies mentioned (each set cuts two sizes of pipe) and pipe rest stand on all except Nos. 300A and 300B. Motor Driven machines include D. C. Motor with attachments and controls. If pipe rest stand is not wanted deduct \$10.00 Extra Sizes of Pipe—No. 304A machine add for 1/2 and 3/4 pipe dies and extra jaws \$15.00 extra. No. 306A—Add for 1 inch dies and jaws, \$15.00 extra; for 1 1/2, 3/4 and 1 inch dies and jaws, \$20.00 extra.

The Forbes Pipe Cutting and Threading Machines

For Hand or Power

With one of the larger portable hand machines, one man can cut off and thread pipe up to 15 inches diameter without assistance, while with the smaller sizes of machine a boy can thread two and three inch pipe with only one hand on the crank.

No. 56 Hand Machine



The machines are equipped with a specially designed Die Head, which does away with all thumb screws for adjusting the dies, which are now clamped with one movement of a lever; they have self centering vise. Dies are quick opening and adjustable to any variation of fittings, have adjustable shell to take up the wear, which greatly prolongs the life of the machine.

In operating these machines, the pipe stands absolutely still, having neither rotary or lengthwise motion, a great advantage in handling long and heavy lengths of pipe. Can be operated in a trench or on a scaffold.

78 Combined Hand and Power Machine



Range of Capacity

	Hand Machines			Hand or Power Machines		
	Number	Price Each	Approximate Net Wt., lbs.	Number	Price Each	Approximate Net Weight, lbs.
1/4 to 2 inches, R. and L.	*30	\$ 50.00	155	*70	\$ 100.00	376
1/4 to 2 inches for solid dies (without dies)	*32	45.00	140	*72	95.00	352
1 to 3 inches, R. H., 1 to 2 inches, L. H.	*34	75.00	185	*74	125.00	491
3/4 to 3 inches, R. H., 3/4 to 2 inches, L. H.	*36	85.00	190	*76	135.00	484
1/2 to 3 inches, R. and L.	*37	105.00	200	*77	155.00	490
1 1/2 to 4 inches, R. H.	*38	100.00	251	*80	150.00	644
1 1/2 to 4 inches, R. and L.	*40	115.00	257	*82	165.00	665
1 to 4 inches, R. H.	*42	110.00	253	*84	160.00	662
1 to 4 inches, R. and L.	*44	130.00	260	*86	180.00	648
2 1/2 to 4 inches, R. H.	*46	85.00	237	*78	140.00	652
4 to 6 inches, R. H.	*50	115.00	341	*88	170.00	758
3 1/2 to 6 inches, R. H.	*52	130.00	341	*90	180.00	802
2 1/2 to 5 inches, R. H.	*54	150.00	343	*92	200.00	810
2 1/2 to 6 inches, R. H.	*56	175.00	345	*94	225.00	800
2 1/2 to 6 inches, R. H.				†110	400.00	2254
1 to 6 inches, R. H.	*58	190.00	384	*96	250.00	860
1 to 6 inches, R. H.				*109	410.00	2000
1 to 6 inches, R. and L.	*60	235.00	404	*98	285.00	881
2 1/2 to 6 inches, R. and L.	*61	205.00	398	*95	255.00	818
2 1/2 to 6 inches, R. and L. (extra heavy)	*62	300.00	815			
1 to 6 inches, R. and L.	*62 1/2	350.00	845	*111	430.00	1920
2 1/2 to 8 inches, R. and L.	*63	360.00	661	*99	535.00	1326
2 1/2 to 8 inches, R. and L.				*114	750.00	2725
2 1/2 to 8 inches, R. H.	†64	325.00	673	†100	500.00	1500
2 1/2 to 8 inches, R. H.				†112	650.00	2525
1 to 8 inches, R. H.	*65	360.00	671	*98 1/2	535.00	881
1 to 8 inches, R. and L.	*65 1/2	395.00	660	*99 1/2	570.00	1370
2 1/2 to 10 inches, R. H.	*66	500.00	989	†102	700.00	2025
2 1/2 to 10 inches, R. H.	*67	500.00	995	*104	700.00	2150
2 1/2 to 10 inches, R. and L.	*68	550.00	1025	*106	750.00	2200
2 1/2 to 12 inches, R. H.	*69	650.00	2293	†107	900.00	3725
2 1/2 to 12 inches, R. and L.	*69 1/2	750.00	2525	*108	1,000.00	4156
4 inches I. D. to 15 inches O. D., R. H.	*69 3/4	1,000.00	2647	†120	1,500.00	5990

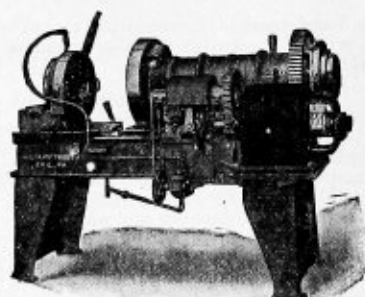
*Pressure Feed Machine. †Lead Screw Machine. Nos. 30 to 37 have no cut-off attachment unless specially ordered.

Our line of pipe vises is complete. There is one for every purpose.

H.Channon Company Chicago

"Williams" Pipe and Bolt Threading Machines

With Quick-Opening Adjustable Dies



No. 2 Machine
(Motor Driven)

Machine Number	Capacity, Inches	Belt Driven or Hand Power	Speed Gear Belt Driven	ELECTRIC MOTOR-DRIVEN MACHINES				Engine-Driven Machines	
				Direct Current	Alternating Current			Steam	Gas or Gasoline
					2 or 3 Phase	Single Phase			
						60-Cycle	25-Cycle		
1	1½ to 2	\$132.50	\$ 294.00	\$ 441.75	\$ 426.75	\$ 452.50	\$ 477.50		\$ 375.00
1½	2 to 3		343.75	515.00	500.00	532.50	575.00	\$ 427.50	525.00
2	1 to 4		500.00	717.50	687.50	760.00	820.00	632.50	720.00
3	1½ to 6		625.00	650.00	812.50	890.00	955.00	740.00	850.00
4	2½ to 8		937.50	1242.50	1182.50	1300.00	1375.00	1090.00	1227.50
4½	2½ to 10		1400.00	1697.50	1637.50	1757.50	1832.50	1560.00	1682.50
5	3½ to 12		1500.00	1822.50	1762.50	1882.50	1957.50	1643.75	1832.50
6	7 to 16		2200.00	2550.00	2550.00	2700.00	2850.00	2375.00	
7	8 to 18		2300.00	2650.00	2650.00	2800.00	2950.00	2593.00	
Semi-Automatic	1½ to 1		343.75	565.00	577.00	602.50			
	1 to 2		406.25	612.50	640.00	665.00			

The above prices include everything necessary to operate machine to capacity cutting right hand pipe threads. See descriptive circulars for detail list of complete equipment of machine.

Motor driven machines are equipped complete with a standard make of constant speed motor with starting and reversing switches. Choice of General Electric, Westinghouse, Burke or Wagner motors can be furnished.

Price List of Dies, Etc., for the Williams Pipe and Bolt Cutting Machines

Machine Number	Capacity, Inches	Dies, Set Pipe or Bolt	Nipple Holders	Flange Gripping Chuck	Nut Tapping Chucks	Floor Space, Feet	Weight, Pounds	Boxed for Export and Ft. to N. Y.	Cubic Feet
1	1½ to 2	\$ 3.00	\$ 35.00		\$24.00	2½ x 4½	1000	\$ 18.00	80
1½	2 to 3	4.20	42.00	\$ 30.00	24.00	2½ x 5	1500	18.00	85
2	1 to 4	4.80	60.00	48.00	30.00	3 x 6½	2200	24.00	100
3	1½ to 6	6.00	84.00	60.00	30.00	3 x 7	3000	30.00	110
4	2½ to 8	8.40	120.00	90.00		3½ x 8½	5500	54.00	145
4½	2½ to 10	14.40	180.00	120.00		4 x 10	7000	60.00	240
5	3½ to 12	14.40	192.00	120.00		4 x 10	9000	72.00	250
6	7 to 16	36.00				4½ x 12	14000	120.00	360
7	8 to 18	36.00				5 x 12	16000	138.00	375

Dies. Nos. 1, 1½ and 2 machines are furnished with four sets of right hand pipe dies of four pieces to set. These four sets cut all sizes of pipe of rated capacity of machine, except No. 1 speed gear machine which requires but three sets; one set cuts from one to two inches, inclusive.

No. 3 machine has five sets and No. 4 machine six sets of six pieces to the set. Nos. 4½ and 5 machines have eight sets of eight pieces to the set, and Nos. 6 and 7 have eight sets of twelve pieces to the set. Below six inches each set cuts two sizes of pipe as follows: ½-inch and ¾-inch; ¾-inch and 1-inch; 1-inch and 1¼-inch; 1½-inch and 2-inch; 2½-inch and 3-inch; 3½-inch and 4-inch; 4½-inch and 5-inch.

Bolt dies require a set for each size of bolt except sizes having the same number of threads to inch.

Orders for bolt dies must state whether threads are V, or U. S. Standard.

Orders for casing dies must give outside diameter and number of threads to inch.

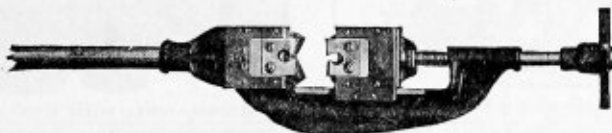
Old dies can be retempered and recut for one-half the price of new dies.

The prices for flange gripping chucks are for special 3-jaw independent chucks put on rear end of spindle for gripping flanges and screwing up fittings. Nos. 6 and 7 are equipped with rear chucks without extra charge.

Beaver Square-End Pipe Cutters

The "Burrless" Cutter for Pipe and Conduit

Quicker than
Other Methods



Leaves an Absolutely Square-end. No Reaming Necessary

No ragged burrs on the inside of the pipe—no rough ridge on the outside. Reaming and filing are not necessary. The "Beaver" cannot split the pipe at the weld because the narrow, sharp knives cut out a thin shaving of metal until the pipe is severed. No strain on the pipe. It will cut steel, wrought-iron or brass pipe to exact lengths within 1-64 of an inch. The "Beaver" cutting principle consists of two narrow tool steel knives with guards to prevent breakage.

When the Cutter is centered or set, the powerful coil springs, which back the knives, are compressed, thus holding the knives against the pipe. The tool is revolved like a Die Stock and the knives cut out a thin shaving of metal until the pipe is severed.

The adjustment of the knives is entirely automatic and Fool proof.



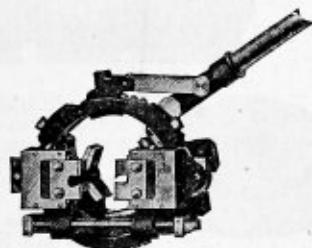
Square End of
Pipe



Showing Operation of Cutter

Number.....	1	5	10	15
Cuts pipe, inches.....	3/8 to 1	3/8 to 2	2 1/2 to 4	2 3/4 to 6
Net weight, pounds.....	8	13 1/4	46	55
Price, complete, each.....	\$18.00	\$20.00	\$90.00	\$180.00
Price extra knives, per set.....	1.20	1.50	2.50	5.00

Beaver Cutter



No. 10. 2 1/2 to 4 inches

Ratchet tool and can be used down in a ditch, or in confined places. The cutting principle is the same as used on smaller cutters, described above. No. 10 will "break" open and allow cutter to be put around the pipe in ditch.

No. 15, 2 1/2 to 6 inch Cutter is similar in construction excepting that it is somewhat heavier and has four instead of two cutting knives.

Number.....	1	5	10	15
List.....	\$18.00	\$20.00	\$90.00	\$180.00
Cutting range, in., incl.	3/8 to 1	3/8 to 2	2 1/2 to 4	2 3/4 to 6
Net weight, pounds.....	8	13	46	55
Shipping wt., pounds.....	10	17	53	65
Extra knives, per set.....	\$1.20	\$1.50	\$2.50	\$5.00
Regrinding knives (including return postage).....	.30	.40	.70	1.40
New coil springs, per set.....	.25	.25	.25	.50

"Toledo" Pipe Cutter No. 250



Capacity 2 1/2-inch to 6-inch pipe, inclusive

Complete with Ratchet Handle List Price \$80.00

The first **real** mechanism for cutting off relatively large pipe by hand. It is operated with a ratchet handle which drives the pinion and gear. It has four cutting knives automatically operated by star wheel feed. It makes a clean, straight cut, leaving no burr. It is very accurate and rapid, and will cut off extra heavy or **double** extra heavy pipe, just as well as standard thickness. As it splits in two in the middle, it may be used on pipe already installed or which may have fittings on both ends.

TRIO Pipe Die Stock

With Bushing Guide



Assortments with Bushing Guides

Number	Cutting Sizes	Net Wt. Lbs.	Price
200	1/8, 1/4, 3/8	4	\$4.25
201	1/4, 3/8, 1/2	4	4.25
210	3/8, 1/2, 3/4	9	6.00
211	1/2, 3/4, 1	9	6.00

Prices of Parts

No.	Stock	Die	Guides	Wedges
200	\$1.00	\$1.00	\$0.25	\$0.15
201	1.00	1.00	.25	.15
210	2.00	1.25	.35	.20
211	2.00	1.25	.35	.20

Stocks ordered separately fitted with wedges and guides. Briggs Standard right hand threads furnished in the United States, and Whitworth in other countries, unless otherwise specified.

DUO Pipe Die Stock

With Bushing Guides



Assortments with Bushing Guides

Number	Cutting Sizes	Net Wt. Lbs.	Price
220	1/8, 3/4	7 1/2	\$ 4.50
221	3/4, 1	7 1/2	4.50
230	1, 1 1/4	17	7.25
240	1 1/4, 1 1/2	18	10.50
241	1 1/2, 2	20	10.50

Prices of Parts

No.	Stock	Die	Guides	Wedges
220	\$2.00	\$1.25	\$0.35	\$0.20
221	2.00	1.25	.35	.20
230	3.50	2.00	.45	.25
240	5.00	3.00	.60	.45
241	5.00	3.00	.60	.45

Strickler Ratchet Pipe Cutter

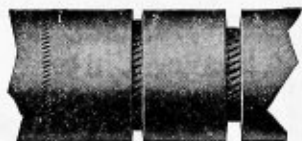
Used by leading water works, gas companies, railroads, mines, municipal heating and plumbing contractors and engineers. Automatically cuts cast iron, steel and wrought iron pipe, either in the trench or in the shop. The cutting blades make a channel cut around pipe, leaving no burrs or ragged edges. It is quickly placed on pipe and centered.

The ratchet head (which holds the handle) is equipped with dogs engaging the teeth on the body of the machine (which holds the

Star Fed Cutting Blade). As the machine rotates around the pipe, the Star Feeder automatically feeds the cutting blade; and this is done so rapidly and easily that one man can quickly cut eight-inch pipe and two men can cut sixteen and twenty-inch cast, wrought or steel pipe. Cuts all pipe from 3/4 inch to 30 inches in diameter, inclusive.

	Weight	Price Each
No. 1. Cuts 3/4 in. to 2 in., incl.,	10 lbs...	\$ 10.00
No. 2. Cuts 1 1/4 in. to 4 in., incl.,	20 lbs...	21.87
No. 3. Cuts 2 1/2 in. to 6 in., incl.,	40 lbs...	43.75
No. 4. Cuts 4 in. to 8 in., incl.,	65 lbs...	62.50
No. 5. Cuts 8 in. to 12 in., incl.,	90 lbs...	93.75
No. 6. Cuts 12 in. to 16 in., incl.,	190 lbs...	156.25
No. 7. Cuts 16 in. to 24 in., incl.,	250 lbs...	375.00
No. 8. Cuts 24 in. to 30 in., incl.,	300 lbs...	437.50

Knurled Cutter Wheels



The knurled cutter wheels actually remove metal in cutting, making a square cut. Made to fit all standard makes of pipe cutters, such as Barnes, Saunders and Trimco. The knurled cutter wheels act like a saw, for they do not simply spread the metal apart as ordinary wheel cutters do, but they make a square clean cut.

Made of Tungsten-Alloy tool steel, hardened and tempered in oil. Guaranteed to cut through pipe with fewer turns and less labor than any other type of cutter wheels on the market.

	Price Each		Price Each
No. 1. Barnes...	\$1.00	No. 1. Saunders..	\$1.20
No. 2. Barnes...	1.00	No. 2. Saunders..	1.20
No. 3. Barnes...	1.00	No. 3. Saunders..	1.80
No. 4. Barnes...	2.00	No. 4. Saunders..	1.80
No. 5. Barnes...	2.00	No. 5. Saunders..	1.80
No. 1. Trimco....	1.00	No. 3. Trimco....	1.00
No. 2. Trimco....	1.00		

Barnes Three Wheel

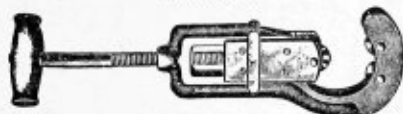
Pipe Cutters

Saunders



Trimo

Armstrong



Three-wheel pipe cutters cut more rapidly than most other styles. They are indispensable shop tools and are especially adapted for cutting in corners and close quarters. The roller turns down burr made in cutting pipe and permits threading after cutting without much effort.

Barnes

Number	Capacity of Pipe, Inches	Price Each	Diameter of Wheels, Inches	Width of Wheels, Inches	Number	Price of Wheels, Each	Price of Pins, Each
0	$\frac{1}{8}$ to $\frac{3}{4}$	\$ 4.00	1 $\frac{1}{8}$	$\frac{3}{4}$	0	\$0.25	\$0.10
1	$\frac{1}{2}$ to 1	4.50	1 $\frac{1}{2}$	$\frac{3}{4}$	1	.25	.10
2	$\frac{3}{4}$ to 2	6.00	1 $\frac{3}{4}$	$\frac{3}{4}$	2	.30	.10
3	1 to 3	10.00	1 $\frac{3}{4}$	$\frac{3}{4}$	3	.40	.10
4	2 to 4	20.00	1 $\frac{3}{4}$	$\frac{3}{4}$	4	.50	.20
5	4 to 6	30.00	1 $\frac{3}{4}$	$\frac{3}{4}$	5	.75	.20
6	6 to 8	40.00	2 $\frac{1}{2}$	$\frac{3}{4}$	6	.75	.20

Trimo

A one or three-wheel pipe cutter as desired, as two rollers and three wheels are furnished with each cutter.

Number	Capacity of Pipe, Inches	Price Each	Diameter of Wheels, Inches	Width of Wheels, Inches	Number	Wheels or Rolls, Each
1	$\frac{1}{4}$ to $1\frac{1}{4}$	\$ 4.50	1 $\frac{1}{2}$	$\frac{3}{4}$	1	\$0.30
2	$\frac{1}{2}$ to 2	6.00	1 $\frac{1}{2}$	$\frac{3}{4}$	2	.30
3	$1\frac{1}{4}$ to 3	10.00	1 $\frac{1}{2}$	$\frac{3}{4}$	3	.40

Saunders

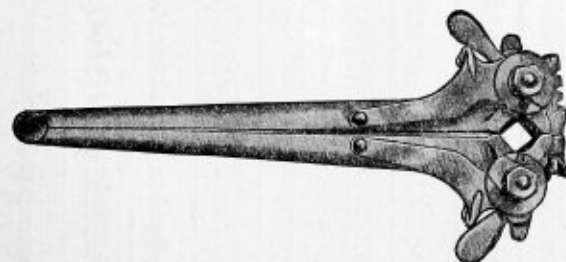
Number	Capacity of Pipe, Inches	Price Each	Diameter of Wheels, In.	Width of Wheels, In.	Number	Price of Wheels, Each	Price of Rollers, Each	Price of Pins, Each
1	$\frac{1}{8}$ to 1	\$ 3.00	1 $\frac{1}{2}$	$\frac{3}{4}$	1	\$0.24	\$0.24	\$0.10
2	1 to 2	4.50	1 $\frac{1}{2}$	$\frac{3}{4}$	2	.32	.32	.10
3	2 to 3	11.00	1 $\frac{1}{2}$	$\frac{3}{4}$	3	.60	.60	.15
4	$2\frac{1}{2}$ to 4	18.00	1 $\frac{1}{2}$	$\frac{3}{4}$	3	.60	.60	.15
5	4 to 6	28.00	1 $\frac{1}{2}$	$\frac{3}{4}$	5	.60	.60	.15

Armstrong

A one or three-wheel pipe cutter as desired, as two rollers and three wheels are furnished with each cutter.

Number	Capacity of Pipe, Inches	Cutter, Complete	Diameter of Wheels, In.	Width of Wheels, In.	Number	Price of Wheels, Each	Price of Rollers, Each	Price of Pins, Each
1	$\frac{1}{8}$ to $1\frac{1}{4}$	\$ 4.50	1 $\frac{1}{2}$	$\frac{3}{4}$	1	\$0.25	\$0.25	\$0.05
2	$\frac{1}{2}$ to $2\frac{1}{2}$	6.00	1 $\frac{1}{2}$	$\frac{3}{4}$	2	.30	.30	.06
3	$1\frac{1}{2}$ to 4	15.00	1 $\frac{1}{2}$	$\frac{3}{4}$	3	.50	.50	.10

"Vosper" Pipe Cutter



It is just as simple as a pair of pipe tongs—more simple than some pipe tongs.

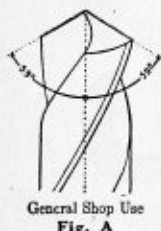
It will cut off a 2-inch pipe as easily and quickly as going through a 2-inch pipe board with a hand saw.

This cutter differs in every particular from previously existing pipe-cutting tools. The main frame of the tool consists of two arms hinged at the handle end and terminating at the other end in V-shaped bearings. The frame opens on its hinge and is put on the pipe and clamped there by means of an adjustable tie-bar and thumb-nut. Pivoted to the side of the main frame are two knife-carrying arms, an integral part of which are overhanging lugs to which are fastened heavy coil springs which actuate the feed of these knife-carrying arms. Heavy steel studs projecting through the ends of these knife-carrying arms hold the knives (which are circular in shape with a segment cut out to provide the cutting edge) and the steel "shoe" that rides ahead of each knife to regulate the depth of the cut. Eccentric levers pivoted on the knife-carrying arms in the proper place enable the operator to overcome the spring-tension and draw the knife-carrying arms back so the knives (or cutters) will clear the pipe when putting the tool on same. After the tool is fastened in the desired position on the pipe, the eccentric levers are turned over, allowing the knives to rest on the pipe; the tool is then rotated and the springs automatically feed the cutters until the pipe is cut off.

Capacity $\frac{1}{2}$ " to 2" Pipe.....List Price, \$16.00

Twist Drills

Speeds, Feed and How to Grind



No tool in the machine shop does as much work proportionately as a Twist Drill, and regardless of this fact it is generally the most abused tool in the plant.

It is just as necessary to have a Drill ground with a proper cutting edge as it is a razor or carpenter's edge tool. Therefore, to begin with, to secure the greatest efficiency and longest life of a Drill, it must be properly ground at the point. The cutting edges must be straight and of exactly the same length, as well as forming a proper and uniform angle with the axis of the Drill, which is 59° for general use. (Fig. A.)

The importance of lip clearance or backing off of the cutting edges should not be overlooked. 12° at the periphery (Fig. B.) is the best angle for ordinary shop work. This angle should be uniformly increased toward the center of the Drill, so that the line across the center shows an angle of about 125° to the cutting edges. (Fig. C.)

In drilling extremely hard material, where lighter feed is used, would suggest grinding the point to an angle of 68° (Fig. D), and the angle of lip clearance decreased to 9° at the periphery (Fig. E.)

Great care should be used in preserving the angle of the dead line between the cutting edges. This is an index to the clearance and if the Drill is ground without lip clearance it not only will not cut, but in nine out of ten times will split.



In grinding carbon Drills a rough, coarse stone should be used (we suggest about 46 grain, M Grade), either wet or dry. If dry, the Drill should not be held on the stone long enough to heat it to point of drawing the temper.

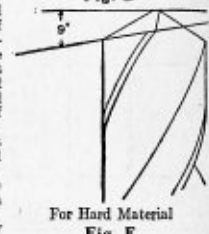
In grinding High Speed Drills a rough, coarse stone is best (we suggest about 46 grain, N. Grade) and should be used dry (never wet) and the Drill must not be submerged in water afterward. Care also should be used to not hold the Drill on wheel long enough to draw its temper.

After the Drill is correctly ground the next thing is its proper use. If carbon steel, a speed of 35 ft. per minute and feed of 1/16-inch per minute for a 1-inch Drill in mild steel and cast iron; in tool steel run 30% slower and in brass 75% faster. This may be varied according to hardness and density of metal to be drilled.

High Speed Drills should be run at two or three times the speed and feed of Carbon Drills.

The tables of Speeds and Feeds at the bottom of this page are based upon average Shop Working Conditions.

Many of our customers are greatly exceeding these rules and are securing more capacity from the use of our Carbon and High Speed Drills than shown in the tables. This, however, is due to their own local conditions.



Speed and Feed for High Speed Drills

Cast Iron and Mild Steel				Tool Steel			
Size	R.P.M.	Feed per Rev.	Feed per Min.	Size	R.P.M.	Feed per Rev.	Feed per Min.
1/16	4891	.002	9/32	1/8	3057	.002	6/32
1/8	2445	.003	7/32	3/8	2028	.002	4/32
1/4	1730	.004	6/32	1/2	1219	.003	3/32
3/8	1335	.005	6/32	3/4	864	.004	3/32
1/2	1067	.006	6/32	1	661	.005	3/32
5/8	873	.007	6/32	1 1/4	509	.006	3/32
3/4	751	.008	6/32	1 1/2	417	.007	2/32
7/8	639	.009	5/32	1 3/4	382	.007	2/32
1	559	.010	5/32	1 3/4	349	.007	2/32
1 1/8	491	.011	5/32	1 3/4	316	.007	2/32
1 1/4	442	.012	5/32	1 3/4	274	.008	2/32
1 1/2	398	.013	5/32	1 3/4	268	.008	2/32
1 3/4	363	.014	5/32	1 3/4	237	.009	2/32
1 3/8	335	.015	5/32	1 3/4	225	.009	2/32
1 1/2	312	.016	4/32	1 3/4	200	.010	2/32
1 1/4	287	.017	4/32	1 3/4	196	.010	1 1/32
1 1/2	270	.018	4/32	1 3/4	193	.010	1 1/32
1 1/4	255	.019	4/32	1 3/4	173	.011	1 1/32
1 1/2	241	.020	4/32	1 3/4	169	.011	1 1/32
1 1/4	232	.020	4/32	1 3/4	153	.012	1 1/32
1 1/2	224	.020	4/32	1 3/4	146	.012	1 1/32
1 1/4	215	.020	4/32	1 3/4	140	.012	1 1/32
1 1/2	210	.020	4/32	1 3/4	133	.012	1 1/32
1 1/4	195	.020	3/32	1 1/2	127	.012	1 1/32
1 1/2	185	.020	3/32	1 1/2	122	.012	1 1/32
1 1/4	176	.020	3/32	1 1/2	117	.012	1 1/32
1 1/2	170	.020	3/32	1 1/2	113	.012	1 1/32
1 1/4	164	.020	3/32	1 1/2	109	.012	1 1/32
1 1/2	158	.020	3/32	1 1/2	105	.012	1 1/32
1 1/4	153	.020	3/32	1 1/2	103	.012	1 1/32
1 1/2	148	.020	3/32	1 1/2	99	.012	1 1/32
1 1/4	143	.020	2 1/32	1 1/2	96	.012	1 1/32
1 1/2	139	.020	2 1/32	1 1/2	92	.012	1 1/32
1 1/4	135	.020	2 1/32	1 1/2	90	.012	1 1/32
1 1/2	131	.020	2 1/32	1 1/2	87	.012	1 1/32
1 1/4	128	.020	2 1/32	1 1/2	85	.012	1 1/32
1 1/2	121	.020	2 1/32	1 1/2	80	.012	1 1/32
1 1/4	114	.020	2 1/32	1 1/2	77	.012	1 1/32
1 1/2	109	.020	2 1/32	1 1/2	73	.012	1 1/32
1 1/4	104	.020	2 1/32	1 1/2	69	.012	1 1/32
1 1/2	100	.020	2 1/32	1 1/2	66	.012	1 1/32
1 1/4	96	.020	1 1/32	1 1/2	64	.012	1 1/32

Speed and Feed for Carbon Twist Drills

Cast Iron and Mild Steel				Tool Steel			
Size	R.P.M.	Feed per Rev.	Feed per Min.	Size	R.P.M.	Feed per Rev.	Feed per Min.
1/16	2445	.002	4/32	1/8	1756	.002	3/32
1/8	1222	.003	3/32	1/4	1045	.002	2 1/32
1/4	815	.004	3/32	3/8	650	.003	1 1/32
3/8	535	.004	2 1/32	1/2	430	.003	1 1/32
1/2	426	.005	2 1/32	3/4	305	.004	1 1/32
3/4	358	.005	1 1/32	1	254	.004	1 1/32
1	300	.006	1 1/32	1 1/4	225	.004	1 1/32
1 1/4	270	.006	1 1/32	1 1/2	199	.004	1 1/32
1 1/2	230	.007	1 1/32	1 3/4	188	.004	1 1/32
1 3/4	216	.007	1 1/32	1 3/4	150	.005	1 1/32
1 3/8	190	.008	1 1/32	1 3/4	142	.005	1 1/32
1 1/2	185	.008	1 1/32	1 3/4	120	.006	1 1/32
1 1/4	166	.009	1 1/32	1 3/4	118	.006	1 1/32
1 1/2	149	.010	1 1/32	1 3/4	100	.007	1 1/32
1 1/4	142	.010	1 1/32	1 3/4	98	.007	1 1/32
1 1/2	134	.010	1 1/32	1 3/4	96	.007	1 1/32
1 1/4	128	.010	1 1/32	1 3/4	94	.007	1 1/32
1 1/2	115	.011	1 1/32	1 3/4	82	.008	1 1/32
1 1/4	113	.011	1 1/32	1 3/4	81	.008	1 1/32
1 1/2	107	.011	1 1/32	1 3/4	78	.008	1 1/32
1 1/4	102	.011	1 1/32	1 3/4	70	.009	1 1/32
1 1/2	92	.012	1 1/32	1 3/4	69	.009	1 1/32
1 1/4	90	.012	1 1/32	1 3/4	66	.009	1 1/32
1 1/2	82	.013	1 1/32	1 3/4	64	.009	1 1/32
1 1/4	82	.013	1 1/32	1 3/4	62	.009	1 1/32
1 1/2	79	.013	1 1/32	1 3/4	60	.009	1 1/32
1 1/4	78	.013	1 1/32	1 3/4	55	.010	1 1/32
1 1/2	76	.013	1 1/32	1 3/4	55	.010	1 1/32
1 1/4	70	.014	1 1/32	1 3/4	53	.010	1 1/32
1 1/2	69	.014	1 1/32	1 3/4	51	.010	1 1/32
1 1/4	66	.014	1 1/32	1 3/4	49	.010	1 1/32
1 1/2	65	.014	1 1/32	1 3/4	47	.010	1 1/32
1 1/4	63	.014	1 1/32	1 3/4	43	.011	1 1/32
1 1/2	61	.014	1 1/32	1 3/4	42	.011	1 1/32
1 1/4	59	.014	1 1/32	1 3/4	41	.011	1 1/32
1 1/2	56	.014	1 1/32	1 3/4	40	.011	1 1/32
1 1/4	55	.014	1 1/32	1 3/4	38	.011	1 1/32
1 1/2	49	.015	1 1/32	1 3/4	36	.011	1 1/32
1 1/4	48	.015	1 1/32	1 3/4	34	.011	1 1/32
1 1/2	46	.015	1 1/32	1 3/4	33	.011	1 1/32
1 1/4	44	.015	1 1/32	1 3/4	32	.011	1 1/32

For Brass 75% faster.

Twist Drill Sizes with Decimal Equivalents and M.M.

In.	Decimal	Wire	m.m.	In.	Decimal	Wire	m.m.	In.	Decimal	Let	m.m.	In.	Decimal	Let	m.m.	In.	Decimal	m.m.	In.	Decimal	m.m.	In.	Decimal	m.m.
.0135	80			.1230	3.1	.2520	6.4	.5312	13.5	1 1/2	1.2599	32	.0276	61	2 1/2	2.7969								
.0145	79			.1250	3.2	.2559	6.5	.5315			1.2656	32 1/2	.0312	2 1/2	2 1/2	2.8125								
.0156				.1260	3.25	.2570		.5469			1.2795	33	.0343	2 3/4	2 3/4	2.8150								
.0160	78			.1279	3.3	.2598	6.6	.5512	14	1 1/2	1.2812	33 1/2	.0375	2 3/4	2 3/4	2.8281								
.0180	77			.1285	3.3	.2610					1.2969	34	.0406	2 3/4	2 3/4	2.8346								
.0197		.5		.1299	3.4	.2638	6.7				1.2992	34 1/2	.0437	2 3/4	2 3/4	2.8437								
.0200	76			.1339	3.4	.2656					1.3125	35	.0469	2 3/4	2 3/4	2.8543								
.0210	75			.1360	20	.2658	6.75				1.3189	35 1/2	.0500	2 3/4	2 3/4	2.8594								
.0225	74			.1378	3.5	.2660					1.3281	36	.0531	2 3/4	2 3/4	2.8740								
.0236		.6		.1405	28	.2677	6.8				1.3386	36 1/2	.0562	2 3/4	2 3/4	2.8750								
.0240	73			.1406		.2716	6.9				1.3437	37	.0594	2 3/4	2 3/4	2.8906								
.0240	72			.1417	27	.2720					1.3583	37 1/2	.0625	2 3/4	2 3/4	2.9037								
.0260	71			.1440	3.6	.2756					1.3750	38	.0656	2 3/4	2 3/4	2.9134								
.0276		.7		.1457	26	.2795	7				1.3780	38 1/2	.0688	2 3/4	2 3/4	2.9219								
.0280	69			.1477	3.75	.2811					1.3906	39	.0719	2 3/4	2 3/4	2.9331								
.0292		.75		.1495	25	.2812	7.25				1.3977	39 1/2	.0750	2 3/4	2 3/4	2.9375								
.0296	68			.1496	3.8	.2835					1.4062	40	.0781	2 3/4	2 3/4	2.9527								
.0310		.8		.1520	24	.2854	7.3				1.4173	40 1/2	.0812	2 3/4	2 3/4	2.9531								
.0315				.1535	3.9	.2874					1.4219	41	.0843	2 3/4	2 3/4	2.9687								
.0320	67			.1540	23	.2900	7.4				1.4370	41 1/2	.0875	2 3/4	2 3/4	2.9724								
.0330	66			.1562		.2913					1.4375	42	.0906	2 3/4	2 3/4	2.9844								
.0350	65			.1570	22	.2950	7.5				1.4531	42 1/2	.0937	2 3/4	2 3/4	2.9921								
.0354		.9		.1575	4	.2953					1.4567	43	.0969	2 3/4	2 3/4	3.0000								
.0360				.1590	21	.2968	7.6				1.4687	43 1/2	.0999	2 3/4	2 3/4	3.0156								
.0370	63			.1610	20	.2992					1.4781	44	.1031	2 3/4	2 3/4	3.0344								
.0380	62			.1614	4.1	.3020	7.7				1.4844	44 1/2	.1062	2 3/4	2 3/4	3.0469								
.0390	61			.1654	4.2	.3031					1.4961	45	.1094	2 3/4	2 3/4	3.0625								
.0394		1		.1660	19	.3052	7.75				1.5000	45 1/2	.1125	2 3/4	2 3/4	3.0781								
.0400	60			.1673	4.25	.3071					1.5156	46	.1156	2 3/4	2 3/4	3.0937								
.0410	59			.1685	4.3	.3110	7.9				1.5158	46 1/2	.1188	2 3/4	2 3/4	3.1094								
.0420	58			.1695	18	.3125					1.5312	47	.1219	2 3/4	2 3/4	3.1250								
.0430	57			.1719		.3150	8				1.5354	47 1/2	.1250	2 3/4	2 3/4	3.1406								
.0433		1.1		.1730	17	.3160					1.5469	48	.1281	2 3/4	2 3/4	3.1562								
.0466	56			.1732	4.4	.3189	8.1				1.5551	48 1/2	.1312	2 3/4	2 3/4	3.1719								
.0472				.1770	16	.3228	8.2				1.5625	49	.1343	2 3/4	2 3/4	3.1875								
.0472		1.2		.1771	4.5	.3230					1.5748	49 1/2	.1375	2 3/4	2 3/4	3.2031								
.0492		1.25		.1800	15	.3248	8.25				1.5781	50	.1406	2 3/4	2 3/4	3.2187								
.0512		1.3		.1811	4.6	.3268					1.5837	50 1/2	.1437	2 3/4	2 3/4	3.2344								
.0520	55			.1820	14	.3281	8.3				1.5945	51	.1469	2 3/4	2 3/4	3.2500								
.0550	54			.1850	13	.3307					1.6094	51 1/2	.1500	2 3/4	2 3/4	3.2656								
.0551		1.4		.1871	4.75	.3320					1.6142	52	.1531	2 3/4	2 3/4	3.2812								
.0591		1.5		.1875		.3346	8.5				1.6250	52 1/2	.1562	2 3/4	2 3/4	3.2969								
.0595	53			.1890	12	.3386	8.6				1.6339	53	.1594	2 3/4	2 3/4	3.3125								
.0625				.1910	11	.3390					1.6406	53 1/2	.1625	2 3/4	2 3/4	3.3281								
.0629		1.6		.1929	4.9	.3425					1.6536	54	.1656	2 3/4	2 3/4	3.3437								
.0635	52			.1935	10	.3437	8.7				1.6562	54 1/2	.1688	2 3/4	2 3/4	3.3594								
.0669		1.7		.1960	9	.3445	8.75				1.6719	55	.1719	2 3/4	2 3/4	3.3750								
.0670	51			.1968	5	.3465					1.6732	55 1/2	.1750	2 3/4	2 3/4	3.3906								
.0690		1.75		.1990	8	.3480	8.8				1.6875	56	.1781	2 3/4	2 3/4	3.4062								
.0700	50			.2008	5.1	.3504	8.9				1.6929	56 1/2	.1812	2 3/4	2 3/4	3.4219								
.0709		1.8		.2010	7	.3550					1.7031	57	.1843	2 3/4	2 3/4	3.4375								
.0748	49			.2031	6	.3580	9.1				1.7126	57 1/2	.1875	2 3/4	2 3/4	3.4531								
.0760		1.9		.2040	5.2	.3583					1.7187	58	.1906	2 3/4	2 3/4	3.4688								
.0781	48			.2047		.3594	9.2				1.7344	58 1/2	.1937	2 3/4	2 3/4	3.4844								
.0785				.2055	5	.3622					1.7344	59	.1969	2 3/4	2 3/4	3.5000								
.0787	47			.2066	5.25	.3641	9.25				1.7500	59 1/2	.1999	2 3/4	2 3/4	3.5156								
.0795		2		.2087	5.3	.3661					1.7520	60	.2031	2 3/4	2 3/4	3.5312								
.0810	46			.2090		.3680	9.4				1.7656	60 1/2	.2062	2 3/4	2 3/4	3.5469								
.0820	45			.2126	4.4	.3701					1.7717	61	.2094	2 3/4	2 3/4	3.5625								
.0827		2.1		.2130	3	.3740	9.5				1.7812	61 1/2	.2125	2 3/4	2 3/4	3.5781								
.0860	44			.2165	5.5	.3750					1.7914	62	.2156	2 3/4	2 3/4	3.5937								
.0866		2.2		.2187		.3770	9.6				1.7969	62 1/2	.2188	2 3/4	2 3/4	3.6093								
.0885		2.25		.2205	5.6	.3780					1.8110	63	.2219	2 3/4	2 3/4	3.6250								
.0900	43			.2210	2	.3819	9.7				1.8281	63 1/2	.2250	2 3/4	2 3/4	3.6406								
.0905		2.3		.2244	5.7	.3839					1.8307	64	.2281	2 3/4	2 3/4	3.6562								
.0935	42			.2254	5.75	.3858	9.75				1.8437	64 1/2	.2312	2 3/4	2 3/4	3.6719								
.0937				.2280	5.8	.3860					1.8504	65	.2343	2 3/4	2 3/4	3.6875								
.0945		2.4		.2283		.3898	9.9				1.8594	65 1/2	.2375	2 3/4	2 3/4	3.7031								
.0960	41			.2323	5.9	.3906					1.8701	66	.2406	2 3/4	2 3/4	3.7187								
.0980	40					.3937	10				1.8750	66 1/2	.2437	2 3/4	2 3/4	3.7344								
.0984		2.5				.3970					1.8808	67	.2469	2 3/4	2 3/4	3.7500								
.0995	39					.4040					1.8906	67 1/2	.2500	2 3/4	2 3/4	3.7656								
.1015	38					.4062					1.9062	68	.2531	2 3/4	2 3/4	3.7812								
.1024		2.6				.4130		</																

"HERCULES" HIGH SPEED TWIST DRILLS

Taper Shank



Hercules Drills are made from a vanadium high speed steel and in the process of twisting while hot preserves the original grain of the steel. The result is a drill which cannot be excelled as to quality, strength, toughness and endurance. They are also milled and ground so as to drill accurately.

Diameter, Inches	Price Each	Length Over All, Inches	Length of Twist, Inches	Shank Taper	Diameter, Inches	Price Each	Length Over All, Inches	Length of Twist, Inches	Shank Taper
$\frac{1}{4}$	\$0.95	$6\frac{1}{8}$	$3\frac{7}{8}$	No. 1	$1\frac{1}{8}$	\$5.80	$12\frac{3}{4}$	$7\frac{5}{8}$	No. 4
$\frac{9}{32}$	.95	$6\frac{1}{4}$	$3\frac{3}{4}$	"	$1\frac{5}{32}$	6.20	$12\frac{1}{8}$	$7\frac{3}{4}$	"
$\frac{5}{16}$	1.00	$6\frac{3}{8}$	$3\frac{3}{4}$	"	$1\frac{13}{32}$	6.55	13	$7\frac{1}{2}$	"
$\frac{11}{32}$	1.00	$6\frac{1}{2}$	$3\frac{3}{4}$	"	$1\frac{7}{16}$	6.90	$13\frac{1}{8}$	8	"
$\frac{3}{8}$	1.05	$6\frac{3}{4}$	$4\frac{1}{8}$	"	$1\frac{1}{2}$	7.20	$13\frac{1}{2}$	$8\frac{3}{8}$	"
$\frac{13}{32}$	1.10	7	$4\frac{1}{4}$	"	$1\frac{9}{16}$	7.60	$14\frac{1}{8}$	9	"
$\frac{7}{16}$	1.05	$7\frac{5}{8}$	$4\frac{1}{4}$	No. 2	$1\frac{5}{8}$	8.00	$14\frac{1}{4}$	$9\frac{1}{8}$	"
$\frac{15}{32}$	1.10	$7\frac{1}{2}$	$4\frac{1}{4}$	"	$1\frac{11}{16}$	8.40	$14\frac{3}{8}$	$9\frac{1}{4}$	"
$\frac{1}{2}$	1.15	$7\frac{3}{4}$	$4\frac{1}{4}$	"	$1\frac{3}{4}$	8.80	$14\frac{1}{2}$	$9\frac{3}{8}$	"
$\frac{9}{16}$	1.20	$7\frac{7}{8}$	$4\frac{1}{2}$	"	$1\frac{7}{8}$	9.20	$15\frac{1}{8}$	9	No. 5
$\frac{17}{32}$	1.30	8	$4\frac{3}{4}$	"	$1\frac{15}{16}$	9.60	$15\frac{3}{8}$	9	"
$\frac{19}{32}$	1.40	$8\frac{1}{4}$	5	"	$1\frac{1}{2}$	10.00	$15\frac{1}{2}$	$9\frac{1}{8}$	"
$\frac{21}{32}$	1.50	$8\frac{1}{2}$	$5\frac{1}{4}$	"	$1\frac{1}{16}$	10.40	$15\frac{5}{8}$	$9\frac{1}{4}$	"
$\frac{23}{32}$	1.60	$8\frac{3}{4}$	$5\frac{1}{4}$	"	$1\frac{1}{8}$	10.80	$15\frac{3}{4}$	$9\frac{3}{8}$	"
$\frac{5}{8}$	1.75	$8\frac{7}{8}$	$5\frac{1}{2}$	"	$1\frac{1}{4}$	11.20	$15\frac{7}{8}$	$9\frac{1}{2}$	"
$\frac{21}{16}$	1.90	9	$5\frac{3}{4}$	"	$1\frac{3}{8}$	11.65	16	$9\frac{5}{8}$	"
$\frac{23}{16}$	2.05	$9\frac{1}{4}$	$5\frac{3}{4}$	No. 3	$1\frac{7}{8}$	12.10	$16\frac{1}{8}$	$9\frac{3}{4}$	"
$\frac{25}{16}$	2.25	10	6	"	$1\frac{21}{32}$	12.60	$16\frac{1}{4}$	$9\frac{7}{8}$	"
$\frac{3}{4}$	2.40	$10\frac{1}{4}$	$6\frac{1}{4}$	"	$1\frac{1}{2}$	13.05	$16\frac{3}{8}$	10	"
$\frac{25}{32}$	2.60	$10\frac{3}{8}$	$6\frac{3}{8}$	"	$1\frac{23}{32}$	13.60	$16\frac{1}{2}$	$10\frac{1}{8}$	"
$\frac{27}{32}$	2.80	$10\frac{1}{2}$	$6\frac{1}{2}$	"	$1\frac{3}{4}$	14.10	$16\frac{5}{8}$	$10\frac{1}{4}$	"
$\frac{29}{32}$	3.00	$10\frac{1}{2}$	$6\frac{1}{2}$	"	$1\frac{25}{32}$	14.55	$16\frac{3}{4}$	$10\frac{3}{8}$	"
$\frac{7}{8}$	3.20	$10\frac{3}{8}$	$6\frac{5}{8}$	"	$1\frac{9}{16}$	15.00	$16\frac{7}{8}$	$10\frac{1}{2}$	"
$\frac{29}{16}$	3.45	$10\frac{3}{8}$	$6\frac{3}{8}$	"	$1\frac{27}{32}$	15.50	17	$10\frac{5}{8}$	"
$\frac{31}{16}$	3.75	$10\frac{3}{4}$	$6\frac{3}{4}$	"	$1\frac{7}{8}$	16.00	$17\frac{1}{8}$	$10\frac{3}{4}$	"
$\frac{33}{16}$	4.05	$10\frac{7}{8}$	$6\frac{7}{8}$	"	$1\frac{29}{32}$	16.55	$17\frac{1}{4}$	$10\frac{7}{8}$	"
1	4.35	12	$6\frac{7}{8}$	No. 4	$1\frac{15}{16}$	17.10	$17\frac{1}{2}$	$10\frac{3}{4}$	"
$1\frac{1}{32}$	4.75	$12\frac{1}{8}$	7	"	$1\frac{31}{32}$	17.65	$17\frac{3}{8}$	$10\frac{3}{4}$	"
$1\frac{1}{16}$	5.10	$12\frac{1}{4}$	$7\frac{1}{8}$	"	2	18.20	$17\frac{1}{2}$	$10\frac{3}{4}$	"
$1\frac{3}{32}$	5.45	$12\frac{1}{2}$	$7\frac{3}{8}$	"					

*Sizes $\frac{3}{8}$ and $\frac{1}{2}$ inches furnished with No. 2 shank unless otherwise specified. On sizes $1\frac{1}{8}$ to 2-inch, inclusive, No. 4 Taper Shank furnished when ordered. We can furnish drills up to 3 inches in diameter upon request.

Approximate Weights of Taper Shank Drills

Size, inches.....	$\frac{3}{8}$	$\frac{1}{4}$	$\frac{3}{16}$	$\frac{1}{8}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{1}{2}$	1	$1\frac{1}{8}$	$1\frac{1}{2}$	$1\frac{3}{4}$	2	$2\frac{1}{2}$	3
Weights, pounds.....	$\frac{3}{8}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	1	$1\frac{1}{2}$	2	3	4	5	6	8

All sizes are carried in stock, up to and including 2 inches. Sixty-fourth sizes can also be furnished.

CARBON AND HIGH SPEED TWIST DRILLS

Taper Shank Twist Drills

No. 102
Carbon
SteelNo. 402
Diamond
High Speed

Our Carbon and Diamond High Speed Drills are made of the grades of steel selected by the manufacturers after exhaustive tests to determine the best material for the purpose. They are turned and milled from the solid bar and with the greatest care exercised in tempering and grinding, we recommend them to do more work with less grinding than any other make. We invite tests to prove their superiority.

Diam. Ins.	High Speed Price Each	Carbon Steel Price Each	Length Over All, Inches	Length of Twist, Inches	Taper of Shank	Diam. Ins.	High Speed Price Each	Carbon Steel Price Each	Length Over All, Inches	Length of Twist, Inches	Taper of Shank
$\frac{1}{16}$	\$ 0.90	\$ 0.35	$4\frac{3}{8}$	$1\frac{1}{4}$	No. 1	$1\frac{1}{16}$	\$12.25	\$ 4.80	$14\frac{1}{4}$	$8\frac{5}{8}$	No. 4
$\frac{3}{32}$	.90	.40	$4\frac{1}{2}$	$1\frac{3}{8}$	"	$1\frac{1}{8}$	13.00	5.00	$14\frac{3}{8}$	$8\frac{3}{4}$	"
$\frac{1}{8}$	.90	.45	$5\frac{1}{8}$	$2\frac{1}{8}$	"	$1\frac{3}{8}$	13.75	5.20	$14\frac{1}{2}$	$8\frac{7}{8}$	"
$\frac{9}{32}$	.90	.45	$5\frac{3}{8}$	$2\frac{3}{8}$	"	$1\frac{1}{2}$	14.65	5.40	$14\frac{3}{4}$	9	"
$\frac{3}{16}$	.90	.50	$5\frac{3}{4}$	$2\frac{3}{4}$	"	$1\frac{5}{8}$	15.50	5.60	$14\frac{3}{4}$	$9\frac{1}{8}$	"
$\frac{7}{16}$	1.00	.55	$5\frac{7}{8}$	$2\frac{7}{8}$	"	$1\frac{3}{4}$	16.40	5.80	$14\frac{7}{8}$	$9\frac{1}{4}$	"
$\frac{1}{2}$	1.10	.60	$6\frac{1}{8}$	3	"	$1\frac{1}{2}$	17.25	6.00	15	$9\frac{3}{8}$	"
$\frac{5}{8}$	1.20	.65	$6\frac{1}{4}$	$3\frac{1}{8}$	"	$1\frac{5}{8}$	18.15	6.30	$15\frac{1}{8}$	$9\frac{1}{2}$	"
$\frac{3}{4}$	1.30	.70	$6\frac{3}{8}$	$3\frac{1}{4}$	"	$1\frac{7}{8}$	19.00	6.60	$15\frac{1}{4}$	$9\frac{5}{8}$	"
$\frac{7}{8}$	1.40	.75	$6\frac{1}{2}$	$3\frac{3}{8}$	"	$1\frac{1}{2}$	20.00	6.90	$15\frac{3}{8}$	$9\frac{3}{4}$	"
1	1.50	.80	$6\frac{3}{4}$	$3\frac{3}{4}$	"	$1\frac{3}{8}$	21.00	7.20	$15\frac{1}{2}$	$9\frac{7}{8}$	"
$1\frac{1}{8}$	1.65	.85	7	$3\frac{7}{8}$	"	$1\frac{1}{2}$	22.00	7.50	$15\frac{5}{8}$	10	"
$1\frac{1}{4}$	1.75	.90	$7\frac{1}{4}$	$4\frac{1}{8}$	"	$1\frac{5}{8}$	23.00	7.80	$15\frac{3}{4}$	$10\frac{1}{8}$	"
$1\frac{3}{8}$	1.90	.95	$7\frac{1}{2}$	$4\frac{3}{8}$	"	$1\frac{3}{4}$	24.00	8.10	$15\frac{7}{8}$	$10\frac{1}{4}$	"
$1\frac{1}{2}$	2.00	1.00	$7\frac{3}{4}$	$4\frac{3}{4}$	"	$1\frac{3}{8}$	25.00	8.40	16	$10\frac{3}{4}$	"
$1\frac{3}{4}$	2.15	1.10	8	$4\frac{7}{8}$	"	$1\frac{5}{8}$	26.25	8.60	$16\frac{1}{8}$	$10\frac{1}{4}$	"
$1\frac{7}{8}$	2.25	1.20	$8\frac{1}{8}$	$5\frac{1}{8}$	"	$1\frac{7}{8}$	27.50	8.80	$16\frac{1}{4}$	$10\frac{3}{8}$	"
2	2.40	1.30	$8\frac{1}{4}$	$4\frac{3}{4}$	No. 2	$1\frac{1}{2}$	28.75	9.00	$16\frac{3}{8}$	$10\frac{1}{2}$	"
$2\frac{1}{8}$	2.50	1.40	$8\frac{3}{4}$	$5\frac{1}{8}$	"	$1\frac{3}{8}$	30.00	9.20	$16\frac{1}{2}$	$10\frac{3}{8}$	"
$2\frac{1}{4}$	2.75	1.50	9	$5\frac{3}{8}$	"	$1\frac{1}{2}$	31.25	9.35	$16\frac{1}{2}$	$10\frac{3}{4}$	"
$2\frac{3}{8}$	3.00	1.60	$9\frac{1}{4}$	$5\frac{1}{2}$	"	$1\frac{5}{8}$	32.50	9.50	$16\frac{3}{4}$	$10\frac{3}{8}$	"
$2\frac{1}{2}$	3.25	1.70	$9\frac{1}{2}$	$5\frac{3}{4}$	"	$1\frac{3}{4}$	33.75	9.65	$16\frac{1}{2}$	$10\frac{3}{4}$	"
$2\frac{7}{8}$	3.50	1.85	$9\frac{3}{4}$	6	"	2	35.00	9.80	$16\frac{1}{2}$	$10\frac{3}{8}$	"
$2\frac{1}{2}$	3.75	2.00	$9\frac{7}{8}$	$6\frac{1}{8}$	"	$2\frac{1}{8}$	36.25	10.20	$16\frac{1}{2}$	$9\frac{1}{2}$	No. 5
3	4.00	2.15	10	$6\frac{3}{8}$	"	$2\frac{1}{4}$	37.50	10.60	17	$10\frac{1}{8}$	"
$3\frac{1}{8}$	4.40	2.30	$10\frac{1}{4}$	$6\frac{3}{4}$	"	$2\frac{3}{8}$	38.75	10.90	17	$10\frac{1}{4}$	"
$3\frac{1}{4}$	4.75	2.45	$10\frac{1}{2}$	$6\frac{7}{8}$	"	$2\frac{1}{2}$	40.00	11.20	17	$10\frac{1}{8}$	"
$3\frac{3}{8}$	5.15	2.60	$10\frac{5}{8}$	$6\frac{7}{8}$	"	$2\frac{3}{4}$	41.25	11.60	17	$10\frac{1}{4}$	"
$3\frac{1}{2}$	5.50	2.75	$10\frac{3}{4}$	$6\frac{1}{4}$	No. 3	$2\frac{3}{8}$	42.50	12.00	17	$10\frac{3}{8}$	"
$3\frac{5}{8}$	5.90	2.90	$10\frac{7}{8}$	$6\frac{3}{8}$	"	$2\frac{1}{2}$	43.75	12.40	$17\frac{1}{2}$	$10\frac{3}{4}$	"
4	6.25	3.00	11	$6\frac{1}{2}$	"	$2\frac{3}{4}$	45.00	12.80	$17\frac{1}{2}$	$10\frac{3}{8}$	"
$4\frac{1}{8}$	6.75	3.25	$11\frac{1}{8}$	$6\frac{3}{8}$	"	$2\frac{7}{8}$	47.50	13.20	$17\frac{1}{2}$	$10\frac{3}{4}$	"
$4\frac{1}{4}$	7.25	3.40	$11\frac{1}{4}$	$6\frac{3}{4}$	"	$2\frac{1}{2}$	50.00	13.60	$17\frac{1}{2}$	$10\frac{3}{8}$	"
$4\frac{3}{8}$	7.75	3.60	$11\frac{1}{2}$	7	"	$2\frac{3}{8}$	52.50	14.00	18	$10\frac{7}{8}$	"
$4\frac{1}{2}$	8.25	3.80	$11\frac{3}{4}$	$7\frac{1}{4}$	"	$2\frac{3}{4}$	55.00	14.40	18	$10\frac{7}{8}$	"
$4\frac{3}{4}$	8.90	4.00	$11\frac{7}{8}$	$7\frac{3}{8}$	"	$2\frac{1}{2}$	57.50	14.70	$18\frac{1}{2}$	$11\frac{3}{8}$	"
$4\frac{7}{8}$	9.50	4.20	12	$7\frac{1}{2}$	"	$2\frac{3}{8}$	60.00	15.00	$18\frac{1}{2}$	$11\frac{3}{8}$	"
5	10.15	4.40	$12\frac{1}{8}$	$7\frac{5}{8}$	"	$2\frac{1}{2}$	62.50	15.30	19	$11\frac{3}{8}$	"
$5\frac{1}{8}$	10.75	4.50	$12\frac{1}{4}$	8	"	$2\frac{3}{4}$	65.00	15.60	19	$11\frac{3}{8}$	"
$5\frac{1}{4}$	11.50	4.65	$14\frac{1}{8}$	$8\frac{1}{2}$	"						

We can furnish drills up to 4 inches in diameter upon request.

Approximate Weights of Taper Shank Drills

Size, inches	$\frac{1}{16}$	$\frac{3}{32}$	$\frac{1}{8}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{7}{16}$	$\frac{1}{2}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	$1\frac{3}{4}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4
Weights, pounds	$\frac{1}{16}$	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	1	$1\frac{1}{2}$	$2\frac{1}{4}$	$3\frac{1}{4}$	$5\frac{1}{4}$	$6\frac{1}{4}$	12	20	50

The above weights are for High Speed only. Carbon Steel Drills weigh about 20% less.

All sizes are carried in stock, up to and including 3 inches. Sixty-fourth sizes can also be furnished.

All orders filled with Carbon Steel Drills, unless High Speed are ordered.

CARBON AND HIGH SPEED TWIST DRILLS

Jobbers' Size Drills
Straight Shank Short LengthNo. 105
Carbon
SteelNo. 405
Diamond
High Speed

Jobbers Drills, both carbon and high speed, are milled from the solid bar. The sizes run from $\frac{1}{32}$ to $\frac{1}{2}$ -inch only and are used extensively for drilling through thin metals. Jobbers Drills are the most common drill on the market and more of them are used than any other. The Straight Shank Drills below, while a little higher in price, are longer and more suitable for deep drilling.

Diam., Ins.	High Speed		Carbon Steel		Lgth. Over All, Ins.	Lgth. Twist, Ins.	Diam., Ins.	High Speed		Carbon Steel		Lgth. Over All, Ins.	Lgth. Twist, Ins.
	Dozen	Each	Dozen	Each				Dozen	Each	Dozen	Each		
$\frac{1}{32}$			\$0.90	\$0.09	$1\frac{1}{2}$	$9\frac{1}{2}$	$\frac{1}{32}$	\$ 9.10	\$0.91	\$3.65	\$0.37	$4\frac{1}{4}$	$2\frac{1}{2}$
$\frac{1}{16}$			1.00	.10	$1\frac{3}{4}$	$9\frac{3}{4}$	$\frac{1}{16}$	10.50	1.05	3.90	.39	$4\frac{3}{8}$	$2\frac{3}{8}$
$\frac{3}{32}$	\$5.70	\$0.57	1.00	.10	$2\frac{1}{2}$	$1\frac{1}{4}$	$\frac{3}{32}$	10.50	1.05	4.20	.42	$4\frac{1}{2}$	$3\frac{1}{8}$
$\frac{1}{8}$	5.70	.57	1.10	.10	$2\frac{3}{4}$	$1\frac{3}{8}$	$\frac{1}{8}$	12.00	1.20	4.50	.45	$4\frac{3}{4}$	$3\frac{3}{8}$
$\frac{5}{32}$	5.70	.57	1.20	.12	$2\frac{3}{4}$	$1\frac{3}{8}$	$\frac{5}{32}$	12.00	1.20	4.80	.48	$4\frac{3}{4}$	$3\frac{3}{8}$
$\frac{3}{16}$	5.90	.59	1.30	.13	$2\frac{3}{4}$	$1\frac{3}{8}$	$\frac{3}{16}$	13.50	1.35	5.10	.51	$4\frac{3}{4}$	$3\frac{3}{8}$
$\frac{7}{32}$	5.90	.59	1.45	.15	3	$1\frac{3}{8}$	$\frac{7}{32}$	13.50	1.35	5.40	.54	5	$3\frac{3}{4}$
$\frac{1}{4}$	6.10	.61	1.60	.16	$3\frac{1}{4}$	$1\frac{3}{8}$	$\frac{1}{4}$	15.00	1.50	5.70	.57	$5\frac{1}{8}$	$3\frac{3}{4}$
$\frac{9}{32}$	6.10	.61	1.80	.18	$3\frac{1}{4}$	$2\frac{1}{8}$	$\frac{9}{32}$	15.00	1.50	6.00	.60	$5\frac{1}{4}$	$3\frac{3}{4}$
$\frac{5}{16}$	6.30	.63	2.00	.20	$3\frac{3}{8}$	$2\frac{1}{8}$	$\frac{5}{16}$	17.00	1.70	6.40	.64	$5\frac{3}{8}$	$3\frac{3}{4}$
$\frac{11}{32}$	6.30	.63	2.20	.22	$3\frac{3}{8}$	$2\frac{1}{8}$	$\frac{11}{32}$	17.00	1.70	6.80	.68	$5\frac{3}{8}$	$4\frac{1}{8}$
$\frac{3}{8}$	7.00	.70	2.40	.24	$3\frac{3}{8}$	$2\frac{1}{8}$	$\frac{3}{8}$	18.75	1.88	7.20	.72	$5\frac{3}{8}$	$4\frac{1}{8}$
$\frac{13}{32}$	7.00	.70	2.65	.27	$3\frac{3}{4}$	$2\frac{1}{2}$	$\frac{13}{32}$	18.75	1.88	7.50	.75	$5\frac{3}{4}$	$4\frac{1}{2}$
$\frac{7}{16}$	7.35	.74	2.90	.29	$3\frac{3}{4}$	$2\frac{1}{2}$	$\frac{7}{16}$	20.00	2.00	7.75	.78	$5\frac{3}{4}$	$4\frac{1}{2}$
$\frac{15}{32}$	7.35	.74	3.15	.32	4	$2\frac{3}{4}$	$\frac{15}{32}$	20.00	2.00	8.00	.80	6	$4\frac{1}{2}$
$\frac{1}{2}$	9.10	.91	3.40	.34	$4\frac{1}{2}$	$2\frac{3}{4}$	$\frac{1}{2}$						

The $\frac{3}{16}$ -inch size is suitable for stay bolt drilling.

Approximate Weights

Size, inches.....	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{7}{16}$	$\frac{1}{2}$
Weight, per dozen.....	2 OZS.	4 OZS.	8 OZS.	13 OZS.	1 $\frac{3}{4}$ lbs.

Straight Shank Drills
Taper LengthNo. 104
Carbon SteelNo. 404 Diamond
High Speed

These Straight Shank Drills, both carbon and high speed like the above, are milled from the solid bar. They have a somewhat longer twist and are used for drilling through thicker metals and for deeper holes.

Diam., Inches	Price Each		Lgth. Over All, Ins.	Lgth. of Twist, Ins.	Diam., Inches	Price Each		Lgth. Over All, Ins.	Lgth. of Twist, Ins.	Diam., Inches	Price Each		Lgth. Over All, Ins.	Lgth. of Twist, Ins.
	High Speed	Carbon Steel				High Speed	Carbon Steel				High Speed	Carbon Steel		
$\frac{1}{16}$	\$0.90	\$0.35	3 $\frac{1}{2}$	1 $\frac{1}{2}$	$\frac{1}{16}$	\$2.25	\$1.20	8 $\frac{1}{2}$	5 $\frac{1}{2}$	$\frac{1}{16}$	\$6.75	\$3.20	11 $\frac{1}{2}$	7 $\frac{3}{8}$
$\frac{3}{32}$	.90	.40	4 $\frac{1}{2}$	1 $\frac{3}{4}$	$\frac{3}{32}$	2.40	1.30	8 $\frac{1}{2}$	5 $\frac{1}{2}$	$\frac{3}{32}$	7.25	3.40	11 $\frac{1}{2}$	7 $\frac{3}{8}$
$\frac{1}{8}$	.90	.45	5 $\frac{1}{4}$	2 $\frac{1}{8}$	$\frac{1}{8}$	2.50	1.40	8 $\frac{1}{2}$	5 $\frac{1}{2}$	$\frac{1}{8}$	7.75	3.60	11 $\frac{1}{2}$	7 $\frac{3}{8}$
$\frac{5}{32}$	.90	.45	5 $\frac{3}{4}$	3	$\frac{5}{32}$	2.75	1.50	9	5 $\frac{3}{4}$	$\frac{5}{32}$	8.25	3.80	11 $\frac{1}{2}$	7 $\frac{3}{8}$
$\frac{3}{16}$	.90	.50	5 $\frac{3}{4}$	3 $\frac{1}{2}$	$\frac{3}{16}$	3.00	1.60	9 $\frac{1}{4}$	6	$\frac{3}{16}$	8.90	4.00	11 $\frac{1}{2}$	7 $\frac{3}{8}$
$\frac{7}{32}$	1.00	.55	6	4	$\frac{7}{32}$	3.25	1.70	9 $\frac{1}{2}$	6 $\frac{1}{4}$	$\frac{7}{32}$	9.50	4.20	12	8 $\frac{1}{4}$
$\frac{1}{4}$	1.10	.60	6 $\frac{1}{4}$	4 $\frac{1}{4}$	$\frac{1}{4}$	3.50	1.85	9 $\frac{3}{4}$	6 $\frac{3}{4}$	$\frac{1}{4}$	10.15	4.40	12 $\frac{1}{2}$	8 $\frac{1}{4}$
$\frac{9}{32}$	1.20	.65	6 $\frac{1}{4}$	4 $\frac{1}{4}$	$\frac{9}{32}$	3.75	2.00	9 $\frac{3}{4}$	6 $\frac{3}{4}$	$\frac{9}{32}$	10.75	4.50	12 $\frac{1}{2}$	8 $\frac{1}{4}$
$\frac{5}{16}$	1.30	.70	6 $\frac{3}{4}$	4 $\frac{3}{4}$	$\frac{5}{16}$	4.00	2.15	10	6 $\frac{3}{4}$	$\frac{5}{16}$	11.50	4.65	14 $\frac{1}{2}$	9 $\frac{1}{4}$
$\frac{11}{32}$	1.40	.75	6 $\frac{3}{4}$	4 $\frac{3}{4}$	$\frac{11}{32}$	4.40	2.30	10 $\frac{1}{2}$	6 $\frac{3}{4}$	$\frac{11}{32}$	12.25	4.80	14 $\frac{1}{2}$	9 $\frac{1}{4}$
$\frac{3}{8}$	1.50	.80	6 $\frac{3}{4}$	4 $\frac{3}{4}$	$\frac{3}{8}$	4.75	2.45	10 $\frac{3}{4}$	7	$\frac{3}{8}$	13.00	5.00	14 $\frac{1}{2}$	9 $\frac{1}{4}$
$\frac{13}{32}$	1.65	.85	7	4 $\frac{3}{4}$	$\frac{13}{32}$	5.15	2.60	10 $\frac{3}{4}$	7	$\frac{13}{32}$	14.65	5.40	14 $\frac{1}{2}$	9 $\frac{1}{4}$
$\frac{7}{16}$	1.75	.90	7 $\frac{1}{4}$	4 $\frac{3}{4}$	$\frac{7}{16}$	5.50	2.75	10 $\frac{3}{4}$	7 $\frac{1}{4}$	$\frac{7}{16}$	14.65	5.40	14 $\frac{1}{2}$	9 $\frac{1}{4}$
$\frac{15}{32}$	1.90	.95	7 $\frac{1}{4}$	4 $\frac{3}{4}$	$\frac{15}{32}$	5.90	2.90	10 $\frac{3}{4}$	7 $\frac{1}{4}$	$\frac{15}{32}$	15.50	5.60	14 $\frac{1}{2}$	9 $\frac{1}{4}$
$\frac{1}{2}$	2.00	1.00	7 $\frac{3}{4}$	5	$\frac{1}{2}$	6.25	3.00	11	7 $\frac{1}{2}$	$\frac{1}{2}$	16.40	5.80	14 $\frac{1}{2}$	9 $\frac{1}{4}$
	2.15	1.10	8	5 $\frac{1}{4}$							17.25	6.00	15	9 $\frac{1}{4}$

Sixty-fourth sizes can also be furnished.

Approximate Weights

Size, inches.....	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{7}{16}$	$\frac{1}{2}$
Weight, each.....	1 oz.	2 OZS.	3 OZS.	4 OZS.	8 OZS.

CARBON AND HIGH SPEED TWIST DRILLS

Wire Gauge Twist Drills

No. 107

Carbon
Steel

No. 407

Diamond
High Speed

Owing to the many different sizes of drills required for special purposes, these Wire Gauge Twist Drills are made in decimal sizes, representing 80 different sizes ranging between 13 and 228 thousandths of an inch. This practically eliminates the necessity of having special drills made.

Nos. by Gauge	High Speed		Carbon Steel		Decimal Equivalent	Length Over All, Inches	Length Twist, Inches	Nos. by Gauge	High Speed		Carbon Steel		Decimal Equivalent	Length Over All, Inches	Length Twist, Inches
	Doz.	Each	Doz.	Each					Doz.	Each	Doz.	Each			
1	\$7.00	\$0.70	\$2.35	\$0.24	.2280	4	2 1/2	41	\$5.70	\$0.57	\$1.10	\$0.11	.0960	2 1/2	1 1/2
2	7.00	.70	2.35	.24	.2210	2 1/2	2 1/2	42	5.70	.57	1.10	.11	.0935	2 1/2	1 1/2
3	7.00	.70	2.35	.24	.2130	3 1/2	2 1/2	43	5.70	.57	1.10	.11	.0890	2 1/2	1 1/2
4	7.00	.70	2.35	.24	.2090	3 1/2	2 1/2	44	5.70	.57	1.10	.11	.0860	2 1/2	1 1/2
5	7.00	.70	2.35	.24	.2055	3 1/2	2 1/2	45	5.70	.57	1.10	.11	.0820	2 1/2	1 1/2
6	7.00	.70	2.25	.23	.2040	3 1/2	2 1/2	46	5.70	.57	.95	.10	.0810	2 1/2	1 1/2
7	7.00	.70	2.25	.23	.2010	3 1/2	2 1/2	47	5.70	.57	.95	.10	.0785	2 1/2	1 1/2
8	7.00	.70	2.25	.23	.1990	3 1/2	2 1/2	48	5.70	.57	.95	.10	.0760	2 1/2	1 1/2
9	7.00	.70	2.25	.23	.1960	3 1/2	2 1/2	49	5.70	.57	.95	.10	.0730	2 1/2	1 1/2
10	7.00	.70	2.25	.23	.1935	3 1/2	2 1/2	50	5.70	.57	.95	.10	.0700	2 1/2	1 1/2
11	6.30	.63	2.10	.21	.1910	3 1/2	2 1/2	51	5.70	.57	.95	.10	.0670	2 1/2	1 1/2
12	6.30	.63	2.10	.21	.1890	3 1/2	2 1/2	52	5.70	.57	.95	.10	.0635	2 1/2	1 1/2
13	6.30	.63	2.10	.21	.1850	3 1/2	2 1/2	53	5.70	.57	.95	.10	.0595	2 1/2	1 1/2
14	6.30	.63	2.10	.21	.1820	3 1/2	2 1/2	54	5.70	.57	.95	.10	.0550	2 1/2	1 1/2
15	6.30	.63	2.10	.21	.1800	3 1/2	2 1/2	55	5.70	.57	.95	.10	.0520	2 1/2	1 1/2
16	6.30	.63	1.95	.20	.1770	3 1/2	2 1/2	56	5.70	.57	.95	.10	.0485	2 1/2	1 1/2
17	6.30	.63	1.95	.20	.1730	3 1/2	2 1/2	57	5.70	.57	.95	.10	.0430	2 1/2	1 1/2
18	6.30	.63	1.95	.20	.1695	3 1/2	2 1/2	58	5.70	.57	.95	.10	.0420	2 1/2	1 1/2
19	6.30	.63	1.95	.20	.1660	3 1/2	2 1/2	59	5.70	.57	.95	.10	.0410	2 1/2	1 1/2
20	6.30	.63	1.95	.20	.1610	3 1/2	2 1/2	60	5.70	.57	.95	.10	.0400	2 1/2	1 1/2
21	6.10	.61	1.75	.18	.1590	3 1/2	2 1/2	61	5.70	.57	.90	.09	.0380	2 1/2	1 1/2
22	6.10	.61	1.75	.18	.1570	3 1/2	2 1/2	62	5.70	.57	.90	.09	.0370	2 1/2	1 1/2
23	6.10	.61	1.75	.18	.1540	3 1/2	2 1/2	63	5.70	.57	.90	.09	.0360	2 1/2	1 1/2
24	6.10	.61	1.75	.18	.1520	3 1/2	2 1/2	64	5.70	.57	.90	.09	.0350	2 1/2	1 1/2
25	6.10	.61	1.75	.18	.1495	3 1/2	2 1/2	65	5.70	.57	.90	.09	.0330	2 1/2	1 1/2
26	6.10	.61	1.55	.16	.1470	2 1/2	1 1/2	66	5.70	.57	.90	.09	.0320	2 1/2	1 1/2
27	6.10	.61	1.55	.16	.1440	2 1/2	1 1/2	67	5.70	.57	.90	.09	.0310	2 1/2	1 1/2
28	6.10	.61	1.55	.16	.1405	2 1/2	1 1/2	68	5.70	.57	.90	.09	.0300	2 1/2	1 1/2
29	6.10	.61	1.55	.16	.1360	2 1/2	1 1/2	69	5.70	.57	.90	.09	.0290	2 1/2	1 1/2
30	6.10	.61	1.55	.16	.1285	2 1/2	1 1/2	70	5.70	.57	.90	.09	.0270	2 1/2	1 1/2
31	5.90	.59	1.40	.14	.1200	2 1/2	1 1/2	71	5.70	.57	1.00	.10	.0260	2 1/2	1 1/2
32	5.90	.59	1.40	.14	.1160	2 1/2	1 1/2	72	5.70	.57	1.00	.10	.0240	2 1/2	1 1/2
33	5.90	.59	1.40	.14	.1130	2 1/2	1 1/2	73	5.70	.57	1.00	.10	.0230	2 1/2	1 1/2
34	5.90	.59	1.40	.14	.1110	2 1/2	1 1/2	74	5.70	.57	1.00	.10	.0220	2 1/2	1 1/2
35	5.90	.59	1.40	.14	.1100	2 1/2	1 1/2	75	5.70	.57	1.00	.10	.0200	2 1/2	1 1/2
36	5.90	.59	1.25	.13	.1065	2 1/2	1 1/2	76	5.70	.57	1.00	.10	.0180	2 1/2	1 1/2
37	5.90	.59	1.25	.13	.1040	2 1/2	1 1/2	77	5.70	.57	1.00	.10	.0160	2 1/2	1 1/2
38	5.90	.59	1.25	.13	.1015	2 1/2	1 1/2	78	5.70	.57	1.00	.10	.0150	2 1/2	1 1/2
39	5.90	.59	1.25	.13	.0995	2 1/2	1 1/2	79	5.70	.57	1.00	.10	.0140	2 1/2	1 1/2
40	5.90	.59	1.25	.13	.0980	2 1/2	1 1/2	80	5.70	.57	1.00	.10	.0130	2 1/2	1 1/2

Approximate Weights

Gauge number.....	1	5	10	15	20	25	30	35	40	50	55	60	65	70	75	80
Weight, per dozen, ounces.....	7	6	5	4	3	2	1	1	1	1	1	1	1	1	1	1

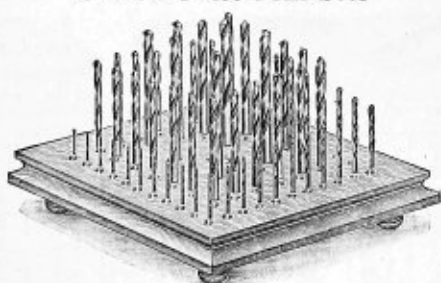
Jobbers' Drills, Straight Shank, Letter Sizes

No. 106
Carbon
SteelNo. 406
Diamond
High Speed

Size	High Speed		Carbon Steel		Decimal Equivalent	Length Over All, Inches	Length Twist, Inches	Size	High Speed		Carbon Steel		Decimal Equivalent	Length Over All, Inches	Length Twist, Inches
	Dozen	Each	Dozen	Each					Dozen	Each	Dozen	Each			
A	\$7.35	\$0.74	\$2.90	\$0.29	.234	3 1/2	2 1/2	N	\$10.50	\$1.05	\$4.20	\$0.42	.302	4 1/2	2 1/2
B	7.35	.74	3.00	.30	.238	3 1/2	2 1/2	O	10.50	1.05	4.30	.43	.316	4 1/2	2 1/2
C	7.35	.74	3.10	.31	.242	3 1/2	2 1/2	P	12.00	1.20	4.40	.44	.323	4 1/2	2 1/2
D	7.35	.74	3.20	.32	.246	3 1/2	2 1/2	Q	12.00	1.20	4.60	.46	.332	4 1/2	2 1/2
E	7.35	.74	3.30	.33	.250	3 1/2	2 1/2	R	12.00	1.20	4.80	.48	.339	4 1/2	2 1/2
F	9.10	.91	3.40	.34	.257	4 1/2	3	S	13.50	1.35	5.00	.50	.348	4 1/2	2 1/2
G	9.10	.91	3.50	.35	.261	4 1/2	3	T	13.50	1.35	5.20	.52	.358	4 1/2	2 1/2
H	9.10	.91	3.60	.36	.266	4 1/2	3	U	13.50	1.35	5.40	.54	.368	5	3 1/2
I	9.10	.91	3.70	.37	.272	4 1/2	3	V	13.50	1.35	5.60	.56	.377	5	3 1/2
J	9.10	.91	3.80	.38	.277	4 1/2	3	W	15.00	1.50	5.80	.58	.386	5 1/2	3 1/2
K	9.10	.91	3.90	.39	.281	4 1/2	3	X	15.00	1.50	6.00	.60	.397	5 1/2	3 1/2
L	10.50	1.05	4.00	.40	.290	4 1/2	2 1/2	Y	15.00	1.50	6.40	.64	.404	5 1/2	3 1/2
M	10.50	1.05	4.10	.41	.295	4 1/2	2 1/2	Z	17.00	1.70	6.80	.68	.413	5 1/2	3 1/2

TWIST DRILLS IN SETS

Carbon Twist Drill Sets



The sets marked mounted are furnished complete with hardwood stand, as illustrated. On all other sets the stand is not included.

Prices of Drills Per Set

- | | | |
|--------|------------------------------------------------------------------------------------------------------------|---------|
| No. 1. | Set of Taper Shank Drills $\frac{1}{4}$ to 1 inch, varying by 16ths. | \$20.00 |
| No. 2. | Set of Taper Shank Drills, $\frac{3}{8}$ to 1 $\frac{1}{4}$ inch, varying by 16ths. | 34.50 |
| No. 3. | Set of Taper Shank Drills, $\frac{1}{2}$ to $\frac{3}{4}$ inch by 32nds, $\frac{3}{4}$ to 1 inch by 16ths. | 42.00 |
| No. 5. | Set Jobbers, straight Shanks, $\frac{1}{8}$ to $\frac{1}{2}$ inch by 64ths, mounted. | 10.00 |
| No. 6. | Set Jobbers, Straight Shanks, $\frac{1}{8}$ to $\frac{1}{2}$ inch by 32nds, mounted. | 5.40 |
| No. 7. | Set Drills, from 60 to $\frac{3}{4}$ inch, mounted. | 9.90 |
| No. 8. | Set Drills, Steel Wire Gauge, from No. 1 to No. 60, mounted. | 8.10 |
| No. 9. | Half Set Drills, alternate Nos. from 1 to 59, mounted. | 4.30 |
| | Wood Block only, price each | 1.25 |

Channon Drill Stand



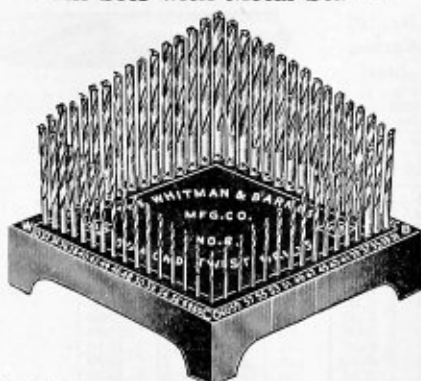
A Channon drill stand is a time saver as well as an absolute necessity. Much time can be saved which is otherwise spent uselessly looking for drills in drawers and boxes. It can easily be carried

from one place to another and the drills are always accessible. The handle can be unscrewed for convenience in packing. The numbers are large and black and are etched on an aluminum background. The stand is a drill gauge as well as a stand. The holes are so accurate that only the proper drills will fit, yet the drills cannot bind.

Beneath each drill number is given the decimal equivalent in inches of the drill. The bottom rows show drill sizes, suitable for different black enamel, polished

- | | | |
|-----------------|------------------------------------------------------------------------------------|---------|
| No. 11. | As illustrated with drills from 1 to 60,
consecutively..... | \$10.75 |
| No. 12. | Like illustration, but drills from $\frac{1}{8}$ to $\frac{1}{2}$
by 64ths..... | 12.50 |
| Stand only..... | | 2.80 |

Drill Sets with Metal Stands

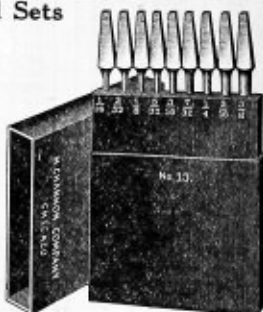


The following sets are mounted on handsome metal stands, copperized finish. Each drill fits in a hole in the stand, of corresponding size. On a 5A stand, the 32nd sizes are on one side of the stand and the 64th sizes on the other. On the 8A stand the even numbers are on one side and the odd numbers on the other.

- | | | |
|----------------|--------------------------------------------------------------------------------------|---------|
| No. 5A. | Jobbers drills, $\frac{1}{8}$ to $\frac{1}{2}$ -inch by 64ths,
price per set..... | \$11.50 |
| No. 8A. | Wire drills, Nos. 1 to 60, inclusive.... | 9.75 |
| | Metal stands only, price per set..... | 2.50 |

Bit Stock Drill Sets

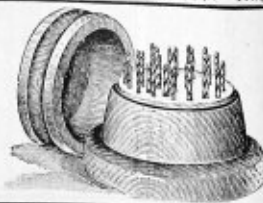
Packed in flat leatherette cases which fit the pocket and keep the drills in good condition. No. 13 Series are for metal working and No. 14 Series for wood boring. The latter will not, however, be injured by contact with nails or other hard substances. Both kinds of drills are sold separately and are listed on another page.



- | | | |
|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|
| Set 13. | Contains one each, $\frac{1}{8}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{5}{8}$, $\frac{3}{4}$, $\frac{7}{8}$, $\frac{15}{16}$. | \$2.75 |
| Set 13A. | Contains one each, $\frac{1}{8}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{5}{8}$, $\frac{3}{4}$, $\frac{7}{8}$, $\frac{15}{16}$ and $\frac{1}{4}$ -inch Drills. | 2.65 |
| Set 13B. | Contains one each, $\frac{1}{8}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{5}{8}$, $\frac{3}{4}$, $\frac{7}{8}$, $\frac{15}{16}$ and $\frac{1}{4}$ -inch Drills. | 4.25 |
| Set 14. | Contains one each, $\frac{1}{8}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{5}{8}$, $\frac{3}{4}$, $\frac{7}{8}$, $\frac{15}{16}$ and $\frac{1}{4}$ -inch Drills. | 2.00 |
| Set 14A. | Contains one each, $\frac{1}{8}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{5}{8}$, $\frac{3}{4}$, $\frac{7}{8}$, $\frac{15}{16}$ and $\frac{1}{4}$ -inch Drills. | 1.90 |

Jewelers' Sets

- No. 10.** Case and Drills No. 30 ($\frac{1}{8}$ inch) to No. 65 Steel Wire Gauge. Price per set.. \$4.25
Case only, each net..... \$1.25



TWIST DRILLS FOR METAL AND WOOD

Extra Long Straight Twist Drills



Size, Inches	Length, Inches	Price Each	Size, Inches	Length, Inches	Price Each
1/8	6	\$1.15	1/2	10	\$2.70
1/8	6	1.15	1/2	10	2.90
1/8	8	1.50	1/2	12	3.00
1/8	8	1.60	1/2	12	3.10
1/8	10	2.25	1/2	12	3.30
1/8	10	2.25	1/2	12	3.45
1/8	10	2.35	1/2	12	3.60
1/8	10	2.40	1/2	12	4.15
1/8	10	2.50	1/2	12	

Straight Shank Center Drills



No. 108A—Carbon Steel.

Diam., Inches	Price per Dozen	Price Each	Length Over All, Inches	Diam., Inches	Price per Dozen	Price Each	Length Over All, Inches
1/8	\$0.80	\$0.08	1 1/8	1/2	\$2.10	\$0.21	1 1/2
1/8	.90	.09	1 1/8	1/2	2.35	.24	1 1/2
1/8	1.10	.11	1 1/8	1/2	2.60	.26	1 1/2
1/8	1.20	.12	1 1/8	1/2	2.85	.29	1 1/2
1/8	1.25	.13	1 1/8	1/2	3.10	.31	1 1/2
1/8	1.35	.14	1 1/8	1/2	3.30	.33	1 1/2
1/8	1.50	.15	1 1/8	1/2	3.50	.35	1 1/2
1/8	1.70	.17	1 1/8	1/2	3.75	.38	1 1/2
1/8	1.90	.19	1 1/8	1/2			

Bonding Drills



No. 105F Carbon Steel.

No. 508 "Diamond" High Speed.

Diameter, 3/8 inch; length 3 1/2 inches; length of twist 2 1/2 inches.

Carbon Steel—Price per doz. . . . \$3.65 Each. . \$0.37

Diamond High Speed—Per doz. . \$9.10 Each. . \$0.91

For drilling bonding wire holes in track circuit signal work. "High Speed" recommended for hard rails.

Flat Ratchet Drills

6 Inches Long



Size, Inches	Price Each	Size, Inches	Price Each
1/8	\$0.60	1	\$0.90
1/8	.60	1 1/8	.70
1/8	.60	1 1/4	.75
1/8	.60	1 1/2	.80
1/8	.60	1 3/4	.85

Bit Stock Drills

For Metal or Wood

Our bit stock drills will fit any brace on the market and will drill steel, iron or other metals, as well as wood. They are not injured by contact with screws or nails and will bore any kind of wood without splitting it.



No. 109

Diam., Inches	Price per Doz.	Price Each	Length Over All, In.	Diam., Inches	Price per Doz.	Price Each	Length Over All, In.
1/8	\$1.50	\$0.15	3 1/4	1 1/8	\$8.80	\$0.88	6 1/2
1/8	1.65	.17	3 3/4	1 1/8	9.60	.96	6 1/2
1/8	2.10	.21	4	1 1/8	10.30	1.03	7
1/8	2.60	.26	4 1/4	1 1/8	11.00	1.10	7 1/4
1/8	3.10	.31	4 1/2	1 1/8	14.35	1.44	7 1/2
1/8	3.60	.36	4 3/4	1 1/8	16.15	1.62	7 1/2
1/8	4.10	.41	5	1 1/8	17.95	1.80	7 1/2
1/8	4.70	.47	5 1/4	1 1/8	19.75	1.98	7 1/2
1/8	5.40	.54	5 1/2	1 1/8	21.55	2.16	7 1/2
1/8	6.30	.63	5 3/4	1 1/8	23.35	2.34	7 1/2
1/8	7.20	.72	6	1 1/8	25.75	2.58	7 1/2
1/8	8.00	.80	6 1/4	1 1/8	28.15	2.82	7 1/2

Wood Boring Brace Drills



No. 109B

The numbers indicate the sizes in 32nds. While intended for boring wood, these drills will not be injured by contact with screws, nails, etc.

No.	Price per Dozen	Price Each	Length Over All, Inches	No.	Price per Dozen	Price Each	Length Over All, Inches
2	\$1.00	\$0.15	3 1/4	14	\$4.50	\$0.40	8 1/4
3	1.60	.15	3 3/4	15	5.00	.45	8 1/4
4	1.60	.15	4 1/4	16	5.00	.45	8 1/4
5	1.75	.18	4 1/2	17	5.50	.50	8 1/4
6	2.00	.20	5	18	5.50	.50	8 1/4
7	2.50	.25	5 1/4	19	6.00	.55	9 1/4
8	3.00	.30	5 1/2	20	6.00	.55	9 1/4
9	3.50	.30	5 3/4	21	6.50	.60	9 1/4
10	4.00	.35	6	22	7.00	.65	9 1/4
11	4.00	.35	6 1/4	23	7.50	.70	9 1/4
12	4.00	.35	6 1/2	24	8.00	.75	9 1/4
13	4.50	.40	6 3/4	25	8.00	.75	9 1/4

Extra Length Wood Boring Brace Drills



No. 109C

For Bell Hangers, Telephone and Telegraph Work

The numbers indicate the sizes in 32nds

No.	12 Inches		18 Inches		24 Inches		30 Inches		36 Inches	
	Per Doz.	Price Each	Per Doz.	Price Each	Per Doz.	Price Each	Per Doz.	Price Each	Per Doz.	Price Each
6	\$ 5.00	\$0.50	\$ 7.00	\$0.70	\$ 9.00	\$0.90	\$11.00	\$1.10	\$13.00	\$1.30
8	5.00	.50	7.00	.70	9.00	.90	11.00	1.10	13.00	1.30
10	5.50	.55	7.50	.75	9.50	.95	12.00	1.20	13.00	1.30
12	6.00	.60	8.00	.80	10.00	1.00	12.00	1.20	13.00	1.30
14	7.00	.70	9.00	.90	11.00	1.10	13.00	1.30	14.00	1.40
16	8.00	.80	10.00	1.00	12.00	1.20	14.00	1.40	15.00	1.50
18	9.00	.90	11.00	1.10	13.00	1.30	15.00	1.50	16.00	1.60
20	10.00	1.00	12.00	1.20	14.00	1.40	15.00	1.50	16.00	1.60
22	11.00	1.10	13.00	1.30	15.00	1.50	16.00	1.60	17.00	1.70
24	12.00	1.20	14.00	1.40	16.00	1.60	17.00	1.70	18.00	1.80

CARBON AND HIGH SPEED TWIST DRILLS

Regular Blacksmith's Drills— $\frac{1}{2}$ -Inch ShankNo. 112
Carbon
SteelNo. 412
Diamond
High Speed

Regular Blacksmiths' Drills are made with $\frac{1}{8}$ and $\frac{1}{4}$ -inch shanks. They are the most popular type of drill used and will fit any Blacksmiths' drill. The shanks are flattened on one side enabling the drill to be held firmly in chuck. Also used for drilling railroad track.

Diam., Ins.	Price Each		Lgth. Over All, Ins.	Lgth. of Twist, Ins.	Diam., Ins.	Price Each		Lgth. Over All, Ins.	Lgth. of Twist, Ins.	Diam., Ins.	Price Each		Lgth. Over All, Ins.	Lgth. of Twist, Ins.
	High Speed	Car- bon Steel				High Speed	Car- bon Steel				High Speed	Car- bon Steel		
$\frac{1}{8}$	.....	\$0.45	$4\frac{1}{8}$	2	$1\frac{1}{8}$	\$2.20	\$1.00	6	$3\frac{1}{4}$	$1\frac{1}{8}$	\$4.50	\$2.00	6	$3\frac{1}{4}$
$\frac{3}{16}$	.....	.45	$5\frac{1}{8}$	$2\frac{1}{4}$	$1\frac{3}{8}$	2.30	1.05	6	$3\frac{5}{8}$	$1\frac{3}{8}$	4.75	2.10	6	$3\frac{5}{8}$
$\frac{1}{4}$	.....	.50	$5\frac{3}{8}$	$2\frac{1}{2}$	$1\frac{1}{2}$	2.40	1.10	6	$3\frac{7}{8}$	$1\frac{1}{2}$	5.00	2.20	6	$3\frac{7}{8}$
$\frac{5}{16}$	.....	.55	$5\frac{5}{8}$	$2\frac{3}{4}$	$1\frac{3}{4}$	2.50	1.15	6	$3\frac{7}{8}$	$1\frac{3}{4}$	5.25	2.25	6	$3\frac{7}{8}$
$\frac{3}{8}$	\$1.10	.60	6	$3\frac{1}{8}$	$1\frac{7}{8}$	2.65	1.20	6	$3\frac{7}{8}$	$1\frac{7}{8}$	5.50	2.30	6	$3\frac{7}{8}$
$\frac{7}{16}$	1.20	.65	6	$3\frac{1}{8}$	$1\frac{7}{8}$	2.75	1.25	6	$3\frac{7}{8}$	$1\frac{7}{8}$	5.80	2.35	6	$3\frac{7}{8}$
$\frac{1}{2}$	1.30	.70	6	$3\frac{1}{8}$	$1\frac{7}{8}$	2.90	1.30	6	$3\frac{7}{8}$	$1\frac{7}{8}$	6.10	2.40	6	$3\frac{7}{8}$
$\frac{9}{16}$	1.40	.73	6	$3\frac{1}{8}$	$1\frac{7}{8}$	3.00	1.35	6	$3\frac{7}{8}$	$1\frac{7}{8}$	6.40	2.50	6	$3\frac{7}{8}$
$\frac{5}{8}$	1.45	.75	6	$3\frac{1}{8}$	$1\frac{7}{8}$	3.15	1.40	6	$3\frac{7}{8}$	$1\frac{7}{8}$	6.70	2.60	6	$3\frac{7}{8}$
$\frac{11}{16}$	1.55	.78	6	$3\frac{1}{8}$	$1\frac{7}{8}$	3.30	1.45	6	$3\frac{7}{8}$	$1\frac{7}{8}$	7.00	2.70	6	$3\frac{7}{8}$
$\frac{3}{4}$	1.60	.80	6	$3\frac{1}{8}$	$1\frac{7}{8}$	3.50	1.50	6	$3\frac{7}{8}$	$1\frac{7}{8}$	7.40	2.80	6	$3\frac{7}{8}$
$\frac{7}{8}$	1.70	.83	6	$3\frac{1}{8}$	$1\frac{7}{8}$	3.70	1.60	6	$3\frac{7}{8}$	$1\frac{7}{8}$	7.80	2.90	6	$3\frac{7}{8}$
$\frac{15}{16}$	1.75	.85	6	$3\frac{1}{8}$	$1\frac{7}{8}$	3.90	1.70	6	$3\frac{7}{8}$	$1\frac{7}{8}$	8.20	3.00	6	$3\frac{7}{8}$
1	1.90	.88	6	$3\frac{1}{8}$	$1\frac{7}{8}$	4.10	1.80	6	$3\frac{7}{8}$	$1\frac{7}{8}$	8.60	3.10	6	$3\frac{7}{8}$
$1\frac{1}{8}$	2.05	.90	6	$3\frac{1}{8}$	$1\frac{7}{8}$	4.30	1.90	6	$3\frac{1}{4}$	$1\frac{1}{2}$	9.00	3.20	6	$3\frac{1}{4}$

Approximate Weights

Size, inches.....	$\frac{1}{8}$	$\frac{3}{16}$	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{7}{16}$	$\frac{1}{2}$	$\frac{9}{16}$	$\frac{5}{8}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$
Weight, each, ounces.....	1	2	3	4	5	6	8	10	14	19		

Regular Blacksmiths' Drills— $\frac{5}{8}$ -Inch ShankNo. 110
Carbon
SteelNo. 506
Diamond
High Speed

Diam., Ins.	Price Each		Lgth. Over All, Ins.	Lgth. of Twist, Ins.	Diam., Ins.	Price Each		Lgth. Over All, Ins.	Lgth. of Twist, Ins.	Diam., Ins.	Price Each		Lgth. Over All, Ins.	Lgth. of Twist, Ins.
	High Speed	Car- bon Steel				High Speed	Car- bon Steel				High Speed	Car- bon Steel		
$\frac{1}{8}$	.....	\$0.55	$4\frac{1}{8}$	2	$1\frac{1}{8}$	\$2.50	\$1.15	6	$3\frac{5}{8}$	$1\frac{1}{8}$	\$6.10	\$2.40	6	$3\frac{1}{4}$
$\frac{3}{16}$	.....	.58	$5\frac{1}{8}$	$2\frac{1}{4}$	$1\frac{3}{8}$	2.65	1.20	6	$3\frac{5}{8}$	$1\frac{3}{8}$	6.40	2.50	6	$3\frac{5}{8}$
$\frac{1}{4}$	.....	.60	$5\frac{3}{8}$	$2\frac{1}{2}$	$1\frac{1}{2}$	2.75	1.25	6	$3\frac{5}{8}$	$1\frac{1}{2}$	6.70	2.60	6	$3\frac{5}{8}$
$\frac{5}{16}$	.....	.65	$5\frac{5}{8}$	$2\frac{3}{4}$	$1\frac{3}{4}$	2.90	1.30	6	$3\frac{5}{8}$	$1\frac{3}{4}$	7.00	2.70	6	$3\frac{5}{8}$
$\frac{3}{8}$	\$1.20	.70	6	$3\frac{1}{8}$	$1\frac{7}{8}$	3.00	1.35	6	$3\frac{5}{8}$	$1\frac{7}{8}$	7.40	2.80	6	$3\frac{5}{8}$
$\frac{7}{16}$	1.30	.73	6	$3\frac{1}{8}$	$1\frac{7}{8}$	3.15	1.40	6	$3\frac{5}{8}$	$1\frac{7}{8}$	7.80	2.90	6	$3\frac{5}{8}$
$\frac{1}{2}$	1.40	.75	6	$3\frac{1}{8}$	$1\frac{7}{8}$	3.30	1.45	6	$3\frac{5}{8}$	$1\frac{7}{8}$	8.20	3.00	6	$3\frac{5}{8}$
$\frac{9}{16}$	1.50	.80	6	$3\frac{1}{8}$	$1\frac{7}{8}$	3.50	1.55	6	$3\frac{5}{8}$	$1\frac{7}{8}$	8.60	3.10	6	$3\frac{5}{8}$
$\frac{5}{8}$	1.55	.85	6	$3\frac{1}{8}$	$1\frac{7}{8}$	3.70	1.60	6	$3\frac{5}{8}$	$1\frac{7}{8}$	9.00	3.20	6	$3\frac{5}{8}$
$\frac{11}{16}$	1.65	.88	6	$3\frac{1}{8}$	$1\frac{7}{8}$	3.90	1.70	6	$3\frac{5}{8}$	$1\frac{7}{8}$	.....	3.40	6	$3\frac{5}{8}$
$\frac{3}{4}$	1.70	.90	6	$3\frac{1}{8}$	$1\frac{7}{8}$	4.10	1.80	6	$3\frac{5}{8}$	$1\frac{7}{8}$	.....	3.60	6	$3\frac{5}{8}$
$\frac{7}{8}$	1.80	.93	6	$3\frac{1}{8}$	$1\frac{7}{8}$	4.30	1.90	6	$3\frac{5}{8}$	$1\frac{7}{8}$	.....	3.80	6	$3\frac{5}{8}$
$\frac{15}{16}$	1.85	.95	6	$3\frac{1}{8}$	$1\frac{7}{8}$	4.50	2.00	6	$3\frac{5}{8}$	$1\frac{7}{8}$	.....	4.05	6	$3\frac{5}{8}$
1	1.95	.98	6	$3\frac{1}{8}$	$1\frac{7}{8}$	4.75	2.10	6	$3\frac{5}{8}$	$1\frac{7}{8}$	.....	4.30	6	$3\frac{5}{8}$
$1\frac{1}{8}$	2.05	1.00	6	$3\frac{1}{8}$	$1\frac{7}{8}$	5.00	2.20	6	$3\frac{5}{8}$	$1\frac{7}{8}$	.....	4.50	6	$3\frac{5}{8}$
$1\frac{1}{4}$	2.20	1.03	6	$3\frac{1}{8}$	$1\frac{7}{8}$	5.25	2.25	6	$3\frac{1}{4}$	$1\frac{1}{2}$	.....	4.75	6	$3\frac{1}{4}$
$1\frac{1}{2}$	2.30	1.05	6	$3\frac{1}{8}$	$1\frac{7}{8}$	5.50	2.30	6	$3\frac{1}{4}$	$1\frac{1}{2}$	.....	5.00	6	$3\frac{1}{4}$
$1\frac{3}{4}$	2.40	1.10	6	$3\frac{1}{8}$	$1\frac{7}{8}$	5.80	2.35	6	$3\frac{1}{4}$	$1\frac{1}{2}$	.....	.....	6	$3\frac{1}{4}$

High Speed furnished in sizes over 1 inch in diameter with .648 shank at customer's risk only. We consider this shank too weak in larger sizes.

Approximate Weights

Size, inches.....	$\frac{1}{8}$	$\frac{3}{16}$	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{7}{16}$	$\frac{1}{2}$	$\frac{9}{16}$	$\frac{5}{8}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$
Weight, each, ounces.....	3	4	5	6	7	8	12	16	20			

CARBON AND HIGH SPEED TWIST DRILLS

Taper Square Shank Ratchet and Track Drill

No. 109E Carbon Steel



No. 507 D'amond High Speed

These Taper Shank Drills are made with two sizes of shanks. Shank A $\frac{5}{8}$ -inch x $\frac{3}{4}$ -inch $1\frac{1}{2}$ inches long, is the most popular and fits all makes of ratchets. This size always sent unless otherwise ordered. Shank B, $\frac{3}{4}$ -inch x $\frac{1}{2}$ -inch, $1\frac{1}{4}$ inches long, used on large size ratchets only. On high speed over 1 inch, B Shank will be furnished.

Diam. Ins.	Price Each		Lgth. Over All, Ins.	Lgth. of Twist, Ins.	Diam. Ins.	Price Each		Lgth. Over All, Ins.	Lgth. of Twist, Ins.	Diam. Ins.	Price Each		Lgth. Over All, Ins.	Lgth. of Twist, Ins.
	High Speed	Carbon Steel				High Speed	Carbon Steel				High Speed	Carbon Steel		
$\frac{1}{8}$	.....	\$0.90	$4\frac{1}{4}$	2	$1\frac{1}{8}$	\$3.40	\$1.45	$6\frac{1}{2}$	$4\frac{3}{8}$	$1\frac{1}{4}$	\$ 7.90	\$3.65	9	$6\frac{1}{2}$
$\frac{1}{4}$	.....	.95	$4\frac{5}{8}$	$2\frac{1}{4}$	$1\frac{1}{2}$	3.50	1.50	$6\frac{1}{2}$	$4\frac{3}{8}$	$1\frac{1}{2}$	8.25	3.75	9	$6\frac{3}{8}$
$\frac{3}{8}$	.....	.95	$4\frac{3}{4}$	$2\frac{3}{8}$	$1\frac{3}{4}$	3.65	1.55	$6\frac{1}{2}$	$4\frac{3}{8}$	$1\frac{3}{4}$	8.60	3.90	9	$6\frac{5}{8}$
$\frac{1}{2}$	.....	1.00	$4\frac{7}{8}$	$2\frac{3}{4}$	$1\frac{7}{8}$	3.80	1.65	$6\frac{1}{2}$	$4\frac{3}{8}$	$1\frac{7}{8}$	9.00	4.05	9	$6\frac{7}{8}$
$\frac{5}{8}$	\$2.50	1.00	5	$2\frac{3}{4}$	$1\frac{7}{8}$	4.00	1.75	7	$4\frac{3}{8}$	$1\frac{7}{8}$	9.40	4.20	9	$6\frac{7}{8}$
$\frac{3}{4}$	2.55	1.05	5	$2\frac{3}{4}$	$1\frac{7}{8}$	4.20	1.90	7	$4\frac{3}{8}$	$1\frac{7}{8}$	9.80	4.35	9	$6\frac{7}{8}$
$\frac{7}{8}$	2.60	1.10	5	$2\frac{3}{4}$	$1\frac{7}{8}$	4.50	2.05	$7\frac{1}{2}$	$4\frac{3}{8}$	$1\frac{7}{8}$	10.20	4.50	9	$6\frac{7}{8}$
1	2.65	1.15	5	$2\frac{3}{4}$	$1\frac{7}{8}$	4.70	2.20	$7\frac{3}{4}$	$4\frac{3}{8}$	$1\frac{7}{8}$	10.60	4.65	9	$6\frac{7}{8}$
$1\frac{1}{8}$	2.70	1.20	6	$3\frac{1}{8}$	$1\frac{7}{8}$	5.00	2.30	8	$4\frac{3}{8}$	$1\frac{7}{8}$	11.00	4.80	9	$6\frac{7}{8}$
$1\frac{1}{4}$	2.75	1.25	$6\frac{1}{4}$	$4\frac{1}{8}$	$1\frac{7}{8}$	5.25	2.40	$8\frac{1}{4}$	$4\frac{3}{8}$	$1\frac{7}{8}$	.....	5.10	9	$6\frac{7}{8}$
$1\frac{1}{2}$	2.80	1.25	$6\frac{1}{4}$	$4\frac{1}{8}$	1	5.50	2.55	$8\frac{1}{2}$	$4\frac{3}{8}$	$1\frac{7}{8}$	.....	5.40	9	$6\frac{7}{8}$
$1\frac{3}{4}$	2.85	1.30	$6\frac{1}{4}$	$4\frac{1}{8}$	$1\frac{1}{8}$	5.75	2.70	$8\frac{3}{4}$	$4\frac{3}{8}$	$1\frac{7}{8}$	.....	5.75	9	$6\frac{7}{8}$
$1\frac{7}{8}$	2.90	1.30	$6\frac{1}{2}$	$4\frac{3}{8}$	$1\frac{1}{8}$	6.00	2.85	9	$4\frac{3}{8}$	$1\frac{7}{8}$	.....	6.10	9	$6\frac{7}{8}$
2	2.95	1.35	$6\frac{1}{2}$	$4\frac{3}{8}$	$1\frac{1}{8}$	6.30	3.00	9	$4\frac{3}{8}$	$1\frac{7}{8}$	.....	6.50	9	$6\frac{7}{8}$
$2\frac{1}{8}$	3.00	1.35	$6\frac{1}{2}$	$4\frac{3}{8}$	$1\frac{1}{8}$	6.70	3.10	9	$4\frac{3}{8}$	$1\frac{7}{8}$	.....	6.50	9	$6\frac{7}{8}$
$2\frac{1}{4}$	3.10	1.40	$6\frac{1}{2}$	$4\frac{3}{8}$	$1\frac{1}{8}$	7.00	3.25	9	$4\frac{3}{8}$	$1\frac{7}{8}$	.....	7.30	9	$6\frac{7}{8}$
$2\frac{1}{2}$	3.20	1.40	$6\frac{1}{2}$	$4\frac{3}{8}$	$1\frac{1}{8}$	7.30	3.35	9	$4\frac{3}{8}$	$1\frac{7}{8}$	.....	7.75	9	$6\frac{7}{8}$
$2\frac{3}{4}$	3.30	1.45	$6\frac{1}{2}$	$4\frac{3}{8}$	$1\frac{1}{8}$	7.60	3.50	9	$4\frac{3}{8}$	$1\frac{7}{8}$	.....	.....	.....	$6\frac{7}{8}$

Approximate Weights

Size inches.....	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	1	$1\frac{1}{4}$
Weight each, ounces.....	2	3	4	6	7	16	24

Economy High Speed Track Bits

All $6\frac{1}{4}$ Inches Long

No. 504. Flat Beaded

Fitting Flat Drill Chucks on Paulus, New Style Paulus, Buda, Climax, Girder and Heavy Drill Machines.

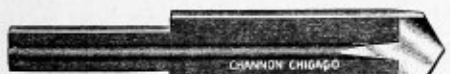
Thickness of bits $\frac{1}{2}$ -inch to $1\frac{1}{4}$ -inch is $\frac{3}{8}$ -inch. No. 1 Bead. Thickness of bits $\frac{1}{2}$ -inch to $1\frac{1}{4}$ -inch is $\frac{3}{8}$ -inch. No. 2 Bead. Size given is for shank end of bit. Point end is $\frac{1}{2}$ -inch larger.



No. 505. Flat with Round Slabbed Shanks

Fitting Chucks on Paulus, Buda, Harvey, Francis Reed & Co.'s Nos. 18 and 19, Duntley and Sheffield Car Co.'s Track Drilling machines.

Thickness of bits $\frac{1}{2}$ -inch to $1\frac{1}{4}$ -inch is $\frac{3}{8}$ -inch. Thickness of bits $\frac{1}{2}$ -inch to $1\frac{1}{4}$ -inch is $\frac{3}{8}$ -inch. Shanks on these bits are $2\frac{1}{4}$ inches long, .648 diameter, commonly called $\frac{5}{8}$ -inch. Size at point end is $\frac{1}{2}$ -inch larger than diameter of drills given.



No. 509. Flat with Combination Flat Beaded and Round Shank

This bit will fit all Chucks for track drilling machines listed under Nos. 504 and 505 bits above. Also for Rich Chucks.

Thickness of bits $\frac{1}{2}$ -inch to $1\frac{1}{4}$ -inch is $\frac{3}{8}$ -inch. Thickness of bits $\frac{1}{2}$ -inch to $1\frac{1}{4}$ -inch is $\frac{3}{8}$ -inch. No. 2 Bead. Shanks on these bits are $2\frac{1}{4}$ inches long, .648 diameter, commonly called $\frac{5}{8}$ -inch. Size at point end is $\frac{1}{2}$ -inch larger than diameter of drills given.

Size, inches.....	$\frac{5}{8}$	$\frac{11}{16}$	$\frac{3}{4}$	$\frac{7}{8}$	$\frac{1}{2}$	$\frac{1}{2}$	1	$1\frac{1}{8}$	$1\frac{1}{4}$	$1\frac{3}{8}$	$1\frac{1}{2}$
Price each.....	\$1.05	1.10	1.20	1.30	1.40	1.50	1.55	1.65	1.75	1.85	1.95

CARBON AND HIGH SPEED TWIST DRILLS

Three and Four-Groove Drills

With Straight and Taper Shanks

Taper Shank

Straight Shank



Three Groove, No. 102B, Carbon Steel
Three Groove, No. 402B, Diamond High Speed
Four Groove, No. 102C, Carbon Steel
Four Groove, No. 402C, Diamond High Speed

Three Groove, No. 104B, Carbon Steel
Three Groove, No. 404B, Diamond High Speed
Four Groove, No. 104C, Carbon Steel
Four Groove, No. 404C, Diamond High Speed

For enlarging cored, punched or drilled holes. Will not drill solid metal.

Diam., Ins.	Price Each		Lgth. Over All, Ins.	Lgth. Twist, Ins. S. S.	Lgth. Twist, Ins. T. S.	Shank Taper	Diam., Ins.	Price Each		Lgth. Over All, Ins.	Lgth. Twist, Ins. S. S.	Lgth. Twist, Ins. T. S.	Shank Taper	Diam., Ins.	Price Each		Lgth. Over All, Ins.	Lgth. Twist, Ins. S. S.	Lgth. Twist, Ins. T. S.	Shank Taper
	High Speed	Car- bon Steel						High Speed	Car- bon Steel						High Speed	Car- bon Steel				
1/4	\$2.00	\$1.50	6 1/8	4 1/8	3	No. 1	1/4	\$4.25	\$2.75	9 1/4	6	5 1/2	No. 2	1 1/8	11.00	\$4.00	11 3/4	7 7/8	7 1/4	No. 3
5/16	2.15	1.60	6 3/4	4 3/4	3 1/8		5/16	4.65	2.85	9 1/2	6 3/8	5 3/4		1 1/4	11.75	4.25	11 7/8	8	7 3/8	
3/8	2.25	1.60	6 3/4	4 3/4	3 1/8		3/8	5.00	2.90	9 3/4	6 3/8	5 3/4		1 1/4	12.50	4.50	12	8 1/8	7 1/2	
7/16	2.40	1.70	6 1/2	4 1/4	3 5/8		7/16	5.40	3.00	9 7/8	6 1/2	6 3/8		1 1/4	13.25	4.65	12 1/8	8 1/8	7 3/8	
1/2	2.50	1.70	6 3/4	4 1/4	3 5/8		1/2	5.75	3.05	10	6 5/8	6 5/8		1 1/4	14.00	4.80	12 1/4	8 1/8	8	
9/16	2.65	1.75	7	4 5/8	3 5/8		9/16	6.15	3.15	10 1/4	6 3/4	6 5/8		1 1/4	14.75	5.00	14 1/8	9 1/8	8 1/8	
5/8	2.75	1.80	7 1/4	4 5/8	4 1/8		5/8	6.50	3.20	10 1/2	7	6 5/8		1 1/4	15.50	5.20	14 1/4	9 1/4	8 3/8	
3/4	2.90	1.85	7 1/2	4 7/8	4 1/8		3/4	7.00	3.30	10 5/8	7	6 5/8		1 1/4	16.25	5.35	14 3/8	9 3/8	8 3/4	
7/8	3.00	1.90	7 3/4	5	4 5/8		7/8	7.50	3.40	10 3/4	7	6 5/8		1 1/4	17.00	5.50	14 1/2	9 1/2	8 7/8	
1	3.15	1.95	8	5 1/4	4 7/8		1	8.00	3.50	10 7/8	7 1/8	6 5/8		1 1/4	17.75	5.80	14 3/4	9 3/4	9	
1 1/16	3.25	2.00	8 1/4	5 1/8	5	2	1 1/16	8.50	3.60	11	7 3/8	6 1/2	3	1 1/4	18.50	6.00	14 3/8	9 5/8	9 1/8	No. 4
1 1/8	3.50	2.30	8 1/2	5 5/8	4 7/8		1 1/8	9.00	3.70	11 1/8	7 3/8	6 3/8		1 1/4	19.25	6.20	14 7/8	9 3/4	9 1/4	
1 1/4	3.75	2.60	8 3/4	5 5/8	5		1 1/4	9.50	3.80	11 1/4	7 3/8	6 3/8		1 1/4	20.00	6.40	15	9 3/8	9 3/8	
1 1/2	4.00	2.70	9	5 7/8	5 1/8		1 1/2	10.25	3.90	11 1/2	7 3/8	6 3/4		1 1/2						
1 3/4							1 3/4													

Weights—Three groove drills weigh 25% more than regular drills of same size. Four groove drills weigh about 35% more than regular drills of same size.

Straight Shank Drills 1 1/4 to 3 inches have shanks 1 3/4-inch diameter by 6 inches long.

No. 108 Straight Shank Machine Bits

For Wood



No. 113 Straight Shank Twist Drills

For Boring Wood



Dia., Ins.	Price Each	Lgth. Over All, Ins.	Lgth. of Twist, Ins.	Dia., Ins.	Price Each	Lgth. Over All, Ins.	Lgth. of Twist, Ins.	Size	Diam., Ins.	Price per Dozen	Price Each	Length Over All Inches	Length of Twist, Inches
1/4	\$0.20	3	1 5/8	3/8	\$1.50	7 1/4	5 1/2	2	5/8	\$1.00	\$0.10	2 1/2	1 1/4
5/16	.25	3 1/4	2 3/8	3/8	1.65	7 1/4	5 5/8	3	3/4	1.20	.12	2 3/4	1 1/2
3/8	.30	3 1/2	2 3/8	3/8	1.80	7 3/4	5 7/8	4	7/8	1.45	.15	3	1 3/4
7/16	.35	3 3/4	2 3/8	3/8	1.95	8	6 1/8	5	1	1.75	.18	3 1/4	1 3/4
1/2	.40	4	2 3/8	3/8	2.15	8 1/4	6 1/4	6	1 1/8	2.00	.20	3 1/2	2
5/8	.45	4 1/4	2 3/8	3/8	2.30	8 1/2	6 3/8	7	1 1/4	2.50	.25	3 3/4	2 1/4
3/4	.50	4 1/2	3 3/8	3/8	2.50	8 3/4	6 5/8	8	1 1/2	3.00	.30	4	2 1/2
7/8	.55	4 3/4	3 3/8	3/8	2.65	9	6 5/8	9	1 3/4	3.50	.35	4 1/4	2 3/4
1	.65	5	3 3/8	3/8	2.85	9 1/4	7	10	1 3/4	3.50	.35	4 1/4	2 3/4
1 1/16	.70	5 1/4	3 3/8	3/8	3.00	9 1/2	7 1/8	11	1 3/4	4.00	.40	4 1/2	3
1 1/8	.75	5 1/2	4 3/8	3/8	3.60	11 1/4	8 1/4	12	1 3/4	4.00	.40	4 1/2	3 1/4
1 1/4	.80	5 3/4	4 3/8	3/8	4.00	11 3/4	8 3/4	13	1 3/4	4.50	.45	5	3 1/2
1 1/2	.85	6	4 1/2	3/8	4.40	12	9	14	1 3/4	4.50	.45	5 1/4	3 3/4
1 3/4	.95	6 1/4	4 1/2	3/8	4.80	12 1/4	9 1/4	15	1 3/4	5.00	.50	5 1/2	4
2	1.00	6 1/2	4 1/2	3/8	5.20	12 1/2	9 3/4	16	1 3/4	5.00	.50	5 1/2	4 1/4
2 1/4	1.10	6 3/4	4 1/2	3/8	5.60	12 3/4	9 3/4	17	1 3/4	5.50	.55	6	4 1/2
2 1/2	1.15	6 3/4	4 1/2	3/8	6.00	12 3/4	9 3/4	18	1 3/4	5.50	.55	6	4 1/2
2 3/4	1.25	6 3/4	5	3/8	6.40	12 3/4	9 3/4	19	1 3/4	6.00	.60	6	4 1/2
3	1.35	7	5 1/2	3/8				20	1 3/4	6.00	.60	6	4 1/2

COUNTERSINKS AND DRILLS

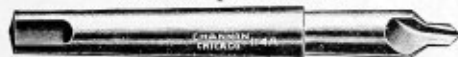
Drills and Countersinks in Sets



A machinist's tool chest equipment is not complete without a set of drills and countersinks. The set contains one each of No. A, B, C, D, EA, AA, F and G. These numbers cover the range of sizes found to be most in demand. Each set packed in a wooden box as shown. Weight of set 7 ounces.

Price per set, complete.....\$2.00

No. 114A Drill and Countersink Combined with Taper Shank



Size	Price Each	Diam. of Body, Inches	Diam. of Drill, Inches	Shank Taper	Length Over All, Inches	Length of Drill, Inches
P	\$0.75	$\frac{1}{8}$	$\frac{1}{8}$	No. 1	4 $\frac{1}{2}$	$\frac{1}{2}$
Q	.75	$\frac{1}{8}$	$\frac{1}{8}$	No. 1	4 $\frac{1}{2}$	$\frac{1}{2}$
R	.75	$\frac{1}{8}$	$\frac{1}{8}$	No. 1	4 $\frac{1}{2}$	$\frac{1}{2}$
S	.75	$\frac{1}{8}$	$\frac{1}{8}$	No. 1	4 $\frac{1}{2}$	$\frac{1}{2}$
T	.75	$\frac{1}{8}$	$\frac{1}{8}$	No. 1	4 $\frac{1}{2}$	$\frac{1}{2}$
U	.75	$\frac{1}{8}$	$\frac{1}{8}$	No. 1	4 $\frac{1}{2}$	$\frac{1}{2}$
V	.75	$\frac{1}{8}$	$\frac{1}{8}$	No. 1	4 $\frac{1}{2}$	$\frac{1}{2}$
	.75	$\frac{1}{8}$	$\frac{1}{8}$	No. 13	No. 1	4 $\frac{1}{2}$

The angle of Countersink is 60°. Special sizes and angles made to order.

Countersinks with Renewable Blades



Countersink with Bit Brace Shank



Renewable Blade

The holder or body part will last practically a lifetime. One No. 68 (or No. 680) countersink with the new double angle reversible blade (60°x80°) will countersink for both bolts and screw heads and take the place of 2 solid countersinks.

Each countersink is packed in an individual box. No. 68. Countersink with bit brace shank, weight each, 3 $\frac{1}{2}$ ounces. Price each.....\$1.00
No. 680. Countersink with $\frac{1}{2}$ inch diameter round shank, weight each, 3 $\frac{1}{2}$ ounces. Price each..... 1.00
Extra blades fitting both No. 68 and No. 680 countersinks, weight per dozen, 3 ounces. Price each. .40

No. 114 Drill and Countersink Combined



Center holes absolutely perfect.

Size	Price Per Dozen	Price Each	Diam. of Body, Inches	Diameter of Drill, Inches	Length Over All, Inches	Length of Drill, Inches
AA	\$1.50	\$0.15	$\frac{1}{8}$	57 and 57	2 $\frac{1}{4}$	$\frac{1}{2}$
A	1.50	.15	$\frac{1}{8}$	$\frac{1}{2}$ and $\frac{1}{2}$	2 $\frac{1}{4}$	$\frac{1}{2}$
B	1.50	.15	$\frac{1}{8}$	$\frac{1}{2}$ and $\frac{1}{2}$	2 $\frac{1}{4}$	$\frac{1}{2}$
C	1.50	.15	$\frac{1}{8}$	$\frac{1}{2}$ and $\frac{1}{2}$	2 $\frac{1}{4}$	$\frac{1}{2}$
CA	1.50	.15	$\frac{1}{8}$	30 and 30	2 $\frac{1}{4}$	$\frac{1}{2}$
D	1.50	.15	$\frac{1}{8}$	49 and 45	2 $\frac{1}{4}$	$\frac{1}{2}$
DA	1.50	.15	$\frac{1}{8}$	46 and 46	2 $\frac{1}{4}$	$\frac{1}{2}$
E	1.50	.15	$\frac{1}{8}$	$\frac{1}{2}$ and $\frac{1}{2}$	2 $\frac{1}{4}$	$\frac{1}{2}$
EA	1.50	.15	$\frac{1}{8}$	$\frac{1}{2}$ and $\frac{1}{2}$	2 $\frac{1}{4}$	$\frac{1}{2}$
EB	1.50	.15	$\frac{1}{8}$	55 and 55	2 $\frac{1}{4}$	$\frac{1}{2}$
F	3.00	.30	$\frac{1}{8}$	$\frac{1}{2}$ and $\frac{1}{2}$	2 $\frac{1}{4}$	$\frac{1}{2}$
G	3.00	.30	$\frac{1}{8}$	$\frac{1}{2}$ and $\frac{1}{2}$	2 $\frac{1}{4}$	$\frac{1}{2}$
H	3.00	.30	$\frac{1}{8}$	$\frac{1}{2}$ and $\frac{1}{2}$	2 $\frac{1}{4}$	$\frac{1}{2}$
I	4.60	.46	$\frac{1}{8}$	$\frac{1}{2}$ and $\frac{1}{2}$	3 $\frac{1}{4}$	$\frac{1}{2}$
J	4.60	.46	$\frac{1}{8}$	$\frac{1}{2}$ and $\frac{1}{2}$	3 $\frac{1}{4}$	$\frac{1}{2}$
K	4.60	.46	$\frac{1}{8}$	$\frac{1}{2}$ and $\frac{1}{2}$	3 $\frac{1}{4}$	$\frac{1}{2}$
L	4.60	.46	$\frac{1}{8}$	$\frac{1}{2}$ and $\frac{1}{2}$	3 $\frac{1}{4}$	$\frac{1}{2}$
M	4.60	.46	$\frac{1}{8}$	$\frac{1}{2}$ and $\frac{1}{2}$	3 $\frac{1}{4}$	$\frac{1}{2}$
N	5.00	.50	$\frac{1}{8}$	12 and 12	3 $\frac{1}{4}$	$\frac{1}{2}$
O	5.00	.50	$\frac{1}{8}$	12 and 12	3 $\frac{1}{4}$	$\frac{1}{2}$

The angle of countersink is 60°. Special sizes and angles made to order.

No. 114B Drill and Countersink Combined Fitting Blacksmiths' Drill Presses



The angle of countersink is 60°. Bodies flattened for set screw.

Specially designed for drilling and countersinking TIRIS and WAGON IRONS AT ONE OPERATION.

Size *	Price Each	Diam. of Body, Inches	Diam. of Drill, Inches	Length Over All, Inches	Length of Drill, Inches
1	\$0.46	$\frac{1}{2}$	$\frac{1}{2}$	4 $\frac{1}{4}$	$\frac{1}{2}$
2	.46	$\frac{1}{2}$	$\frac{1}{2}$	4 $\frac{1}{4}$	$\frac{1}{2}$
3	.50	$\frac{1}{2}$	$\frac{1}{2}$	4 $\frac{1}{4}$	$\frac{1}{2}$
4	.50	$\frac{1}{2}$	$\frac{1}{2}$	4 $\frac{1}{4}$	$\frac{1}{2}$
11	.70	$\frac{1}{2}$	$\frac{1}{2}$	4 $\frac{1}{4}$	$\frac{1}{2}$
12	.70	$\frac{1}{2}$	$\frac{1}{2}$	4 $\frac{1}{4}$	$\frac{1}{2}$
13	.75	$\frac{1}{2}$	$\frac{1}{2}$	4 $\frac{1}{4}$	$\frac{1}{2}$
14	.75	$\frac{1}{2}$	$\frac{1}{2}$	4 $\frac{1}{4}$	$\frac{1}{2}$

Countersink Bits

Drop Forged, Oil Tempered, Polished Finish.



No. 3 for Iron

Price each.....\$0.24



No. 4 for Brass

Price each.....\$0.30



No. 5 for Wood

Price each.....\$0.24

Drill Sockets

Steel Sleeves for Taper Shank Drills
No. 100B

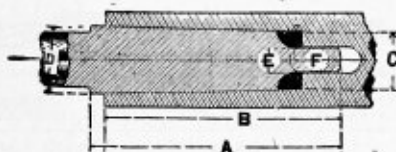
Size No.	1-2	1-3	1-4	1-5	2-3	2-4
Hole No.	1	1	1	1	2	2
Socket No.	2	3	4	5	3	4
Price Each	\$1.80	2.40	3.00	4.40	2.40	3.00
Size No.	2-5	3-4	3-5	4-5	4-6	5-6
Hole No.	2	3	3	4	4	5
Socket No.	5	4	5	5	6	6
Price Each	\$4.40	3.00	4.40	4.40	10.00	10.00

No. 100A Fitted



Size No.	1-2	1-3	1-4	1-5	2-3	2-4	2-5	3-2	3-3
Hole No.	1	1	1	1	2	2	2	3	3
Shank No.	2	3	4	5	3	4	5	2	3
Price Each	\$2.00	2.30	3.20	4.80	2.50	3.20	4.80	3.20	3.20
Size No.	3-4	3-5	4-3	4-4	4-5	4-6	5-4	5-5	5-6
Hole No.	3	3	4	4	4	4	5	5	5
Shank No.	4	5	3	4	5	6	4	5	6
Price Each	\$3.20	4.80	4.80	4.80	4.80	12.00	12.00	12.00	12.00

Dimensions of Shanks on Taper Shank Drills



Shank No.	A	B	C	D	*E	F	Taper Ft.	Per Ins.	Drift No.
0	2 1/2	2 1/2	.239	.356	1/16	3/8	.625	.05208	0
1	2 1/2	2 3/8	.353	.475	1/8	1/2	.600	.050	1
2	3 1/8	3	.550	.700	1/4	3/4	.602	.05016	2
3	4	3 1/2	.750	.938	3/8	1	.602	.05016	3
4	5 1/8	4 1/4	.984	1.231	1/2	1 1/8	.623	.05191	4
5	6 1/8	5 1/4	1.433	1.748	5/8	1 3/8	.630	.0525	5
6	8 1/4	7 1/4	2.060	2.494	3/4	1 3/4	.626	.05216	6
7	11 1/4	11 1/4	2.684	3.270	1 1/8	1 1/2	.625	.05208	7

*E—Thickness of tang.

Steel Sockets for Taper Shank Drills
No. 100. Rough End

Centered Plugs for turning shanks furnished with these sockets. Illustration shows center plug inserted.

No.	Price Each	Capacity, Inches	Entire Length, Inches	Diam. Blank End, Ins.
1	\$ 1.20	Holds 1/8 to 1/4 inc.	7 1/2	1 1/4
2	1.80	Holds 1/4 to 3/8 inc.	8	1 1/2
3	2.50	Holds 3/8 to 1 1/2 inc.	10	1 3/4
4	4.00	Holds 1 1/4 to 2 inc.	13	2
5	7.50	Holds 2 1/4 to 3 inc.	16	2 3/4
6	14.00	Holds 3 1/4 to 6 inc.	22	3 3/4

"Use Em Up" Type

Sleeve Style

Will put into immediate use drills and reamers with tangs twisted off, by grinding flat surface on the remaining shank. No great accuracy required in doing this work and will give positive drive. Special tools can be made to fit these sockets without the expense of milling a tang.

See that flat?



Size No.	1-2	1-3	1-4	1-5	2-3	2-4
Hole No.	1	1	1	1	2	2
Socket No.	2	3	4	5	3	4
Price Each	\$1.80	2.40	3.00	4.40	2.40	3.00
Size No.	2-5	3-4	3-5	4-5	4-6	5-6
Hole No.	2	3	3	4	4	5
Socket No.	5	4	5	5	6	6
Price Each	\$4.40	3.00	4.40	4.40	10.00	10.00

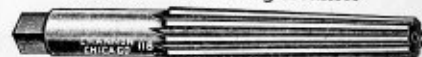
Fitted on Socket Style

See that flat?

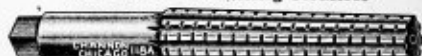


Price Each

Size No.	1-2	1-3	1-4	1-5	2-3	2-4	2-5	3-2	3-3
Hole No.	1	1	1	1	2	2	2	3	3
Shank No.	2	3	4	5	3	4	5	2	3
Price	\$2.00	2.50	3.20	4.80	2.50	3.20	4.80	3.20	3.20
Size No.	3-4	3-5	4-3	4-4	4-5	4-6	5-4	5-5	5-6
Hole No.	3	3	4	4	4	4	5	5	5
Shank No.	4	5	3	4	5	6	4	5	6
Price	\$3.20	4.80	4.80	4.80	4.80	12.00	12.00	12.00	12.00

Taper Reamers for Drill Sockets
No. 118. Finishing Reamer

No. 118A. Roughing Reamer



Used principally for reaming holes to receive taper shank drills, as the shanks of all makes of taper shank drills are made to suit this taper.

Size No.	Price Each	Length Over All, Inches	Length of Flute, Inches	Large Diam.	Small Diam.	Taper per Foot, Inches
0	\$ 1.60	3 1/2	2 1/4	.369	by .252	.625
1	2.00	5 1/2	3	.519	by .369	.600
2	2.60	7	3 1/4	.7475	by .572	.602
3	3.40	8	4 1/4	.991	by .778	.602
4	4.20	9	5 1/4	1.2925	by 1.020	.621
5	6.60	10	6 1/4	1.803	by 1.475	.630
6	12.00	12	8 1/2	2.559	by 2.116	.626
7	35.00	16	12	3.375	by 2.750	.626

Number 118A Roughing Reamers are made .010 inch smaller in diameter than Finishing Reamers.

CARBON AND HIGH SPEED REAMERS

Hand Reamers

Eccentric Flutes

No. 115
Carbon
SteelNo. 250
Diamond
High Speed

This type of hand reamer is the most popular and is used for very accurate work. On account of the square shank it can be used with reamer wrench. It will not chatter when in use. Hand reamers also furnished in 64 sizes in both carbon and Diamond High Speed steel.

Diam., Inches	Diamond H. Speed, Each	Carbon Steel, Each	Length Over All, Inches	Length of Flute, Inches	Diam., Inches	Diamond H. Speed, Each	Carbon Steel, Each	Length Over All, Inches	Length of Flute, Inches	Diam., Inches	Diamond H. Speed, Each	Carbon Steel, Each	Length Over All, Inches	Length of Flute, Inches
1/16	\$1.00	3	1 1/2	1/16	\$ 9.50	\$3.40	10 1/4	5 1/4	1 1/16	\$29.50	\$ 7.80	13 1/2	6 1/4
1/8	1.10	3 1/4	1 5/8	1/8	10.50	3.55	10 5/8	5 5/8	1 1/8	29.50	8.00	13 1/2	6 1/4
3/16	1.20	3 3/4	1 3/4	3/16	10.50	3.70	10 3/4	5 3/4	1 3/16	31.50	8.20	13 1/2	6 1/4
1/4	1.30	3 3/4	1 3/4	1/4	11.50	3.85	11 1/8	5 7/8	1 1/4	31.50	8.40	13 1/2	6 1/4
5/16	\$3.50	4	2	5/16	11.50	4.00	11 1/4	5 7/8	1 1/4	33.50	8.60	13 1/2	6 1/4
3/8	3.75	4 1/4	2 1/4	3/8	12.75	4.15	11 3/4	5 3/4	1 3/8	33.50	8.80	14	7
7/16	4.25	4 1/2	2 1/2	7/16	12.75	4.30	11 3/4	5 3/4	1 3/8	35.75	9.00	14	7
1/2	4.25	5	2 3/4	1/2	14.25	4.45	11 3/4	5 3/4	1 1/2	35.75	9.20	14	7
5/8	4.75	5 1/4	3	5/8	14.25	4.60	12	6	1 1/2	38.00	9.40	14	7
3/4	4.75	5 1/4	3	3/4	15.75	4.75	12 1/4	6 1/4	2	38.00	9.60	14	7
7/8	4.75	5 1/4	3	7/8	15.75	4.90	12 1/4	6 1/4	2 1/2	40.75	10.00	14 1/2	7 1/2
1	5.25	5 3/4	3 1/4	1	17.25	5.05	12 1/2	6 1/2	2 1/2	43.50	10.40	14 1/2	7 1/2
1 1/16	5.25	6	3	1 1/16	17.25	5.20	12 1/2	6 1/2	2 3/4	46.25	10.80	15	7 1/2
1 1/8	5.75	6 1/4	3 1/4	1 1/8	18.75	5.40	12 3/4	6 3/4	2 3/4	49.00	11.30	15	7 1/2
1 1/4	5.75	6 1/4	3 1/4	1 1/4	18.75	5.60	12 3/4	6 3/4	2 3/4	51.75	11.80	15	7 1/2
1 1/2	6.25	6 1/2	3 1/2	1 1/2	20.50	5.80	12 3/4	6 3/4	2 3/4	55.00	12.30	15	7 1/2
1 3/4	6.25	6 1/2	3 1/2	1 3/4	20.50	6.00	12 3/4	6 3/4	2 3/4	58.25	12.80	15 1/2	7 3/4
2	6.75	7	3 3/4	2	22.25	6.20	13	6 1/2	2 3/4	61.50	13.40	15 1/2	7 3/4
2 1/4	6.75	7 1/4	3 3/4	2 1/4	22.25	6.40	13	6 1/2	2 3/4	64.75	14.00	15 1/2	7 3/4
2 1/2	7.25	7 1/2	4	2 1/2	24.00	6.60	13	6 1/2	2 3/4	68.00	14.60	16	8
2 3/4	7.25	7 1/2	4	2 3/4	24.00	6.80	13	6 1/2	2 3/4	71.25	15.40	16	8
3	7.75	7 3/4	4 1/4	3	25.75	7.00	13	6 1/2	2 3/4	74.50	16.20	16	8
3 1/4	7.75	7 3/4	4 1/4	3 1/4	25.75	7.20	13	6 1/2	2 3/4	77.75	17.00	16 1/2	8 1/4
3 1/2	8.50	8	4 1/2	3 1/2	27.50	7.40	13 1/2	6 3/4	2 3/4	81.00	17.80	16 1/2	8 1/4
3 3/4	8.50	8	4 1/2	3 3/4	27.50	7.60	13 1/2	6 3/4	2 3/4	84.25	18.60	16 1/2	8 1/4
4	9.50	8 1/2	5	4					3	87.50	19.40	16 1/2	8 1/4

Taper Shank Jobbers' Reamers

No. 116
Carbon
SteelNo. 251
Diamond
High Speed

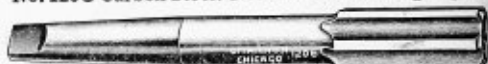
Exactly the same as the above reamer except that it has a taper shank. This type is recommended where a large quantity of work is to be reamed. Can also be used in drill presses, etc.

Diam., Inches	Diamond H. Speed, Each	Carbon Steel, Each	Length Over All In.	Length Flute, Inches	Taper Shank No.	Diam., Inches	Diamond H. Speed, Each	Carbon Steel, Each	Length Over All, In.	Length Flute, Inches	Taper Shank No.	Diam., Inches	Diamond H. Speed, Each	Carbon Steel, Each	Length Over All, In.	Length Flute, Inches	Taper Shank No.
1/16	\$ 4.00	\$1.50	5 1/2	2	1	1/16	\$ 7.75	\$2.60	8	3 3/4	1	1 1/16	\$15.25	\$4.70	11 1/4	6	3
1/8	4.25	1.55	5 1/2	2 1/4	1	1/8	7.75	2.70	8 1/4	4 3/4	1	1 1/8	16.75	4.85	11 1/4	6	3
3/16	4.25	1.60	5 1/2	2 1/4	1	3/16	8.50	2.80	8 3/4	4 3/4	1	1 3/16	16.75	5.00	12 1/4	6 1/4	3
1/4	4.75	1.65	5 1/2	2 1/4	1	1/4	8.50	2.90	8 3/4	4 3/4	1	1 1/4	18.25	5.15	12 1/4	6 1/4	3
5/16	4.75	1.70	5 1/2	2 1/4	1	5/16	9.50	3.05	8 3/4	4 3/4	1	1 1/4	18.25	5.30	12 1/4	6 1/4	3
3/8	5.25	1.80	5 1/2	2 1/4	1	3/8	9.50	3.20	9 3/4	4 3/4	1	1 1/4	19.75	5.50	12 1/4	6 1/4	3
7/16	5.25	1.85	6 1/4	2 3/4	1	7/16	10.50	3.35	9 3/4	4 3/4	1	1 1/4	19.75	5.70	12 1/4	6 1/4	3
1/2	5.75	1.95	6 1/4	2 3/4	1	1/2	10.50	3.50	10	5 3/4	1	1 1/4	21.50	5.90	12 1/4	6 1/4	3
5/8	5.75	2.00	6 1/4	2 3/4	1	5/8	11.50	3.65	10	5 3/4	1	1 1/4	21.50	6.10	13	6 1/4	4
3/4	6.25	2.10	6 1/4	3	1	3/4	11.50	3.80	10 1/4	5 3/4	1	1 1/4	23.25	6.30	13	6 1/4	4
7/8	6.25	2.15	6 1/4	3 1/4	1	7/8	12.50	3.95	10 1/4	5 3/4	1	1 1/4	23.25	6.50	13 1/4	6 1/4	4
1	6.75	2.25	7	3 1/4	1	1	12.50	4.10	10 1/4	5 3/4	1	1 1/4	25.00	6.70	13 1/4	6 1/4	4
1 1/16	6.75	2.30	7 1/4	3 1/4	1	1 1/16	13.75	4.25	10 1/4	5 3/4	1	1 1/4	25.00	6.90	13 1/4	6 1/4	4
1 1/8	7.25	2.40	7 1/4	3 1/4	1	1 1/8	13.75	4.40	10 1/4	5 3/4	1	1 1/4	26.75	7.10	13 1/4	6 1/4	4
1 1/4	7.25	2.50	8	3 3/4	1	1 1/4	15.25	4.55	10 1/4	5 3/4	1	1 1/4	26.75	7.30	13 1/4	6 1/4	4

CARBON AND HIGH SPEED REAMERS

Chucking Reamers—With Taper Shanks

Fluted—No. 120E Carbon Steel. No. 262 High Speed. Rose—No. 120G Carbon Steel. No. 264 Diamond High Speed



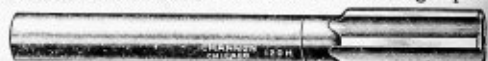
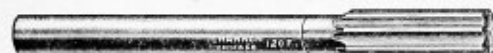
Fluted reamers are especially made for reaming for accurate work, while Rose Reamers are primarily for rough reaming but will ream fairly accurate. They are often preferred in place of hand reamers on account of the short flute and are much more efficient for shallow reaming.

Diam., Inches	Price Each		Length Over All	Length of Flute		Taper Shank Number	Diam., Inches	Price Each		Length Over All	Length of Flute		Taper Shank Number
	High Speed	Carbon Steel		Fluted	Rose			High Speed	Carbon Steel		Fluted	Rose	
1/4	\$3.50	\$1.20	6	7/8	1 1/2	1	5/16	\$10.00	\$2.65	10	1 1/2	2 5/8	3
3/8	3.75	1.20	6	7/8	1 1/2		11/16	11.00	2.70	10	1 1/2	2 5/8	
1/2	3.75	1.30	6	7/8	1 1/2		1 1/4	11.00	2.75	10 1/2	1 5/8	2 3/4	
5/8	4.25	1.30	6	7/8	1 1/2		1 1/2	12.25	2.80	10 1/2	1 5/8	2 3/4	
3/4	4.25	1.45	7	1	1 3/4		1 3/4	12.25	2.85	10 1/2	1 5/8	2 3/4	
7/8	4.75	1.50	7	1	1 3/4		1 3/8	13.50	2.95	10 1/2	1 5/8	2 3/4	
1	4.75	1.55	7	1	1 3/4		1 3/8	13.50	3.10	11	1 5/8	2 3/4	
1 1/8	5.25	1.60	7	1	1 3/4		1 3/8	14.75	3.20	11	1 5/8	2 3/4	
1 1/4	5.25	1.65	8	1 1/8	2		1 3/8	14.75	3.30	11	1 5/8	2 3/4	
1 1/2	5.75	1.70	8	1 1/8	2		1 3/8	16.25	3.40	11	1 5/8	2 3/4	
1 3/4	5.75	1.75	8	1 1/8	2	2	1 3/4	16.25	3.50	11 1/2	1 5/8	3	4
1 7/8	6.25	1.80	8	1 1/8	2		1 3/4	18.00	3.70	11 1/2	1 5/8	3	
2	6.25	1.90	9	1 1/4	2 1/4		1 3/8	19.75	3.95	12	2	3 1/4	
2 1/8	6.75	1.95	9	1 1/4	2 1/4		1 3/8	21.50	4.15	12	2	3 1/4	
2 1/4	6.75	2.00	9	1 1/4	2 1/4		1 1/2	23.25	4.40	12 1/2	2 1/8	3 1/2	
2 1/2	7.25	2.10	9	1 1/4	2 1/4		1 1/2	25.00	4.60	12 1/2	2 1/8	3 1/2	
2 3/4	7.25	2.20	9 1/2	1 3/8	2 1/2		1 5/8	26.75	4.85	13	2 1/4	3 3/4	
3	8.00	2.30	9 1/2	1 3/8	2 1/2		1 5/8	28.50	5.10	13	2 1/4	3 3/4	
3 1/8	8.00	2.40	9 1/2	1 3/8	2 1/2		1 3/4	30.50	5.30	13 1/2	2 3/8	4	
3 1/4	9.00	2.50	9 1/2	1 3/8	2 1/2		1 3/4	32.50	5.50	13 1/2	2 3/8	4	
3 1/2	9.00	2.55	10	1 1/2	2 5/8	2	1 3/8	34.50	5.70	14	2 1/2	4 1/4	5
3 3/4	10.00	2.60	10	1 1/2	2 5/8		1 3/8	36.75	5.95	14	2 1/2	4 1/4	
							1 3/8	39.00	6.20	14	2 1/2	4 1/4	

Larger sizes quoted upon application.

Chucking Reamers—With Straight Shanks

Fluted—No. 120F Carbon Steel. No. 263 High Speed. Rose—120H Carbon Steel. No. 265 Diamond High Speed



These are the same as the above reamers except that they have straight shanks. The shanks are so ground that they will run true with the flutes when used in chucks.

Diam., Inches	High Speed Each	Carbon Steel		Length Over All, Inches	Length Flute		Diam., Inches	High Speed Each	Carbon Steel		Length Over All, Inches	Length Flute		Diam., Inches	High Speed Each	Carbon Steel		Length Over All, Inches	Length Flute	
		Fluted	Rose		Fluted	Rose			Fluted	Rose		Fluted	Rose			Fluted	Rose		Fluted	Rose
1/4	\$3.00	\$0.90	\$0.80	6	7/8	1 1/2	5/16	\$6.75	\$1.65	\$1.55	9	1 1/4	2 1/4	1 3/8	13.75	\$2.75	\$2.55	11	1 3/4	2 3/8
3/8	3.25	.95	.85	6	7/8	1 1/2	11/16	6.75	1.70	1.60	9 1/2	1 3/8	2 1/2	1 3/8	15.25	2.85	2.65	11	1 3/4	2 3/8
1/2	3.25	1.00	.90	6	7/8	1 1/2	1 1/4	7.25	1.80	1.65	9 1/2	1 3/8	2 1/2	1 3/8	15.25	2.90	2.70	11 1/2	1 3/4	3
5/8	3.75	1.05	.95	6	7/8	1 1/2	1 1/2	7.25	1.85	1.70	9 1/2	1 3/8	2 1/2	1 3/8	17.00	3.05	2.85	11 1/2	1 3/4	3
3/4	3.75	1.10	1.00	7	1	1 3/4	1 1/2	8.00	1.90	1.75	9 1/2	1 3/8	2 1/2	1 3/8	18.75	3.20	3.00	12	2	3 1/4
7/8	4.25	1.15	1.05	7	1	1 3/4	1 1/2	8.00	2.00	1.80	10	1 1/2	2 3/8	1 3/8	20.50	3.35	3.15	12	2	3 1/4
1	4.25	1.20	1.10	7	1	1 3/4	1 1/2	9.00	2.10	1.90	10	1 1/2	2 3/8	1 3/8	22.25	3.50	3.30	12 1/2	2 1/8	3 1/2
1 1/8	4.75	1.25	1.15	7	1	1 3/4	1 1/2	9.00	2.15	1.95	10	1 1/2	2 3/8	1 3/8	24.00	3.65	3.45	12 1/2	2 1/8	3 1/2
1 1/4	4.75	1.30	1.20	8	1 1/8	2	1 1/2	10.00	2.25	2.05	10	1 1/2	2 3/8	1 3/8	25.75	3.80	3.60	13	2 1/4	3 3/4
1 1/2	5.25	1.35	1.25	8	1 1/8	2	1 1/2	10.00	2.30	2.10	10 1/2	1 1/2	2 3/8	1 3/8	27.50	4.00	3.75	13	2 1/4	3 3/4
1 3/4	5.25	1.40	1.30	8	1 1/8	2	1 1/2	11.25	2.40	2.20	10 1/2	1 1/2	2 3/8	1 3/8	29.50	4.20	3.90	13 1/2	2 1/2	4
1 7/8	5.75	1.45	1.35	8	1 1/8	2	1 1/2	11.25	2.45	2.25	10 1/2	1 1/2	2 3/8	1 3/8	31.50	4.40	4.05	13 1/2	2 1/2	4
2	5.75	1.50	1.40	9	1 1/4	2 1/4	1 1/2	12.50	2.50	2.35	10 1/2	1 1/2	2 3/8	1 3/8	33.50	4.60	4.20	14	2 1/2	4 1/4
2 1/8	6.25	1.55	1.45	9	1 1/4	2 1/4	1 1/2	12.50	2.60	2.40	11	1 3/4	2 7/8	1 3/8	35.75	4.80	4.40	14	2 1/2	4 1/4
2 1/4	6.25	1.60	1.50	9	1 1/4	2 1/4	1 1/2	13.75	2.70	2.50	11	1 3/4	2 7/8	2	38.00	5.00	4.60	14	2 1/2	4 1/4

CARBON AND HIGH SPEED REAMERS

W. & B. Shell Reamers



Fluted
No. 117. Carbon Steel.
No. 260. Diamond High Speed.

The Fluted type should be used when an accurately finished hole is required.

Rose

No. 117A. Carbon Steel.
No. 261. Diamond High Speed.

The Rose type is used for roughing, but will ream a fairly accurate hole.



Dia. Ins.	Price Each		Size Hole	Lgth. Over All, Ins.	Fitting Arbor	Dia. Ins.	Price Each		Size Hole	Lgth. Over All, Ins.	Fitting Arbor	Dia. Ins.	Price Each		Size Hole	Lgth. Over All, Ins.	Fitting Arbor
	High Sp'd	Car- bon Steel					High Sp'd	Car- bon Steel					High Sp'd	Car- bon Steel			
1/2	\$3.25	\$1.40	1/2	2		1 1/2	\$9.75	\$3.80	1 1/2	3 1/2		2 1/2	\$27.00	\$ 8.80	1 1/2	4	
3/4	3.40	1.50	1 1/4	2	No. 3	1 3/4	10.50	4.10	1 3/4	3 1/2		2 3/4	28.50	9.20	1 3/4	4	No. 10
5/8	3.55	1.60	1 1/2	2		1 7/8	11.25	4.40	1 7/8	3 1/2		3	30.00	9.60	1 7/8	4	
7/8	3.70	1.60	1 3/4	2 1/4	No. 4	2	12.00	4.70	2	3 1/2		3 1/4	31.50	9.90	1 3/4	4 1/2	
1	3.85	1.60	2	2 1/2		2 1/8	12.75	5.00	2 1/8	3 1/2		3 1/2	33.25	10.20	1 3/4	4 1/2	
1 1/8	4.00	1.60	2 1/4	2 3/4		2 1/4	13.50	5.20	2 1/4	3 1/2		3 1/2	35.25	10.60	1 3/4	4 1/2	
1 1/4	4.25	1.70	2 1/2	2 3/4	No. 5	2 3/8	14.25	5.40	2 3/8	3 3/4		3 3/4	37.50	11.00	1 3/4	4 1/2	No. 11
1 1/2	4.50	1.70	2 3/4	2 3/4		2 1/2	15.00	5.60	2 1/2	3 3/4		3 3/4	40.00	11.50	1 3/4	4 1/2	
1 3/4	4.75	1.80	3	2 3/4		2 3/4	15.75	5.80	2 3/4	3 3/4		3 3/4	42.50	12.00	1 3/4	4 1/2	
2	5.00	1.80	3 1/4	2 3/4	No. 6	2 3/4	16.50	6.00	2 3/4	3 3/4		3 3/4	45.25	12.50	1 3/4	4 1/2	
2 1/8	5.25	1.90	3 1/2	2 3/4		2 3/4	17.25	6.20	2 3/4	3 3/4		3 3/4	48.00	13.00	1 3/4	4 1/2	
2 1/4	5.50	2.00	3 3/4	2 3/4		2 3/4	18.00	6.40	2 3/4	3 3/4		3 3/4	50.75	13.50	1 3/4	4 1/2	
2 1/2	5.75	2.20	4	2 3/4		2 3/4	18.75	6.60	2 3/4	3 3/4		3 3/4	53.50	14.00	2	5	
2 3/4	6.00	2.40	4 1/4	3		2 3/4	19.50	6.80	2 3/4	3 3/4		3 3/4	56.50	14.50	2	5	
3	6.50	2.60	4 1/2	3		2 3/4	20.50	7.00	2 3/4	4		3 3/4	59.50	15.00	2	5	No. 12
3 1/4	7.00	2.80	4 3/4	3		2 3/4	21.75	7.30	2 3/4	4		3 3/4	62.75	15.50	2	5	
3 1/2	7.50	3.00	5	3	No. 7	2 3/4	23.00	7.60	2 3/4	4		3 3/4	66.00	16.00	2	5	
3 3/4	8.25	3.20	5 1/4	3		2 3/4	24.25	8.00	2 3/4	4		3 3/4	69.25	17.00	2	5	
4	9.00	3.50	5 1/2	3		2 3/4	25.50	8.40	2 3/4	4		3 3/4	72.50	18.00	2	5	

Can be furnished up to 6 inches in diameter. Thirty-second sizes can also be furnished.

Diamond Easy Starting Arbors

No. 125, With Straight Shank



No. 125A, With Taper Shank



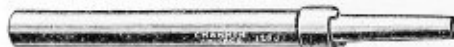
Size No.	Price No. 125A Taper Shank	Price No. 125 Straight Shank	Fitting Sizes, Inches	Lengths Over All, Inches	Taper Shank No.
3	\$ 3.90	\$ 2.40	1/2 to 5/8	8	1
4	4.20	2.70	5/8 to 3/4	9	2
5	4.50	3.00	3/4 to 1	9 1/2	2
6	4.80	3.30	1 to 1 1/8	10	3
7	5.10	3.60	1 1/8 to 1 1/4	11	3
8	5.55	4.05	1 1/4 to 1 1/2	12	4
9	6.75	4.50	1 1/2 to 1 3/4	13	4
10	7.35	5.10	1 3/4 to 2	14	5
11	10.15	7.50	2 to 2 1/4	15	5
12	13.15	10.50	2 1/4 to 2 3/4	16	6
13	16.15	13.50	2 3/4 to 3	17	6
14	21.00	18.00	3 to 3 1/2	18	6
15	25.15	22.15	3 1/2 to 4	19	6
16	29.25	26.25	4 to 4 1/2	20	6

"Diamond" Easy Starting Arbors are made with a nut and sliding collar, the nut being used to move the collar forward and start the reamer or shell tool from the arbor. It is not necessary to remove the arbor from the machine.

This device is a time saver and likewise prevents damaging the tools.

Arbors for Shell Reamers

No. 120J, with Straight Shank



No. 120T, with Taper Shank



No.	Price Each		Fitting Sizes, Inches	Lgth., Ins.	Size of Shank No. 120T
	No. 120J	No. 120T			
3	\$ 1.60	\$ 2.60	1/2 to 5/8	6	1
4	1.80	2.80	5/8 to 3/4	7	2
5	2.00	3.00	3/4 to 1	8	2
6	2.20	3.20	1 to 1 1/8	9	3
7	2.40	3.40	1 1/8 to 1 1/4	9 1/2	3
8	2.70	3.70	1 1/4 to 1 1/2	10	4
9	3.00	4.50	1 1/2 to 1 3/4	11	4
10	3.40	4.90	1 3/4 to 2	12	5
11	5.00	6.75	2 to 2 1/4	13	5
12	7.00	8.75	2 1/4 to 2 3/4	14	5
13	9.00	10.75	2 3/4 to 3	15	5
14	12.00	14.00	3 to 3 1/2	16	6
15	14.75	16.75	3 1/2 to 4	17	6
16	17.50	19.50	4 to 4 1/2	18	6

Stub Broaches or 5 Sided Reamers



For experimental and precision work, size is measured at largest diameter of flutes.

Size, each.....	\$0.16	\$0.18	\$0.20	\$0.22	\$0.24	\$0.28
Price, each.....	\$0.32	\$0.40	\$0.50	\$0.60	\$0.70	\$0.82
Size, each.....	\$0.86	\$0.90	\$1.00	\$1.30	\$1.50	\$1.80
Price, each.....						

EXPANSION REAMERS

Diamond Expansion Reamers



Diamond Expansion Reamers are highly recommended where fine precision reaming is required. Adjustment can be made to less than one one-thousandth of an inch. Taper Shank Regular Reamers furnished up to 3 inches in diameter in 32nd and 64th sizes, both Carbon and Diamond High Speed steel.

Not guaranteed to give expansion greater than as follows: Sizes $\frac{1}{4}$ to $\frac{11}{16}$, .006 inch; $\frac{1}{2}$ to $\frac{11}{16}$, .010 inch; 1 to $\frac{11}{16}$, .012 inch; $1\frac{1}{4}$ to 3, .015 inch.

Diam., Inches	Price Each	Length Over All, Inches	Length of Flute, Inches	Diam., Inches	Price Each	Length Over All, Inches	Length of Flute, Inches	Diam., Inches	Price Each	Length Over All, Inches	Length of Flute, Inches
$\frac{1}{4}$	\$3.00	$3\frac{3}{4}$	$1\frac{1}{2}$	$\frac{3}{8}$	\$5.00	7	$2\frac{3}{4}$	$1\frac{1}{2}$	\$ 9.20	$10\frac{1}{8}$	$4\frac{1}{2}$
$\frac{5}{16}$	3.05	4	$1\frac{5}{8}$	$\frac{7}{16}$	5.25	7	3	$1\frac{3}{8}$	9.50	$10\frac{1}{8}$	$4\frac{5}{8}$
$\frac{3}{8}$	3.10	4	$1\frac{5}{8}$	$\frac{1}{2}$	5.50	$7\frac{1}{2}$	$3\frac{1}{8}$	$1\frac{3}{8}$	10.00	$10\frac{3}{8}$	$4\frac{5}{8}$
$\frac{7}{16}$	3.15	$4\frac{1}{4}$	$1\frac{5}{8}$	$\frac{9}{16}$	5.75	$7\frac{1}{2}$	$3\frac{3}{8}$	$1\frac{3}{8}$	10.50	$10\frac{3}{8}$	$4\frac{5}{8}$
$\frac{1}{2}$	3.20	$4\frac{1}{4}$	$1\frac{5}{8}$	$\frac{5}{8}$	6.00	$7\frac{3}{8}$	$3\frac{7}{8}$	$1\frac{3}{8}$	11.00	$10\frac{3}{8}$	$4\frac{5}{8}$
$\frac{9}{16}$	3.25	$4\frac{1}{2}$	$1\frac{5}{8}$	$\frac{11}{16}$	6.25	$7\frac{3}{8}$	$3\frac{7}{8}$	$1\frac{3}{8}$	11.50	$10\frac{3}{8}$	$4\frac{5}{8}$
$\frac{5}{8}$	3.30	$4\frac{1}{2}$	$1\frac{5}{8}$	$\frac{3}{4}$	6.50	$8\frac{3}{8}$	$3\frac{3}{4}$	$1\frac{3}{8}$	12.00	$11\frac{1}{8}$	$4\frac{5}{8}$
$\frac{11}{16}$	3.35	5	$1\frac{5}{8}$	1	6.75	$8\frac{3}{8}$	$3\frac{7}{8}$	$1\frac{3}{8}$	12.50	$11\frac{1}{8}$	$4\frac{5}{8}$
$\frac{3}{4}$	3.40	5	$1\frac{5}{8}$	$1\frac{1}{16}$	7.00	$8\frac{5}{8}$	$3\frac{7}{8}$	$1\frac{3}{8}$	13.00	$11\frac{1}{8}$	$4\frac{5}{8}$
$\frac{13}{16}$	3.50	$5\frac{3}{8}$	$1\frac{5}{8}$	$1\frac{1}{8}$	7.25	$8\frac{5}{8}$	4	$1\frac{3}{8}$	13.50	$11\frac{1}{8}$	$4\frac{5}{8}$
$\frac{7}{8}$	3.65	$5\frac{3}{8}$	$1\frac{5}{8}$	$1\frac{1}{4}$	7.50	9	$4\frac{1}{8}$	$1\frac{3}{4}$	14.00	$11\frac{1}{8}$	$4\frac{5}{8}$
$\frac{15}{16}$	3.80	$5\frac{7}{8}$	$2\frac{1}{8}$	$1\frac{3}{8}$	7.75	9	$4\frac{1}{8}$	$1\frac{3}{4}$	14.50	$11\frac{1}{8}$	$4\frac{5}{8}$
$\frac{15}{16}$	4.00	$5\frac{7}{8}$	$2\frac{1}{8}$	$1\frac{3}{8}$	8.00	$9\frac{3}{8}$	$4\frac{3}{8}$	$1\frac{3}{4}$	15.00	$12\frac{1}{8}$	$4\frac{5}{8}$
$\frac{15}{16}$	4.20	$6\frac{1}{4}$	$2\frac{3}{8}$	$1\frac{3}{8}$	8.30	$9\frac{3}{8}$	$4\frac{3}{8}$	$1\frac{3}{4}$	15.50	$12\frac{1}{8}$	5
$\frac{15}{16}$	4.40	$6\frac{1}{4}$	$2\frac{3}{8}$	$1\frac{3}{8}$	8.60	$9\frac{3}{4}$	$4\frac{5}{8}$	$1\frac{5}{8}$	16.00	$12\frac{3}{8}$	5
$\frac{15}{16}$	4.60	$6\frac{1}{2}$	$2\frac{3}{8}$	$1\frac{3}{4}$	8.90	$9\frac{3}{4}$	$4\frac{5}{8}$	2	16.50	$12\frac{3}{8}$	$5\frac{1}{8}$
$\frac{15}{16}$	4.80	$6\frac{1}{2}$	$2\frac{3}{8}$								

Critchley's Patent Expanding Reamer



Some Facts About the "Critchley"

Expands $\frac{1}{8}$ inch while others expand .005; easy adjustment; use any wrench; perfect alignment; no nut on end to interfere; one does the work of four; new blades can be had at small cost; blades can be reground many times; it is the only tool that will do what the repairman wants without his investing more than the value of the job.

No.	Diam. Inches	Expands to	Length Cutting, Inches	Full Length, Inches	Price Each
00	$\frac{1}{16}$	$\frac{1}{16}$	$1\frac{3}{4}$	$5\frac{1}{2}$	\$ 4.50
00 $\frac{1}{4}$	$\frac{1}{8}$	$\frac{1}{8}$	$1\frac{3}{4}$	$5\frac{3}{8}$	4.50
00 $\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{4}$	$1\frac{3}{4}$	$5\frac{3}{8}$	4.50
0	$\frac{3}{8}$	$\frac{3}{8}$	$2\frac{1}{4}$	$6\frac{1}{4}$	4.75
$0\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$2\frac{1}{4}$	$6\frac{3}{4}$	4.75
1	$\frac{3}{4}$	$\frac{3}{4}$	$2\frac{5}{8}$	7	5.00
$1\frac{1}{2}$	$\frac{7}{8}$	$\frac{7}{8}$	$2\frac{5}{8}$	$7\frac{1}{4}$	5.00
2	$1\frac{1}{8}$	$1\frac{1}{8}$	$2\frac{3}{4}$	8	5.50
3	$1\frac{1}{4}$	$1\frac{1}{4}$	3	9	5.80
4	$1\frac{3}{8}$	$1\frac{3}{8}$	$3\frac{1}{4}$	10	6.60
5	$1\frac{7}{8}$	$1\frac{7}{8}$	$3\frac{3}{4}$	11	7.50
6	$1\frac{1}{2}$	$1\frac{1}{2}$	4	12	8.50
7	$1\frac{3}{4}$	$1\frac{3}{4}$	$4\frac{1}{4}$	14	9.90
8	$1\frac{7}{8}$	$1\frac{7}{8}$	$4\frac{3}{4}$	16	11.50
9	$2\frac{1}{4}$	$2\frac{1}{4}$	$5\frac{1}{4}$	18	14.00
10	$2\frac{3}{8}$	$2\frac{3}{8}$	$6\frac{1}{4}$	20	17.00
11	$3\frac{1}{8}$	$3\frac{1}{8}$	7	22	20.00
12	$3\frac{3}{8}$	$4\frac{1}{8}$	$7\frac{3}{4}$	24	24.00

Auto Cylinder Reamer
For Ford and Dodge Cars

This is a shell reamer with taper slots and fitted with 8 semi-high speed steel cutters. As will be seen from illustration it is only necessary to loosen the top nut and screw on the lower one to make the reamer cut larger.

This reamer has an adjustment of $\frac{1}{8}$ inch. There is a shaft extending through the reamer more than the length of the cylinder; on this shaft is fitted a taper guide that fits in bottom end of cylinder to be reamed, thus insuring a straight hole.

This tool will ream a $3\frac{3}{4}$ -inch cylinder as smooth and clean as a gun barrel at a cost of labor that is astonishing to mechanic and car-owner, and any repairman is enabled to do as good work as the shop with boring mills and internal grinders. No complicated jigs are necessary to adjust or govern it. Two men on the ends of a 36 tap wrench will ream a 4-cylinder engine in 25 minutes. In other words it costs ten cents per cylinder to ream an engine.

Reamer in perpendicular position, never in a lathe. It may be used in a drill press, but the time necessary to attach a chuck really offsets the advantage.

We guarantee "no chattering or bucking"—consequently glass-smooth walls.

Rebored cylinders mean profitable work for the repairman and pleasurable driving for the car-owner.

Size $3\frac{3}{4}$ inches, adjustment $\frac{1}{8}$ inch. Price each, \$30.00

McCrosky Adjustable Reamers

We recommend these reamers on all machine work where extreme accuracy is required. They are also adapted for reaming automobile cylinders.

New Style Reamers

Regular Hand Reamer. Fig. 2



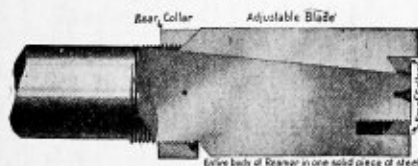
Machine Reamer

Straight Shank Fig. 5—Taper Shank Fig. 6



Size Inches	Hand		Length Inches	Machine		Length Inches
	High Speed	Carbon Steel		Straight Shank	Taper Shank	
1 1/4	\$ 7.75	\$ 6.45	10	\$ 7.95	\$ 8.70	11
1 1/2	8.25	6.85	10	8.30	9.10	11
1 3/8	8.80	7.35	10 1/2	8.65	9.50	12
1 1/2	9.45	7.85	10 1/2	9.00	9.90	12
1 3/4	10.10	8.40	10 1/2	9.50	10.50	12
1 7/8	10.75	8.95	11	9.80	10.80	13
1 5/8	11.40	9.50	11	10.00	11.10	13
1 1/2	12.00	10.00	11	10.25	11.45	13
1 3/4	12.65	10.55	12	10.55	11.70	14
1 7/8	13.25	11.05	12	10.90	12.20	14
1 5/8	13.95	11.60	12	11.25	12.50	14
1 3/4	14.55	12.10	12 1/2	11.50	12.90	14 1/2
2	15.20	12.65	12 1/2	11.75	13.25	14 1/2
2 1/8	15.85	13.20	12 1/2	12.10	13.70	14 1/2
2 1/4	16.50	13.75	13	12.55	14.30	15
2 1/2	17.10	14.25	13	12.95	14.65	15
2 3/8	17.75	14.80	13	13.35	15.05	15
2 1/2	18.35	15.30	14	13.55	15.40	15
2 3/4	19.00	15.85	14	13.90	15.80	15
2 5/8	19.70	16.40	14	14.30	16.25	15
2 1/2	20.30	16.90	15	14.95	16.95	15 1/2
2 3/4	20.90	17.40	15	15.75	17.80	15 1/2
2 5/8	21.50	17.90	15	16.60	18.65	15 1/2
2 3/4	22.10	18.40	15 1/2	17.35	19.55	15 1/2
2 5/8	22.70	18.90	15 1/2	18.10	20.35	15 1/2
2 3/4	23.30	19.40	15 1/2	18.90	21.25	15 1/2
2 5/8	23.90	19.90	16	19.75	22.15	16
2 3/4	24.50	20.40	16	20.50	22.95	16
3	25.10	20.90	16	21.30	23.80	16

Construction



Blade is held rigid and drawn firmly down against seat by outside and inside collars. Adjusted by releasing rear collar and moving up front collar. Simple and rigid in construction with ample chip clearance. Standard size can be maintained through years of service. Blades easily renewed. A two-inch reamer gives about 3/8-inch expansion. Other sizes in proportion.

Old Style Reamers

Hand Reamer Fig. 4



Machine Reamer

Straight Shank Fig. 7—Taper Shank Fig. 7T



Made only in sizes up to 1 1/2 inches because in larger sizes the New Style Reamer is superior. The Old Style Reamer, however, gives better satisfaction in the smaller sizes.

Size Inches	Hand		Length Inches	Machine		Length Inches
	High Speed	Carbon Steel		Straight Shank	Taper Shank	
3/8	\$6.50	\$5.40	8			
1/2	8.55	8.45	8			
5/8	6.50	5.50	8 1/2	\$6.10	\$6.75	9
3/4	6.70	5.55	8 1/2	6.25	6.85	9
7/8	6.80	5.65	8 1/2	6.45	7.05	10
1	6.95	5.80	8 1/2	6.75	7.40	10
1 1/8	7.15	5.95	9	7.00	7.70	10 1/2
1 1/4	7.45	6.20	9	7.35	8.05	10 1/2

McCrosky Shell Reamer



Size In.	Hole In.	Carbon Steel		High Speed	Size In.	Hole In.	Carbon Steel		High Speed
2	3/4	\$ 8.85	\$10.65	3 1/2	1 1/2	\$15.50	\$18.60		
2 1/8	3/4	9.00	10.80	3 1/2	1 1/2	16.00	19.20		
2 1/4	3/4	9.25	11.10	3 1/2	1 1/2	16.50	19.80		
2 3/8	3/4	9.50	11.40	3 1/2	1 1/2	17.00	20.40		
2 1/2	3/4	9.75	11.70	3 1/2	1 1/2	17.50	21.00		
2 3/4	3/4	10.00	12.00	3 1/2	1 1/2	18.00	21.60		
2 5/8	3/4	10.25	12.30	3 1/2	1 1/2	18.50	22.20		
2 3/4	3/4	10.50	12.60	3 1/2	1 1/2	19.00	22.80		
2 5/8	1 1/4	10.75	12.90	3 1/2	1 1/2	19.50	23.40		
2 3/4	1 1/4	11.00	13.20	3 1/2	1 1/2	20.00	24.00		
2 5/8	1 1/4	11.50	13.80	3 1/2	1 1/2	20.50	24.60		
2 3/4	1 1/4	12.00	14.40	3 1/2	1 1/2	21.00	25.20		
2 5/8	1 1/4	12.50	15.00	3 1/2	1 1/2	21.50	25.80		
2 3/4	1 1/4	13.00	15.60	3 1/2	1 1/2	22.00	26.40		
2 5/8	1 1/4	13.50	16.20	4	1 1/2	22.50	27.00		
2 3/4	1 1/4	14.00	16.80	4 1/2	2	23.00	28.20		
3	1 1/4	14.50	17.40	4 1/2	2	24.50	29.40		
3 1/8	1 1/4	15.00	18.00	4 1/2	2	25.50	30.60		

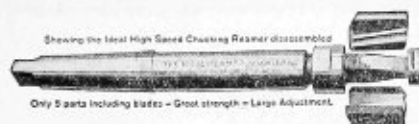
Furnished regularly up to 6 inches by 16ths. Made to order up to 12 inches. Prices on application.

Arbors of Shell Reamers

Number of Arbor	Size of Reamer	Price		Length
		Straight Shank	Morse Taper	
30	2 to 2 1/4	\$2.45	\$3.70	12
31	2 1/4 to 2 1/2	2.55	3.80	13
20	2 1/2 to 2 3/4	2.65	3.90	14
21	2 3/4 to 2 5/8	2.80	4.05	14 1/2
22	3 to 3 1/8	3.60	4.95	15
23	3 1/8 to 3 1/2	4.15	5.60	15 1/2
24	3 1/2 to 3 3/4	5.27	6.72	16
25	3 3/4 to 4	6.35	7.83	16 1/2

In ordering give arbor number and state whether straight or Morse taper shank is desired.

Ideal Adjustable High Speed Machine Finishing Reamer



Only 2 parts including blades - Great strength - Large Adjustment.



Type No. 13



Type No. 14

The Ideal Reamer will ream the toughest, hardest and most fibrous metals with ease. It reams every hole true, smooth and round. It will not bind, heat up or clog up with chips. It will be found especially valuable for working on phosphor bronze, steel tubing, steel castings, steel forgings or aluminum.

A 2-inch Ideal Reamer will adjust $\frac{1}{8}$ -inch and other sizes in proportion. Thus one Ideal will outwear many solid reamers and even then it is only necessary to buy a new set of blades. Adjustment is effected by loosening rear collar and tightening front collar, which forces the two halves of reamer head up the inclined surfaces of the arbor.

In ordering Type 14 Reamer, state which size Morse Taper Shank is desired. Intermediate sizes furnished at price of next larger size. Sizes larger than 3-inch made to order. New blades of any size cost one-half the price of the Type 14 Reamer of same size.

Size Reamer, inches.....	$\frac{7}{8}$	$\frac{9}{8}$	1	$1\frac{1}{8}$	$1\frac{1}{2}$	$1\frac{3}{4}$	$1\frac{7}{8}$	2	$2\frac{1}{2}$	$2\frac{3}{4}$	$2\frac{7}{8}$	3	$3\frac{1}{8}$	$3\frac{1}{2}$	$3\frac{3}{4}$	$3\frac{7}{8}$	4	$4\frac{1}{8}$	$4\frac{1}{2}$	$4\frac{3}{4}$	$4\frac{7}{8}$	5	$5\frac{1}{8}$	$5\frac{1}{2}$	$5\frac{3}{4}$	$5\frac{7}{8}$	6	$6\frac{1}{8}$	$6\frac{1}{2}$	$6\frac{3}{4}$	$6\frac{7}{8}$	7	$7\frac{1}{8}$	$7\frac{1}{2}$	$7\frac{3}{4}$	$7\frac{7}{8}$	8	$8\frac{1}{8}$	$8\frac{1}{2}$	$8\frac{3}{4}$	$8\frac{7}{8}$	9	$9\frac{1}{8}$	$9\frac{1}{2}$	$9\frac{3}{4}$	$9\frac{7}{8}$	10	$10\frac{1}{8}$	$10\frac{1}{2}$	$10\frac{3}{4}$	$10\frac{7}{8}$	11	$11\frac{1}{8}$	$11\frac{1}{2}$	$11\frac{3}{4}$	$11\frac{7}{8}$	12	$12\frac{1}{8}$	$12\frac{1}{2}$	$12\frac{3}{4}$	$12\frac{7}{8}$	13	$13\frac{1}{8}$	$13\frac{1}{2}$	$13\frac{3}{4}$	$13\frac{7}{8}$	14	$14\frac{1}{8}$	$14\frac{1}{2}$	$14\frac{3}{4}$	$14\frac{7}{8}$	15	$15\frac{1}{8}$	$15\frac{1}{2}$	$15\frac{3}{4}$	$15\frac{7}{8}$	16	$16\frac{1}{8}$	$16\frac{1}{2}$	$16\frac{3}{4}$	$16\frac{7}{8}$	17	$17\frac{1}{8}$	$17\frac{1}{2}$	$17\frac{3}{4}$	$17\frac{7}{8}$	18	$18\frac{1}{8}$	$18\frac{1}{2}$	$18\frac{3}{4}$	$18\frac{7}{8}$	19	$19\frac{1}{8}$	$19\frac{1}{2}$	$19\frac{3}{4}$	$19\frac{7}{8}$	20	$20\frac{1}{8}$	$20\frac{1}{2}$	$20\frac{3}{4}$	$20\frac{7}{8}$	21	$21\frac{1}{8}$	$21\frac{1}{2}$	$21\frac{3}{4}$	$21\frac{7}{8}$	22	$22\frac{1}{8}$	$22\frac{1}{2}$	$22\frac{3}{4}$	$22\frac{7}{8}$	23	$23\frac{1}{8}$	$23\frac{1}{2}$	$23\frac{3}{4}$	$23\frac{7}{8}$	24	$24\frac{1}{8}$	$24\frac{1}{2}$	$24\frac{3}{4}$	$24\frac{7}{8}$	25	$25\frac{1}{8}$	$25\frac{1}{2}$	$25\frac{3}{4}$	$25\frac{7}{8}$	26	$26\frac{1}{8}$	$26\frac{1}{2}$	$26\frac{3}{4}$	$26\frac{7}{8}$	27	$27\frac{1}{8}$	$27\frac{1}{2}$	$27\frac{3}{4}$	$27\frac{7}{8}$	28	$28\frac{1}{8}$	$28\frac{1}{2}$	$28\frac{3}{4}$	$28\frac{7}{8}$	29	$29\frac{1}{8}$	$29\frac{1}{2}$	$29\frac{3}{4}$	$29\frac{7}{8}$	30	$30\frac{1}{8}$	$30\frac{1}{2}$	$30\frac{3}{4}$	$30\frac{7}{8}$	31	$31\frac{1}{8}$	$31\frac{1}{2}$	$31\frac{3}{4}$	$31\frac{7}{8}$	32	$32\frac{1}{8}$	$32\frac{1}{2}$	$32\frac{3}{4}$	$32\frac{7}{8}$	33	$33\frac{1}{8}$	$33\frac{1}{2}$	$33\frac{3}{4}$	$33\frac{7}{8}$	34	$34\frac{1}{8}$	$34\frac{1}{2}$	$34\frac{3}{4}$	$34\frac{7}{8}$	35	$35\frac{1}{8}$	$35\frac{1}{2}$	$35\frac{3}{4}$	$35\frac{7}{8}$	36	$36\frac{1}{8}$	$36\frac{1}{2}$	$36\frac{3}{4}$	$36\frac{7}{8}$	37	$37\frac{1}{8}$	$37\frac{1}{2}$	$37\frac{3}{4}$	$37\frac{7}{8}$	38	$38\frac{1}{8}$	$38\frac{1}{2}$	$38\frac{3}{4}$	$38\frac{7}{8}$	39	$39\frac{1}{8}$	$39\frac{1}{2}$	$39\frac{3}{4}$	$39\frac{7}{8}$	40	$40\frac{1}{8}$	$40\frac{1}{2}$	$40\frac{3}{4}$	$40\frac{7}{8}$	41	$41\frac{1}{8}$	$41\frac{1}{2}$	$41\frac{3}{4}$	$41\frac{7}{8}$	42	$42\frac{1}{8}$	$42\frac{1}{2}$	$42\frac{3}{4}$	$42\frac{7}{8}$	43	$43\frac{1}{8}$	$43\frac{1}{2}$	$43\frac{3}{4}$	$43\frac{7}{8}$	44	$44\frac{1}{8}$	$44\frac{1}{2}$	$44\frac{3}{4}$	$44\frac{7}{8}$	45	$45\frac{1}{8}$	$45\frac{1}{2}$	$45\frac{3}{4}$	$45\frac{7}{8}$	46	$46\frac{1}{8}$	$46\frac{1}{2}$	$46\frac{3}{4}$	$46\frac{7}{8}$	47	$47\frac{1}{8}$	$47\frac{1}{2}$	$47\frac{3}{4}$	$47\frac{7}{8}$	48	$48\frac{1}{8}$	$48\frac{1}{2}$	$48\frac{3}{4}$	$48\frac{7}{8}$	49	$49\frac{1}{8}$	$49\frac{1}{2}$	$49\frac{3}{4}$	$49\frac{7}{8}$	50	$50\frac{1}{8}$	$50\frac{1}{2}$	$50\frac{3}{4}$	$50\frac{7}{8}$	51	$51\frac{1}{8}$	$51\frac{1}{2}$	$51\frac{3}{4}$	$51\frac{7}{8}$	52	$52\frac{1}{8}$	$52\frac{1}{2}$	$52\frac{3}{4}$	$52\frac{7}{8}$	53	$53\frac{1}{8}$	$53\frac{1}{2}$	$53\frac{3}{4}$	$53\frac{7}{8}$	54	$54\frac{1}{8}$	$54\frac{1}{2}$	$54\frac{3}{4}$	$54\frac{7}{8}$	55	$55\frac{1}{8}$	$55\frac{1}{2}$	$55\frac{3}{4}$	$55\frac{7}{8}$	56	$56\frac{1}{8}$	$56\frac{1}{2}$	$56\frac{3}{4}$	$56\frac{7}{8}$	57	$57\frac{1}{8}$	$57\frac{1}{2}$	$57\frac{3}{4}$	$57\frac{7}{8}$	58	$58\frac{1}{8}$	$58\frac{1}{2}$	$58\frac{3}{4}$	$58\frac{7}{8}$	59	$59\frac{1}{8}$	$59\frac{1}{2}$	$59\frac{3}{4}$	$59\frac{7}{8}$	60	$60\frac{1}{8}$	$60\frac{1}{2}$	$60\frac{3}{4}$	$60\frac{7}{8}$	61	$61\frac{1}{8}$	$61\frac{1}{2}$	$61\frac{3}{4}$	$61\frac{7}{8}$	62	$62\frac{1}{8}$	$62\frac{1}{2}$	$62\frac{3}{4}$	$62\frac{7}{8}$	63	$63\frac{1}{8}$	$63\frac{1}{2}$	$63\frac{3}{4}$	$63\frac{7}{8}$	64	$64\frac{1}{8}$	$64\frac{1}{2}$	$64\frac{3}{4}$	$64\frac{7}{8}$	65	$65\frac{1}{8}$	$65\frac{1}{2}$	$65\frac{3}{4}$	$65\frac{7}{8}$	66	$66\frac{1}{8}$	$66\frac{1}{2}$	$66\frac{3}{4}$	$66\frac{7}{8}$	67	$67\frac{1}{8}$	$67\frac{1}{2}$	$67\frac{3}{4}$	$67\frac{7}{8}$	68	$68\frac{1}{8}$	$68\frac{1}{2}$	$68\frac{3}{4}$	$68\frac{7}{8}$	69	$69\frac{1}{8}$	$69\frac{1}{2}$	$69\frac{3}{4}$	$69\frac{7}{8}$	70	$70\frac{1}{8}$	$70\frac{1}{2}$	$70\frac{3}{4}$	$70\frac{7}{8}$	71	$71\frac{1}{8}$	$71\frac{1}{2}$	$71\frac{3}{4}$	$71\frac{7}{8}$	72	$72\frac{1}{8}$	$72\frac{1}{2}$	$72\frac{3}{4}$	$72\frac{7}{8}$	73	$73\frac{1}{8}$	$73\frac{1}{2}$	$73\frac{3}{4}$	$73\frac{7}{8}$	74	$74\frac{1}{8}$	$74\frac{1}{2}$	$74\frac{3}{4}$	$74\frac{7}{8}$	75	$75\frac{1}{8}$	$75\frac{1}{2}$	$75\frac{3}{4}$	$75\frac{7}{8}$	76	$76\frac{1}{8}$	$76\frac{1}{2}$	$76\frac{3}{4}$	$76\frac{7}{8}$	77	$77\frac{1}{8}$	$77\frac{1}{2}$	$77\frac{3}{4}$	$77\frac{7}{8}$	78	$78\frac{1}{8}$	$78\frac{1}{2}$	$78\frac{3}{4}$	$78\frac{7}{8}$	79	$79\frac{1}{8}$	$79\frac{1}{2}$	$79\frac{3}{4}$	$79\frac{7}{8}$	80	$80\frac{1}{8}$	$80\frac{1}{2}$	$80\frac{3}{4}$	$80\frac{7}{8}$	81	$81\frac{1}{8}$	$81\frac{1}{2}$	$81\frac{3}{4}$	$81\frac{7}{8}$	82	$82\frac{1}{8}$	$82\frac{1}{2}$	$82\frac{3}{4}$	$82\frac{7}{8}$	83	$83\frac{1}{8}$	$83\frac{1}{2}$	$83\frac{3}{4}$	$83\frac{7}{8}$	84	$84\frac{1}{8}$	$84\frac{1}{2}$	$84\frac{3}{4}$	$84\frac{7}{8}$	85	$85\frac{1}{8}$	$85\frac{1}{2}$	$85\frac{3}{4}$	$85\frac{7}{8}$	86	$86\frac{1}{8}$	$86\frac{1}{2}$	$86\frac{3}{4}$	$86\frac{7}{8}$	87	$87\frac{1}{8}$	$87\frac{1}{2}$	$87\frac{3}{4}$	$87\frac{7}{8}$	88	$88\frac{1}{8}$	$88\frac{1}{2}$	$88\frac{3}{4}$	$88\frac{7}{8}$	89	$89\frac{1}{8}$	$89\frac{1}{2}$	$89\frac{3}{4}$	$89\frac{7}{8}$	90	$90\frac{1}{8}$	$90\frac{1}{2}$	$90\frac{3}{4}$	$90\frac{7}{8}$	91	$91\frac{1}{8}$	$91\frac{1}{2}$	$91\frac{3}{4}$	$91\frac{7}{8}$	92	$92\frac{1}{8}$	$92\frac{1}{2}$	$92\frac{3}{4}$	$92\frac{7}{8}$	93	$93\frac{1}{8}$	$93\frac{1}{2}$	$93\frac{3}{4}$	$93\frac{7}{8}$	94	$94\frac{1}{8}$	$94\frac{1}{2}$	$94\frac{3}{4}$	$94\frac{7}{8}$	95	$95\frac{1}{8}$	$95\frac{1}{2}$	$95\frac{3}{4}$	$95\frac{7}{8}$	96	$96\frac{1}{8}$	$96\frac{1}{2}$	$96\frac{3}{4}$	$96\frac{7}{8}$	97	$97\frac{1}{8}$	$97\frac{1}{2}$	$97\frac{3}{4}$	$97\frac{7}{8}$	98	$98\frac{1}{8}$	$98\frac{1}{2}$	$98\frac{3}{4}$	$98\frac{7}{8}$	99	$99\frac{1}{8}$	$99\frac{1}{2}$	$99\frac{3}{4}$	$99\frac{7}{8}$	100	$100\frac{1}{8}$	$100\frac{1}{2}$	$100\frac{3}{4}$	$100\frac{7}{8}$	101	$101\frac{1}{8}$	$101\frac{1}{2}$	$101\frac{3}{4}$	$101\frac{7}{8}$	102	$102\frac{1}{8}$	$102\frac{1}{2}$	$102\frac{3}{4}$	$102\frac{7}{8}$	103	$103\frac{1}{8}$	$103\frac{1}{2}$	$103\frac{3}{4}$	$103\frac{7}{8}$	104	$104\frac{1}{8}$	$104\frac{1}{2}$	$104\frac{3}{4}$	$104\frac{7}{8}$	105	$105\frac{1}{8}$	$105\frac{1}{2}$	$105\frac{3}{4}$	$105\frac{7}{8}$	106	$106\frac{1}{8}$	$106\frac{1}{2}$	$106\frac{3}{4}$	$106\frac{7}{8}$	107	$107\frac{1}{8}$	$107\frac{1}{2}$	$107\frac{3}{4}$	$107\frac{7}{8}$	108	$108\frac{1}{8}$	$108\frac{1}{2}$	$108\frac{3}{4}$	$108\frac{7}{8}$	109	$109\frac{1}{8}$	$109\frac{1}{2}$	$109\frac{3}{4}$	$109\frac{7}{8}$	110	$110\frac{1}{8}$	$110\frac{1}{2}$	$110\frac{3}{4}$	$110\frac{7}{8}$	111	$111\frac{1}{8}$	$111\frac{1}{2}$	$111\frac{3}{4}$	$111\frac{7}{8}$	112	$112\frac{1}{8}$	$112\frac{1}{2}$	$112\frac{3}{4}$	$112\frac{7}{8}$	113	$113\frac{1}{8}$	$113\frac{1}{2}$	$113\frac{3}{4}$	$113\frac{7}{8}$	114	$114\frac{1}{8}$	$114\frac{1}{2}$	$114\frac{3}{4}$	$114\frac{7}{8}$	115	$115\frac{1}{8}$	$115\frac{1}{2}$	$115\frac{3}{4}$	$115\frac{7}{8}$	116	$116\frac{1}{8}$	$116\frac{1}{2}$	$116\frac{3}{4}$	$116\frac{7}{8}$	117	$117\frac{1}{8}$	$117\frac{1}{2}$	$117\frac{3}{4}$	$117\frac{7}{8}$	118	$118\frac{1}{8}$	$118\frac{1}{2}$	$118\frac{3}{4}$	$118\frac{7}{8}$	119	$119\frac{1}{8}$	$119\frac{1}{2}$	$119\frac{3}{4}$	$119\frac{7}{8}$	120	$120\frac{1}{8}$	$120\frac{1}{2}$	$120\frac{3}{4}$	$120\frac{7}{8}$	121	$121\frac{1}{8}$	$121\frac{1}{2}$	$121\frac{3}{4}$	$121\frac{7}{8}$	122	$122\frac{1}{8}$	$122\frac{1}{2}$	$122\frac{3}{4}$	$122\frac{7}{8}$	123	$123\frac{1}{8}$	$123\frac{1}{2}$	$123\frac{3}{4}$	$123\frac{7}{8}$	124	$124\frac{1}{8}$	$124\frac{1}{2}$	$124\frac{3}{4}$	$124\frac{7}{8}$	125	$125\frac{1}{8}$	$125\frac{1}{2}$	$125\frac{3}{4}$	$125\frac{7}{8}$	126	$126\frac{1}{8}$	$126\frac{1}{2}$	$126\frac{3}{4}$	$126\frac{7}{8}$	127	$127\frac{1}{8}$	$127\frac{1}{2}$	$127\frac{3}{4}$	$127\frac{7}{8}$	128	$128\frac{1}{8}$	$128\frac{1}{2}$	$128\frac{3}{4}$	$128\frac{7}{8}$	129	$129\frac{1}{8}$	$129\frac{1}{2}$	$129\frac{3}{4}$	$129\frac{7}{8}$	130	$130\frac{1}{8}$	$130\frac{1}{2}$	$130\frac{3}{4}$	$130\frac{7}{8}$	131	$131\frac{1}{8}$	$131\frac{1}{2}$	$131\frac{3}{4}$	$131\frac{7}{8}$	132	$132\frac{1}{8}$	$132\frac{1}{2}$	$132\frac{3}{4}$	$132\frac{7}{8}$	133	$133\frac{1}{8}$	$133\frac{1}{2}$	$133\frac{3}{4}$	$133\frac{7}{8}$	134	$134\frac{1}{8}$	$134\frac{1}{2}$	$134\frac{3}{4}$	$134\frac{7}{8}$	135	$135\frac{1}{8}$	$135\frac{1}{2}$	$135\frac{3}{4}$	$135\frac{7}{8}$	136	$136\frac{1}{8}$	$136\frac{1}{2}$	$136\frac{3}{4}$	$136\frac{7}{8}$	137	$137\frac{1}{8}$	$137\frac{1}{2}$	$137\frac{3}{4}$	$137\frac{7}{8}$	138	$138\frac{1}{8}$	$138\frac{1}{2}$	$138\frac{3}{4}$	$138\frac{7}{8}$	139	$139\frac{1}{8}$	$139\frac{1}{2}$	$139\frac{3}{4}$	$139\frac{7}{8}$	140	$140\frac{1}{8}$	$140\frac{1}{2}$	$140\frac{3}{4}$	$140\frac{7}{8}$	141	$141\frac{1}{8}$	$141\frac{1}{2}$	$141\frac{3}{4}$	$141\frac{7}{8}$	142	$142\frac{1}{8}$	$142\frac{1}{2}$	$142\frac{3}{4}$	$142\frac{7}{8}$	143	$143\frac{1}{8}$	$143\frac{1}{2}$	$143\frac{3}{4}$	$143\frac{7}{8}$	144	$144\frac{1}{8}$	$144\frac{1}{2}$	$144\frac{3}{4}$	$144\frac{7}{8}$	145	$145\frac{1}{8}$	$145\frac{1}{2}$	$145\frac{3}{4}$	$145\frac{7}{8}$	146	$146\frac{1}{8}$	$146\frac{1}{2}$	$146\frac{3}{4}$	$146\frac{7}{8}$	147	$147\frac{1}{8}$	$147\frac{1}{2}$	$147\frac{3}{4}$	$147\frac{7}{8}$	148	$148\frac{1}{8}$	$148\frac{1}{2}$	$148\frac{3}{4}$	$148\frac{7}{8}$	149	$149\frac{1}{8}$	$149\frac{1}{2}$	$149\frac{3}{4}$	$149\frac{7}{8}$	150	$150\frac{1}{8}$	$150\frac{1}{2}$	$150\frac{3}{4}$	$150\frac{7}{8}$	151	$151\frac{1}{8}$	$151\frac{1}{2}$	$151\frac{3}{4}$	$151\frac{7}{8}$	152	$152\frac{1}{8}$	$152\frac{1}{2}$	$152\frac{3}{4}$	$152\frac{7}{8}$	153	$153\frac{1}{8}$	$153\frac{1}{2}$	$153\frac{3}{4}$	$153\frac{7}{8}$	154	$154\frac{1}{8}$	$154\frac{1}{2}$	$154\frac{3}{4}$	$154\frac{7}{8}$	155	$155\frac{1}{8}$	$155\frac{1}{2}$	$155\frac{3}{4}$	$155\frac{7}{8}$	156	$156\frac{1}{8}$	$156\frac{1}{2}$	$156\frac{3}{4}$	$156\frac{7}{8}$	157	$157\frac{1}{8}$	$157\frac{1}{2}$	$157\frac{3}{4}$	$157\frac{7}{8}$	158	$158\frac{1}{8}$	$158\frac{1}{2}$	$158\frac{3}{4}$	$158\frac{7}{8}$	159	$159\frac{1}{8}$	$159\frac{1}{2}$	$159\frac{3}{4}$	$159\frac{7}{8}$	160	$160\frac{1}{8}$	$160\frac{1}{2}$	$160\frac{3}{4}$	$160\frac{7}{8}$	161	$161\frac{1}{8}$	$161\frac{1}{2}$	$161\frac{3}{4}$	$161\frac{7}{8}$	162	$162\frac$
--------------------------	---------------	---------------	---	----------------	----------------	----------------	----------------	---	----------------	----------------	----------------	---	----------------	----------------	----------------	----------------	---	----------------	----------------	----------------	----------------	---	----------------	----------------	----------------	----------------	---	----------------	----------------	----------------	----------------	---	----------------	----------------	----------------	----------------	---	----------------	----------------	----------------	----------------	---	----------------	----------------	----------------	----------------	----	-----------------	-----------------	-----------------	-----------------	----	-----------------	-----------------	-----------------	-----------------	----	-----------------	-----------------	-----------------	-----------------	----	-----------------	-----------------	-----------------	-----------------	----	-----------------	-----------------	-----------------	-----------------	----	-----------------	-----------------	-----------------	-----------------	----	-----------------	-----------------	-----------------	-----------------	----	-----------------	-----------------	-----------------	-----------------	----	-----------------	-----------------	-----------------	-----------------	----	-----------------	-----------------	-----------------	-----------------	----	-----------------	-----------------	-----------------	-----------------	----	-----------------	-----------------	-----------------	-----------------	----	-----------------	-----------------	-----------------	-----------------	----	-----------------	-----------------	-----------------	-----------------	----	-----------------	-----------------	-----------------	-----------------	----	-----------------	-----------------	-----------------	-----------------	----	-----------------	-----------------	-----------------	-----------------	----	-----------------	-----------------	-----------------	-----------------	----	-----------------	-----------------	-----------------	-----------------	----	-----------------	-----------------	-----------------	-----------------	----	-----------------	-----------------	-----------------	-----------------	----	-----------------	-----------------	-----------------	-----------------	----	-----------------	-----------------	-----------------	-----------------	----	-----------------	-----------------	-----------------	-----------------	----	-----------------	-----------------	-----------------	-----------------	----	-----------------	-----------------	-----------------	-----------------	----	-----------------	-----------------	-----------------	-----------------	----	-----------------	-----------------	-----------------	-----------------	----	-----------------	-----------------	-----------------	-----------------	----	-----------------	-----------------	-----------------	-----------------	----	-----------------	-----------------	-----------------	-----------------	----	-----------------	-----------------	-----------------	-----------------	----	-----------------	-----------------	-----------------	-----------------	----	-----------------	-----------------	-----------------	-----------------	----	-----------------	-----------------	-----------------	-----------------	----	-----------------	-----------------	-----------------	-----------------	----	-----------------	-----------------	-----------------	-----------------	----	-----------------	-----------------	-----------------	-----------------	----	-----------------	-----------------	-----------------	-----------------	----	-----------------	-----------------	-----------------	-----------------	----	-----------------	-----------------	-----------------	-----------------	----	-----------------	-----------------	-----------------	-----------------	----	-----------------	-----------------	-----------------	-----------------	----	-----------------	-----------------	-----------------	-----------------	----	-----------------	-----------------	-----------------	-----------------	----	-----------------	-----------------	-----------------	-----------------	----	-----------------	-----------------	-----------------	-----------------	----	-----------------	-----------------	-----------------	-----------------	----	-----------------	-----------------	-----------------	-----------------	----	-----------------	-----------------	-----------------	-----------------	----	-----------------	-----------------	-----------------	-----------------	----	-----------------	-----------------	-----------------	-----------------	----	-----------------	-----------------	-----------------	-----------------	----	-----------------	-----------------	-----------------	-----------------	----	-----------------	-----------------	-----------------	-----------------	----	-----------------	-----------------	-----------------	-----------------	----	-----------------	-----------------	-----------------	-----------------	----	-----------------	-----------------	-----------------	-----------------	----	-----------------	-----------------	-----------------	-----------------	----	-----------------	-----------------	-----------------	-----------------	----	-----------------	-----------------	-----------------	-----------------	----	-----------------	-----------------	-----------------	-----------------	----	-----------------	-----------------	-----------------	-----------------	----	-----------------	-----------------	-----------------	-----------------	----	-----------------	-----------------	-----------------	-----------------	----	-----------------	-----------------	-----------------	-----------------	----	-----------------	-----------------	-----------------	-----------------	----	-----------------	-----------------	-----------------	-----------------	----	-----------------	-----------------	-----------------	-----------------	----	-----------------	-----------------	-----------------	-----------------	----	-----------------	-----------------	-----------------	-----------------	----	-----------------	-----------------	-----------------	-----------------	----	-----------------	-----------------	-----------------	-----------------	----	-----------------	-----------------	-----------------	-----------------	----	-----------------	-----------------	-----------------	-----------------	----	-----------------	-----------------	-----------------	-----------------	----	-----------------	-----------------	-----------------	-----------------	----	-----------------	-----------------	-----------------	-----------------	----	-----------------	-----------------	-----------------	-----------------	----	-----------------	-----------------	-----------------	-----------------	----	-----------------	-----------------	-----------------	-----------------	----	-----------------	-----------------	-----------------	-----------------	----	-----------------	-----------------	-----------------	-----------------	----	-----------------	-----------------	-----------------	-----------------	----	-----------------	-----------------	-----------------	-----------------	----	-----------------	-----------------	-----------------	-----------------	----	-----------------	-----------------	-----------------	-----------------	----	-----------------	-----------------	-----------------	-----------------	----	-----------------	-----------------	-----------------	-----------------	----	-----------------	-----------------	-----------------	-----------------	-----	------------------	------------------	------------------	------------------	-----	------------------	------------------	------------------	------------------	-----	------------------	------------------	------------------	------------------	-----	------------------	------------------	------------------	------------------	-----	------------------	------------------	------------------	------------------	-----	------------------	------------------	------------------	------------------	-----	------------------	------------------	------------------	------------------	-----	------------------	------------------	------------------	------------------	-----	------------------	------------------	------------------	------------------	-----	------------------	------------------	------------------	------------------	-----	------------------	------------------	------------------	------------------	-----	------------------	------------------	------------------	------------------	-----	------------------	------------------	------------------	------------------	-----	------------------	------------------	------------------	------------------	-----	------------------	------------------	------------------	------------------	-----	------------------	------------------	------------------	------------------	-----	------------------	------------------	------------------	------------------	-----	------------------	------------------	------------------	------------------	-----	------------------	------------------	------------------	------------------	-----	------------------	------------------	------------------	------------------	-----	------------------	------------------	------------------	------------------	-----	------------------	------------------	------------------	------------------	-----	------------------	------------------	------------------	------------------	-----	------------------	------------------	------------------	------------------	-----	------------------	------------------	------------------	------------------	-----	------------------	------------------	------------------	------------------	-----	------------------	------------------	------------------	------------------	-----	------------------	------------------	------------------	------------------	-----	------------------	------------------	------------------	------------------	-----	------------------	------------------	------------------	------------------	-----	------------------	------------------	------------------	------------------	-----	------------------	------------------	------------------	------------------	-----	------------------	------------------	------------------	------------------	-----	------------------	------------------	------------------	------------------	-----	------------------	------------------	------------------	------------------	-----	------------------	------------------	------------------	------------------	-----	------------------	------------------	------------------	------------------	-----	------------------	------------------	------------------	------------------	-----	------------------	------------------	------------------	------------------	-----	------------------	------------------	------------------	------------------	-----	------------------	------------------	------------------	------------------	-----	------------------	------------------	------------------	------------------	-----	------------------	------------------	------------------	------------------	-----	------------------	------------------	------------------	------------------	-----	------------------	------------------	------------------	------------------	-----	------------------	------------------	------------------	------------------	-----	------------------	------------------	------------------	------------------	-----	------------------	------------------	------------------	------------------	-----	------------------	------------------	------------------	------------------	-----	------------------	------------------	------------------	------------------	-----	------------------	------------------	------------------	------------------	-----	------------------	------------------	------------------	------------------	-----	------------------	------------------	------------------	------------------	-----	------------------	------------------	------------------	------------------	-----	------------------	------------------	------------------	------------------	-----	------------------	------------------	------------------	------------------	-----	------------------	------------------	------------------	------------------	-----	------------------	------------------	------------------	------------------	-----	------------------	------------------	------------------	------------------	-----	------------------	------------------	------------------	------------------	-----	------------------	------------------	------------------	------------------	-----	------------------	------------------	------------------	------------------	-----	------------

Taper Bridge Reamers

With Taper Shank

No. 120L Carbon Steel. No. 268 "Diamond" High Speed



Used in electric and air drilling devices by boilermakers, structural iron, bridge and shipbuilders for reaming out holes for rivets, bolts, rods, etc.

Diameter at			Price Each		Lgth. Over All, ins.	Lgth. of Flute, ins.	Taper End Lgth. ins.	Shank Taper
A	B	C	High Speed	Carbon Steel				
1/4	1/4	1/4	\$ 3.00	\$2.75	6 1/4	3 1/4	1 1/4	No. 1
1/2	1/2	1/2	3.25	2.75	6 1/4	3 1/2	1 1/4	
3/4	3/4	3/4	3.50	2.75	7 1/4	4 1/4	1 1/2	
1	1	1	3.75	2.75	7 1/4	4 1/2	1 1/2	
1 1/4	1 1/4	1 1/4	4.00	2.75	9	5 1/4	2	No. 2
1 1/2	1 1/2	1 1/2	4.25	2.80	9	5 1/2	2	
1 3/4	1 3/4	1 3/4	4.50	2.90	10	5 3/4	2 1/2	
2	2	2	4.75	3.00	11	6 1/4	2 1/2	
2 1/4	2 1/4	2 1/4	5.00	3.10	12	7 1/4	3	No. 3
2 1/2	2 1/2	2 1/2	5.30	3.30	12	7 1/2	3	
2 3/4	2 3/4	2 3/4	5.70	3.50	12	7 3/4	3	
3	3	3	6.00	3.70	12	7 3/4	3	
3 1/4	3 1/4	3 1/4	6.50	3.90	12	7 3/4	3	No. 4
3 1/2	3 1/2	3 1/2	7.00	4.00	12	7 3/4	3	
3 3/4	3 3/4	3 3/4	7.50	4.30	12	7 3/4	3	
4	4	4	8.00	4.60	12	7 3/4	3	
4 1/4	4 1/4	4 1/4	8.75	4.90	13	7 3/4	3	No. 4
4 1/2	4 1/2	4 1/2	8.75	4.90	13	7 3/4	3	
4 3/4	4 3/4	4 3/4	9.50	5.20	13	7 3/4	3	
5	5	5	10.50	5.60	13	7 3/4	3	
5 1/4	5 1/4	5 1/4	11.75	6.00	13	7 3/4	3	No. 4
5 1/2	5 1/2	5 1/2	12.00	6.00	13	7 3/4	3	
5 3/4	5 3/4	5 3/4	14.00	6.40	13	7 3/4	3	

Reamers from 1/4-inch to 1 1/4-inch have five flutes; 1 1/2 to 1 3/4-inch have six flutes.

The 1 1/4-inch Carbon Steel is furnished regularly with either No. 3 or No. 4 Taper Shank. No. 3 Taper Shank will be furnished unless otherwise specified.

Taper Bridge Reamers

With Square Shanks

No. 120C. Carbon Steel

No. 268A. Diamond High Speed



Diameter at			Price Each		Lgth. Over All, inches	Lgth. of Flute, inches	Taper'd End Lgths. inches
A	B	C	High Speed	Carbon Steel			
1/4	1/4	1/4	\$ 2.50	\$2.75	4 1/4	2 1/4	1
1/2	1/2	1/2	2.70	2.75	4 1/4	2 1/4	1
3/4	3/4	3/4	2.90	2.75	5 1/4	3 1/4	1 1/2
1	1	1	3.10	2.75	6 1/4	4 1/4	2
1 1/4	1 1/4	1 1/4	3.30	2.75	6 1/4	5 1/4	2 1/2
1 1/2	1 1/2	1 1/2	3.50	2.80	7 1/4	5 1/4	2 1/2
1 3/4	1 3/4	1 3/4	3.70	2.90	8 1/4	6 1/4	2 1/2
2	2	2	3.90	3.00	8 1/4	6 1/4	2 1/2
2 1/4	2 1/4	2 1/4	4.10	3.10	10 1/4	7 1/4	3
2 1/2	2 1/2	2 1/2	4.40	3.30	10 1/4	7 1/4	3
2 3/4	2 3/4	2 3/4	4.70	3.50	10 1/4	7 1/4	3
3	3	3	5.00	3.70	10 1/4	7 1/4	3
3 1/4	3 1/4	3 1/4	5.30	3.90	10 1/4	7 1/4	3
3 1/2	3 1/2	3 1/2	5.55	4.00	10 1/4	7 1/4	3
3 3/4	3 3/4	3 3/4	6.40	4.30	10 1/4	7 1/4	3
4	4	4	6.95	4.60	10 1/4	7 1/4	3
4 1/4	4 1/4	4 1/4	7.50	4.90	10 1/4	7 1/4	3
4 1/2	4 1/2	4 1/2	8.25	5.20	10 1/4	7 1/4	3
4 3/4	4 3/4	4 3/4	9.00	5.60	10 1/4	7 1/4	3
5	5	5	10.00	6.00	10 1/4	7 1/4	3
5 1/4	5 1/4	5 1/4	11.00	6.40	10 1/4	7 1/4	3

Same as No. 120L and 268, but have square shanks.

Taper Bridge Reamers

No. 127



With Taper Square Shanks Fitting Ratchets

For use on boilers and structural ironwork where power is not available or work is not sufficient to rig air tools.

Diameter at A	1/4	3/8	1/2	5/8	1 1/4
Diameter at B	1/4	3/8	1/2	5/8	1 1/4
Diameter at C	1/4	3/8	1/2	5/8	1 1/4
Price Each	\$2.80	\$3.00	\$3.30	\$3.70	\$4.00

Taper or Rod Reamers

For Locomotive Work

No. 124 Taper Shank Carbon Steel

No. 120A Square Shank Carbon Steel



Regular Taper 1/8 inch per foot. Taper 1/32 inch per foot furnished if so ordered

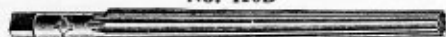
Machine Taper and Square Shanks															
Diameter Small End inches		Lgth. of Flute, inches	No. 124 Taper Shank			No. 120A Square Shank		Diameter Small End, inches	Lgth. of Flute, inches	No. 124 Taper Shank			No. 120A Square Shank		
			Price Each	Lgth. Over All inches	Shank Taper	Price Each	Lgth. Over All inches			Price Each	Lgth. Over All inches	Shank Taper	Price Each	Lgth. Over All inches	
1/4	4	\$3.10	7 1/4	No. 1		\$2.20	5 1/4	5/8	8	\$4.00	12	\$3.50	9 1/4	No. 2	
1/2	4	3.10	7 1/4			2.20	5 1/4	1/2	8	4.50	12	3.80	9 1/4		
3/4	4	3.15	7 1/4			2.25	5 1/4	3/4	8	4.90	12	4.10	9 1/4		
1	4	3.15	7 1/4			2.25	5 1/4	1	9	5.30	13 1/8	4.50	11 1/4		
1 1/4	5	3.20	8 1/4			2.30	6 1/4	1 1/4	9	5.70	13 1/2	4.80	11 1/4		
1 1/2	5	3.25	8 1/4			2.40	6 1/4	1 1/2	9	6.05	13 3/4	5.10	11 1/4		
1 3/4	6	3.30	9 1/4			2.55	7 1/4	1 3/4	9	6.40	13 7/8	5.40	11 1/4		
2	6	3.45	9 1/4			2.70	7 1/4	2	9	6.60	14 1/8	5.70	11 1/4		
2 1/4	7	3.50	10 1/4			3.00	8 1/4	2 1/4	10	6.80	14 3/8	6.20	12 1/4		
2 1/2	8	3.50	11 1/4			3.20	9 1/4	2 1/2	10	7.25	14 3/4	6.60	12 1/4		
2 3/4							2 3/4	10	7.70	16	7.00	12 1/4	No. 4		
3							3								

Special sizes made to order at special prices. To prevent errors in filling orders always specify TAPER desired.

TAPER REAMERS

Standard Taper-Pin
Reamers

No. 120D



Taper $\frac{1}{4}$ inch per foot. For reaming holes for regular taper pins used in connection with automobiles, machinery, etc.

Size No.	Price Each	Length of Flute, Inches	Length, Inches	Diameter at Small End, Inches
*000	\$1.35	1 $\frac{1}{4}$	2	.108
* 00	1.35	1 $\frac{1}{4}$	2	.124
0	1.00	1 $\frac{1}{2}$	2 $\frac{1}{4}$	.135
1	1.00	1 $\frac{3}{4}$	2 $\frac{1}{2}$	.146
2	1.25	2	3	.162
3	1.50	2 $\frac{1}{4}$	3 $\frac{1}{2}$	.183
4	1.75	2 $\frac{3}{4}$	4	.208
5	2.00	3	4 $\frac{1}{4}$	.240
6	2.25	3 $\frac{1}{4}$	5	.279
7	2.50	4	6	.331
8	3.00	5 $\frac{1}{4}$	6 $\frac{3}{4}$	.398
9	3.50	6 $\frac{1}{4}$	8	.482
10	4.00	7	9	.581
11	4.75	8 $\frac{1}{4}$	11 $\frac{1}{4}$	.706
12	5.50	10	13 $\frac{1}{4}$	.842
13	6.50	12	16	1.009
14	7.75	14	18 $\frac{1}{4}$	1.250

These reamers have the same taper and each will over-lay in convenient measure the size next smaller.

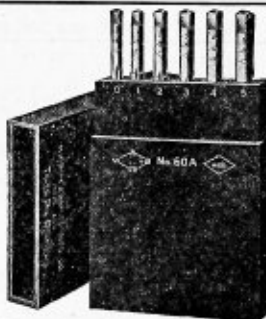
*These sizes not carried in stock.

Taper-Pin
Reamers

In Sets

Intended for automobile use. Contains one each of No. 0-1-2-3-4 and 5 Taper Pin Reamers.

Set is put up in a flat wooden box as shown. Price per set.....\$8.50

No. 126 Straight Shank
Taper Reamers

With Shanks $\frac{1}{2}$ In. Diameter and 2 In. Long Fitting Blacksmith's Drill Presses



Taper 1 inch to the foot; diameter at large end of flutes $\frac{1}{4}$ inch larger than nominal size.

Nom. Size, Ins.	Price Each	Lgth. Over All, Ins.	Lgth. of Flute, Ins.	Nom. Size, Ins.	Price Each	Lgth. Over All, Ins.	Lgth. of Flute, Ins.
$\frac{1}{4}$	\$0.45	5 $\frac{1}{4}$	2 $\frac{1}{2}$	$\frac{1}{2}$	\$1.95	6 $\frac{3}{4}$	3 $\frac{1}{4}$
$\frac{3}{8}$	.50	5 $\frac{1}{4}$	2 $\frac{1}{2}$	$\frac{3}{4}$	2.20	6 $\frac{3}{4}$	3 $\frac{1}{4}$
$\frac{1}{2}$	.55	5 $\frac{1}{4}$	2 $\frac{1}{2}$	1	2.35	6 $\frac{3}{4}$	3 $\frac{1}{4}$
$\frac{5}{8}$	.60	5 $\frac{1}{4}$	2 $\frac{1}{2}$	1 $\frac{1}{4}$	2.45	6 $\frac{3}{4}$	3 $\frac{1}{4}$
$\frac{3}{4}$	.70	5 $\frac{1}{4}$	2 $\frac{1}{2}$	1 $\frac{1}{2}$	2.60	7	4
$\frac{7}{8}$	.80	5 $\frac{1}{4}$	2 $\frac{1}{2}$	1 $\frac{3}{4}$	2.70	7	4
$\frac{15}{16}$	.90	5 $\frac{1}{4}$	2 $\frac{1}{2}$	2	3.00	7	4
1	1.05	5 $\frac{1}{4}$	2 $\frac{1}{2}$	2 $\frac{1}{4}$	3.20	7	4
$\frac{11}{8}$	1.20	5 $\frac{1}{4}$	2 $\frac{1}{2}$	2 $\frac{1}{2}$	3.40	7	4
$\frac{13}{8}$	1.45	6 $\frac{1}{4}$	3 $\frac{1}{2}$	2 $\frac{3}{4}$	3.60	7	4
$\frac{15}{8}$	1.65	6 $\frac{1}{4}$	3 $\frac{1}{2}$	3			

Bit Stock Taper Reamers
No. 120B Carbon Steel

Very convenient to use in brace or breast drill for regular work, etc. Taper 1 inch per foot, diameter at large end of flute $\frac{1}{4}$ inch larger than nominal size.

Nom. Size, Ins.	Price Each	Lgth. Over All, Ins.	Lgth. of Flute, Ins.	Nom. Size, Ins.	Price Each	Lgth. Over All, Ins.	Lgth. of Flute, Ins.
$\frac{1}{4}$	\$0.45	4 $\frac{1}{4}$	2 $\frac{1}{4}$	$\frac{1}{2}$	\$1.45	7 $\frac{1}{4}$	3 $\frac{1}{4}$
$\frac{3}{8}$	.45	4 $\frac{1}{4}$	2 $\frac{1}{4}$	$\frac{3}{4}$	1.65	8	3 $\frac{1}{4}$
$\frac{1}{2}$	.50	4 $\frac{1}{4}$	2 $\frac{1}{4}$	1	1.95	8 $\frac{1}{4}$	3 $\frac{1}{4}$
$\frac{5}{8}$	.55	5 $\frac{1}{4}$	3 $\frac{1}{4}$	1 $\frac{1}{4}$	2.20	8 $\frac{1}{4}$	3 $\frac{1}{4}$
$\frac{3}{4}$	.60	5 $\frac{1}{4}$	3 $\frac{1}{4}$	1 $\frac{1}{2}$	2.35	8 $\frac{1}{4}$	3 $\frac{1}{4}$
$\frac{7}{8}$	.70	5 $\frac{1}{4}$	3 $\frac{1}{4}$	1 $\frac{3}{4}$	2.45	8 $\frac{1}{4}$	3 $\frac{1}{4}$
$\frac{15}{16}$	.80	6 $\frac{1}{4}$	3 $\frac{1}{4}$	2	2.60	9	4
1	.90	6 $\frac{1}{4}$	3 $\frac{1}{4}$	2 $\frac{1}{4}$	2.70	9 $\frac{1}{4}$	4
$\frac{11}{8}$	1.05	7	3 $\frac{1}{4}$	2 $\frac{1}{2}$	3.20	9 $\frac{1}{4}$	4
$\frac{13}{8}$	1.20	7 $\frac{1}{4}$	3 $\frac{1}{4}$	2 $\frac{3}{4}$	3.60	9 $\frac{1}{4}$	4

Bit Stock Taper
Reamers in Sets

For the convenience of the trade we furnish "Diamond" Bit Stock Taper Reamers packed in sets.

Set No. 50. Contains one each $\frac{1}{4}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{5}{8}$, $\frac{3}{4}$, $\frac{7}{8}$, $\frac{15}{16}$, and $\frac{1}{2}$ inch. Price per set, \$6.75

Set No. 50A. Contains one each $\frac{1}{4}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{5}{8}$, $\frac{3}{4}$, $\frac{7}{8}$, $\frac{15}{16}$, and $\frac{1}{2}$ inch. Price per set, \$2.80

Set No. 51. Same as No. 50 except packed in a hardwood case as illustrated. Price per set, \$7.00

Three Groove Chucking
Reamers

No. 120K Carbon Steel. No. 266 "Diamond" High Speed



Especially designed for enlarging cored or drilled holes and, being ground to size on centers, need not be followed by a finishing reamer unless extreme accuracy is required

Diameter, Inches	High Speed Each	Carbon Steel Each	Length Over All, Inches	Length of Flute, Inches	Shank Taper	Diameter, Inches	High Speed Each	Carbon Steel Each	Length Over All, Inches	Length of Flute, Inches	Shank, Inches
$\frac{1}{4}$	4.00	1.70	6 $\frac{1}{4}$	3	No. 1	1 $\frac{1}{4}$	12.50	3.70	11	6 $\frac{1}{4}$	1 $\frac{1}{4}$
$\frac{3}{8}$	4.25	1.70	6 $\frac{1}{4}$	3	1 $\frac{1}{2}$	13.75	3.80	11	6 $\frac{1}{4}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$
$\frac{1}{2}$	4.50	1.70	6 $\frac{1}{4}$	3	1 $\frac{3}{4}$	15.00	3.90	11	6 $\frac{1}{4}$	1 $\frac{3}{4}$	1 $\frac{3}{4}$
$\frac{5}{8}$	4.75	1.70	6 $\frac{1}{4}$	3	2	16.25	4.00	11	6 $\frac{1}{4}$	2	2
$\frac{3}{4}$	5.00	1.70	6 $\frac{1}{4}$	3	2 $\frac{1}{4}$	17.50	4.10	11	6 $\frac{1}{4}$	2 $\frac{1}{4}$	2 $\frac{1}{4}$
$\frac{7}{8}$	5.25	1.70	6 $\frac{1}{4}$	3	2 $\frac{1}{2}$	18.75	4.20	11	6 $\frac{1}{4}$	2 $\frac{1}{2}$	2 $\frac{1}{2}$
$\frac{15}{16}$	5.50	1.70	6 $\frac{1}{4}$	3	2 $\frac{3}{4}$	20.00	4.30	11	6 $\frac{1}{4}$	2 $\frac{3}{4}$	2 $\frac{3}{4}$
1	5.75	1.70	6 $\frac{1}{4}$	3	3	21.25	4.40	11	6 $\frac{1}{4}$	3	3
$\frac{11}{8}$	6.00	1.70	6 $\frac{1}{4}$	3	3 $\frac{1}{4}$	22.50	4.50	11	6 $\frac{1}{4}$	3 $\frac{1}{4}$	3 $\frac{1}{4}$
$\frac{13}{8}$	6.25	1.70	6 $\frac{1}{4}$	3	3 $\frac{1}{2}$	23.75	4.60	11	6 $\frac{1}{4}$	3 $\frac{1}{2}$	3 $\frac{1}{2}$
$\frac{15}{8}$	6.50	1.70	6 $\frac{1}{4}$	3	3 $\frac{3}{4}$	25.00	4.70	11	6 $\frac{1}{4}$	3 $\frac{3}{4}$	3 $\frac{3}{4}$
$\frac{17}{8}$	6.75	1.70	6 $\frac{1}{4}$	3	4	26.25	4.80	11	6 $\frac{1}{4}$	4	4
$\frac{19}{8}$	7.00	1.70	6 $\frac{1}{4}$	3	4 $\frac{1}{4}$	27.50	4.90	11	6 $\frac{1}{4}$	4 $\frac{1}{4}$	4 $\frac{1}{4}$
$\frac{21}{8}$	7.25	1.70	6 $\frac{1}{4}$	3	4 $\frac{1}{2}$	28.75	5.00	11	6 $\frac{1}{4}$	4 $\frac{1}{2}$	4 $\frac{1}{2}$
$\frac{23}{8}$	7.50	1.70	6 $\frac{1}{4}$	3	4 $\frac{3}{4}$	30.00	5.10	11	6 $\frac{1}{4}$	4 $\frac{3}{4}$	4 $\frac{3}{4}$
$\frac{25}{8}$	7.75	1.70	6 $\frac{1}{4}$	3	5	31.25	5.20	11	6 $\frac{1}{4}$	5	5
$\frac{27}{8}$	8.00	1.70	6 $\frac{1}{4}$	3	5 $\frac{1}{4}$	32.50	5.30	11	6 $\frac{1}{4}$	5 $\frac{1}{4}$	5 $\frac{1}{4}$
$\frac{29}{8}$	8.25	1.70	6 $\frac{1}{4}$	3	5 $\frac{1}{2}$	33.75	5.40	11	6 $\frac{1}{4}$	5 $\frac{1}{2}$	5 $\frac{1}{2}$
$\frac{31}{8}$	8.50	1.70	6 $\frac{1}{4}$	3	5 $\frac{3}{4}$	35.00	5.50	11	6 $\frac{1}{4}$	5 $\frac{3}{4}$	5 $\frac{3}{4}$
$\frac{33}{8}$	8.75	1.70	6 $\frac{1}{4}$	3	6	36.25	5.60	11	6 $\frac{1}{4}$	6	6
$\frac{35}{8}$	9.00	1.70	6 $\frac{1}{4}$	3	6 $\frac{1}{4}$	37.50	5.70	11	6 $\frac{1}{4}$	6 $\frac{1}{4}$	6 $\frac{1}{4}$
$\frac{37}{8}$	9.25	1.70	6 $\frac{1}{4}$	3	6 $\frac{1}{2}$	38.75	5.80	11	6 $\frac{1}{4}$	6 $\frac{1}{2}$	6 $\frac{1}{2}$
$\frac{39}{8}$	9.50	1.70	6 $\frac{1}{4}$	3	6 $\frac{3}{4}$	40.00	5.90	11	6 $\frac{1}{4}$	6 $\frac{3}{4}$	6 $\frac{3}{4}$
$\frac{41}{8}$	9.75	1.70	6 $\frac{1}{4}$	3	7	41.25	6.00	11	6 $\frac{1}{4}$	7	7
$\frac{43}{8}$	10.00	1.70	6 $\frac{1}{4}$	3	7 $\frac{1}{4}$	42.50	6.10	11	6 $\frac{1}{4}$	7 $\frac{1}{4}$	7 $\frac{1}{4}$
$\frac{45}{8}$	10.25	1.70	6 $\frac{1}{4}$	3	7 $\frac{1}{2}$	43.75	6.20	11	6 $\frac{1}{4}$	7 $\frac{1}{2}$	7 $\frac{1}{2}$
$\frac{47}{8}$	10.50	1.70	6 $\frac{1}{4}$	3	7 $\frac{3}{4}$	45.00	6.30	11	6 $\frac{1}{4}$	7 $\frac{3}{4}$	7 $\frac{3}{4}$
$\frac{49}{8}$	10.75	1.70	6 $\frac{1}{4}$	3	8	46.25	6.40	11	6 $\frac{1}{4}$	8	8
$\frac{51}{8}$	11.00	1.70	6 $\frac{1}{4}$	3	8 $\frac{1}{4}$	47.50	6.50	11	6 $\frac{1}{4}$	8 $\frac{1}{4}$	8 $\frac{1}{4}$
$\frac{53}{8}$	11.25	1.70	6 $\frac{1}{4}$	3	8 $\frac{1}{2}$	48.75	6.60	11	6 $\frac{1}{4}$	8 $\frac{1}{2}$	8 $\frac{1}{2}$
$\frac{55}{8}$	11.50	1.70	6 $\frac{1}{4}$	3	8 $\frac{3}{4}$	50.00	6.70	11	6 $\frac{1}{4}$	8 $\frac{3}{4}$	8 $\frac{3}{4}$
$\frac{57}{8}$	11.75	1.70	6 $\frac{1}{4}$	3	9	51.25	6.80	11	6 $\frac{1}{4}$	9	9
$\frac{59}{8}$	12.00	1.70	6 $\frac{1}{4}$	3	9 $\frac{1}{4}$	52.50	6.90	11	6 $\frac{1}{4}$	9 $\frac{1}{4}$	9 $\frac{1}{4}$
$\frac{61}{8}$	12.25	1.70	6 $\frac{1}{4}$	3	9 $\frac{1}{2}$	53.75	7.00	11	6 $\frac{1}{4}$	9 $\frac{1}{2}$	9 $\frac{1}{2}$
$\frac{63}{8}$	12.50	1.70	6 $\frac{1}{4}$	3	9 $\frac{3}{4}$	55.00	7.10	11	6 $\frac{1}{4}$	9 $\frac{3}{4}$	9 $\frac{3}{4}$
$\frac{65}{8}$	12.75	1.70	6 $\frac{1}{4}$	3	10	56.25	7.20	11	6 $\frac{1}{4}$	10	10
$\frac{67}{8}$	13.00	1.70	6 $\frac{1}{4}$	3	10 $\frac{1}{4}$	57.50	7.30	11	6 $\frac{1}{4}$	10 $\frac{1}{4}$	10 $\frac{1}{4}$
$\frac{69}{8}$	13.25	1.70	6 $\frac{1}{4}$	3	10 $\frac{1}{2}$	58.75	7.40	11	6 $\frac{1}{4}$	10 $\frac{1}{2}$	10 $\frac{1}{2}$
$\frac{71}{8}$	13.50	1.70	6 $\frac{1}{4}$	3	10 $\frac{3}{4}$	60.00	7.50	11	6 $\frac{1}{4}$	10 $\frac{3}{4}$	10 $\frac{3}{4}$
$\frac{73}{8}$	13.75	1.70	6 $\frac{1}{4}$	3	11	61.25	7.60	11	6 $\frac{1}{4}$	11	11
$\frac{75}{8}$	14.00	1.70	6 $\frac{1}{4}$	3	11 $\frac{1}{4}$	62.50	7.70	11	6 $\frac{1}{4}$	11 $\frac{1}{4}$	11 $\frac{1}{4}$
$\frac{77}{8}$	14.25	1.70	6 $\frac{1}{4}$	3	11 $\frac{1}{2}$	63.75	7.80	11	6 $\frac{1}{4}$	11 $\frac{1}{2}$	11 $\frac{1}{2}$
$\frac{79}{8}$	14.50	1.70	6 $\frac{1}{4}$	3	11 $\frac{3}{4}$	65.00	7.90	11	6 $\frac{1}{4}$	11 $\frac{3}{4}$	11 $\frac{3}{4}$
$\frac{81}{8}$	14.75	1.70	6 $\frac{1}{4}$	3	12	66.25	8.00	11	6 $\frac{1}{4}$	12	12

Thirty-second and sixty-fourth sizes can be furnished. Can furnish these reamers with straight shanks; also four groove chucking reamers with taper and straight shanks.

Burring Reamers or Tools



Style of
Nos.

1-2-2 1/2-5-4



Style of Nos.
5 and 6

For burring gas, steam and electric conduit pipes, etc. All pipes should be burred to insure full capacity.

No.	Price Each	Length, inches	Length of Flute, inches	Size at Point, inches	Size at Large End, in.	Capacity of Pipe, inches
1	\$1.20	3	1 1/2	3/8	1 1/2	3/8 to 1 1/2
2	1.40	3 1/2	1 3/4	3/8	1 3/4	3/8 to 1 3/4
2 1/2	1.70	4	2 1/2	3/8	1 3/4	3/8 to 1 3/4
2 1/2	3.60	4 1/2	2 3/4	3/8	2 3/4	3/8 to 2 3/4
3	1.40	3 1/2	1 3/4	3/8	1 3/4	3/8 to 1 3/4
3 1/2	1.70	4 1/2	2 1/2	3/8	1 3/4	3/8 to 1 3/4
4	3.60	5 1/2	2 3/4	3/8	2 3/4	3/8 to 2 3/4
5	4.20	4 1/2	2 1/2	3/8	1	1 to 2
6	4.80	5 1/2	3	3/8	2 1/2	1 1/2 to 2

*With 1/2-inch Round Shank.

Plain and Ratchet Pipe Reamers

Capacity 3/8 to 3-inch pipe.

This type of Pipe Reamer is preferred by many steamfitters and mechanics. The ratchet feature is very convenient when working in cramped places and corners.

No. 10P. Plain pattern, price each.....\$6.50

No. 20R. Ratchet pattern, price each.....\$6.00



Bit Brace Countersinks



For countersinking wood and machine screws, stove and tire bolts. Use 82° for countersinking for wood and machine screws and stove bolts. 54° for tire bolts.

Bit Brace Shank	Round Shank		Price Each	Diam.	Cut Angle
	1/2-inch Diam.	3/4-inch Diam.			
No. 501	No. 502	No. 503	\$0.50	3/8	60°
No. 504	No. 505	No. 506	.60	3/8	80°
No. 507	No. 508	No. 509	.75	3/8	60°
No. 511	No. 512	No. 513	.75	3/8	80°

In ordering state figure Number. Bit Stock, Countersinks, metal or wood, and Reamer Bits are listed elsewhere in this book.

Center Reamers No. 120M



Style A

60° Angle



Style B

Packed: Sizes 1/8 to 3/8-inch, one dozen; 1/2, 5/8 and 3/4-inch, one-half dozen of a size in a wood box.

Counter Bores



A new design of the best quality steel for setting the heads of Fillister Head Screws

Machine Screw sizes Nos. 4, 6, 8, 10, 12 and 14, price each.....\$1.00

Diameter of Screw	Diameter of Head	Price Each
1/8	3/8	\$1.00
3/8	1/2	1.10
1/2	3/4	1.20
5/8	1 1/4	1.40
3/4	1 1/2	1.60
7/8	1 3/4	1.90
1	2	2.30
1 1/8	2 1/2	2.70
1 1/4	3	2.80
1 1/2	3 1/2	3.00

Special sizes furnished on request.

Center Keys or Drifts



Drop forged from special steel, finished and case hardened. Sizes will fit corresponding numbers of sockets.

Number.....	1	2	3	4	5	6
Length, in....	6	6 3/4	7 1/2	8 1/2	10	11 3/4
Thickness, in....	3/8	3/8	3/8	3/8	3/8	3/8
Width, in....	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2
Price, each....	\$0.30	\$0.35	\$0.40	\$0.50	\$0.60	\$0.75

Armstrong Automatic Drill Drift



The handle or driver is always ready to strike a blow as the spring automatically throws it back in position. It can be operated with one hand, leaving the other to hold the drill, thus preventing the tool from falling upon the work below.

No.	Price Each	Extra Blades Each	Capacity Morse Taper	Recom- mended for	Wt., Lbs.
1-A	\$1.25	\$0.40	No. 1-2-3	No. 1 or 2	1 1/2
2-A	1.50	.60	No. 2-3-4	No. 2 or 3	2 1/2
3-A	2.00	.65	No. 3-4-5	No. 3 or 4	3
4-A	3.00	1.00	No. 4-5-6	No. 4 or 5	6

Diameter of Body, inches	Diameter of Shank, inches	Style A Price Each	Style B Price Each
1/8	3/8	\$0.25	\$0.30
3/8	1/2	.30	.35
1/2	3/4	.35	.40
5/8	1 1/4	.60	.70
3/4	1 1/2	.80	.85

The Advantages of Coarse Tooth Milling Cutters

Furnished in High Speed Steel Only

In the development of coarse tooth milling cutters the aim has been to obtain the freest possible cutting action without impairing the accuracy of the surface produced. The new cutters with wide spaced teeth have a marked advantage, on many classes of work, over the usual types, being capable of removing a considerable greater quantity of metal in a given time, without distressing the cutter or overloading the machine.

The free cutting action of coarse tooth cutters is largely due to the fact that less cutting is actually required to remove a given amount of metal, each tooth taking a large deep chip. This results in a considerable decrease in the tendency to slide over the surface and spring the cutter arbor. The rake and increased spiral of the teeth give a more nearly perfect shearing, rather than a pushing or a dragging action. Accordingly there is less friction generated for a given cut, leaving the teeth much cooler and causing them to do much more work between grindings.

The wide spaces between the teeth allow the cutting edges to be well backed up, which was not always possible with closely spaced teeth. This increase in the strength of the teeth is much greater in proportion than the increase in work done by each tooth in removing the larger chips. Therefore the cutters are well prepared to handle deep and rapid cuts without danger of failing.

The main advantage of coarse tooth milling cutters may be stated as increased production and decreased power consumption due to the heavier cuts taken and the freer cutting action. Of course, the amount of improvement in these points differs greatly in various instances owing to the conditions, such as the stiffness of the work, nature of the cut, strength of the machine, etc.

In developing our line of milling cutters, the manufacturer has paid particular attention to the angle of rake and the lead of the spiral of the teeth. After a long series of practical experiments the present type, with steep spiral and considerable angle of rake has been adopted as the most economical and practical form.

Coarse Tooth Milling Cutters



Coarse Tooth Side Milling Cutters

Number	Diameter, Inches	Width of Face, Inches	Size Hole, Inches	Price Each
M-300	2 1/2	2 1/2	1	\$ 8.95
M-301	2 1/2	3	1	10.00
M-302	2 1/2	4	1	12.45
*M-303	3	1	1 1/4	7.50
*M-304	3	1 1/4	1 1/4	8.40
*M-305	3	1 1/2	1 1/4	9.30
M-306	3	2	1 1/4	10.20
M-307	3	2 1/2	1 1/4	11.10
M-308	3	3	1 1/4	12.05
M-309	3	4	1	14.90
M-310	3	4	1 1/4	14.90
*M-311	3 1/2	1	1 1/2	9.20
*M-312	3 1/2	1 1/4	1 1/2	10.50
*M-313	3 1/2	1 1/2	1 1/2	11.75
*M-314	3 1/2	2	1 1/2	13.90
*M-315	3 1/2	2 1/2	1 1/2	15.60
M-316	3 1/2	3	1 1/2	17.30
M-317	3 1/2	3 1/2	1 1/2	18.90
M-318	3 1/2	4	1 1/2	21.55
M-319	3 1/2	5	1 1/4	25.00
M-320	3 1/2	5	1 1/2	25.00
M-321	3 1/2	6	1 1/2	29.45
M-322	3 3/4	3	1 1/2	18.95
M-323	3 3/4	4	1 1/2	23.70
M-324	3 3/4	5	1 1/2	29.25
M-325	3 3/4	6	1 1/2	34.60
*M-326	4	1	1 1/2	11.40
*M-327	4	1 1/4	1 1/2	12.90
*M-328	4	1 1/2	1 1/2	14.05
*M-329	4	2	1 1/2	16.45
*M-330	4	2 1/2	1 1/2	19.35
M-331	4	3	1 1/2	21.50
M-332	4	3 1/2	1 1/2	24.20
M-333	4	4	1 1/2	26.90

Number	Diameter, Inches	Width of Face, Inches	Size Hole, Inches	Price Each
8-300	2 1/2	1 1/2	1	\$ 3.30
8-301	2 1/2	2	1	3.60
8-302	2 1/2	3	1	3.70
8-303	3	1 1/2	1	4.10
8-304	3	2	1 1/4	3.82
8-305	3	2 1/2	1 1/4	4.35
8-306	3	3	1 1/4	4.75
8-307	3	3 1/2	1 1/4	5.10
8-308	3	4	1 1/4	5.40
8-309	3 1/2	1 1/2	1 1/4	4.25
8-310	3 1/2	2	1 1/4	4.85
8-311	3 1/2	2 1/2	1 1/4	5.60
8-312	3 1/2	3	1 1/4	5.75
8-313	3 1/2	3 1/2	1 1/4	6.95
8-314	3 1/2	4	1 1/4	7.55
8-315	3 1/2	4 1/2	1 1/4	8.50
8-316	4	1 1/2	1 1/2	7.75
8-317	4	2	1 1/2	8.55
8-318	4	2 1/2	1 1/2	9.45
8-319	4	3	1 1/2	10.40
8-320	4	3 1/2	1 1/2	11.35
8-321	4	4	1 1/2	12.45
8-322	5	1 1/2	1 1/2	11.00
8-323	5	2	1 1/2	12.45
8-324	5	2 1/2	1 1/2	13.65
8-325	5	3	1 1/2	15.05
8-326	6	1 1/2	1 1/2	15.35
8-327	6	2	1 1/2	16.90
8-328	6	2 1/2	1 1/2	18.55

Number	Diameter, Inches	Width of Face, Inches	Size Hole, Inches	Price Each
M-334	4	5	1 1/2	\$32.55
M-335	4	6	1 1/2	38.45
*M-336	4 1/2	1 1/4	1 1/2 or 2	13.00
*M-337	4 1/2	1 1/2	1 1/2 or 2	14.45
*M-338	4 1/2	1 3/4	1 1/2 or 2	16.20
*M-339	4 1/2	2	1 1/2 or 2	19.75
*M-340	4 1/2	2 1/2	1 1/2 or 2	22.90
M-341	4 1/2	3	1 1/2 or 2	25.95
M-342	4 1/2	3 1/2	1 1/2 or 2	29.00
M-343	4 1/2	4	1 1/2 or 2	34.45
M-344	4 1/2	5	1 1/2 or 2	39.45
M-345	4 1/2	6	1 1/2 or 2	46.85

Face Milling Cutters

With Inserted Teeth

This form of cutter is especially adapted for all classes of face milling. Body is machinery steel, provided with a taper hole and keyway, held firmly in place on arbor by a screw. Teeth are held in place by taper bushings and screws are easily adjusted or removed. Bushings, screws and teeth are interchangeable.

High speed cutters furnished unless otherwise ordered.

Left Hand Cutter

furnished unless otherwise ordered.

No. of Mill With High Speed Blades, Price per Cutter	With Carbon Steel Blades, Price per Cutter	Size inches	Face A inches	Face B inches	No. of Taper Hole	No. of Arbor on which Cutter can be used
1 \$15.00	\$15.00	5 1/2	2 1/4	1 1/2	10	79 or 80
2 15.00	15.00	5 1/2	2 1/4	1 1/2	12	81, 82, 84, 85 or 87
3 17.50	17.50	6 1/2	2 1/4	1 1/2	10	79 or 80
4 17.50	17.50	6 1/2	2 1/4	1 1/2	12	81, 82, 83, 84, 85 or 87
6 20.00	20.00	7 1/2	2 1/4	1 1/2	12	81, 82, 83, 84, 85 or 87
7 22.50	22.50	8 1/2	2 1/4	1 1/2	12	81, 82, 83, 84, 85 or 87
8 25.00	25.00	9 1/2	2 1/4	1 1/2	12	81, 82, 83, 84, 85 or 87

In ordering, state whether Right or Left Hand cutters are wanted. Other sizes made to order.

Face Milling Cutters

With Inserted Teeth and Threaded Holes
Can be used directly upon spindle of machine

No. of Cutter	With High Speed Blades, Price per Cutter	With Carbon Steel Blades, Price per Cutter	Hole		Cutter		
			Diag.	Thread	Diag.	Face A	Face B
10	\$17.50	\$17.50	2 1/2	4, L. H.	5 1/2	2 1/4	1 1/2
12	20.00	20.00	2 1/2	4, L. H.	6 1/2	2 1/4	1 1/2
16	22.50	22.50	2 1/2	4, L. H.	7 1/2	2 1/4	1 1/2
15	20.00	20.00	3 1/4	3 1/2, L. H.	6 1/2	2 1/4	1 1/2
13	22.50	22.50	3 1/4	3 1/2, L. H.	7 1/2	2 1/4	1 1/2
21	25.00	25.00	3 1/4	3 1/2, L. H.	8 1/2	2 1/4	1 1/2
24	27.50	27.50	3 1/4	3 1/2, L. H.	9 1/2	2 1/4	1 1/2
19	22.50	22.50	4	3, L. H.	7 1/2	2 1/4	1 1/2
22	25.00	25.00	4	3, L. H.	8 1/2	2 1/4	1 1/2
25	27.50	27.50	4	3, L. H.	9 1/2	2 1/4	1 1/2
22A	25.00	25.00	4 1/2	2 1/4, L. H.	8 1/2	2 1/4	1 1/2
26	27.50	27.50	4 1/2	2 1/4, L. H.	9 1/2	2 1/4	1 1/2

Standard Keyways for Cutters

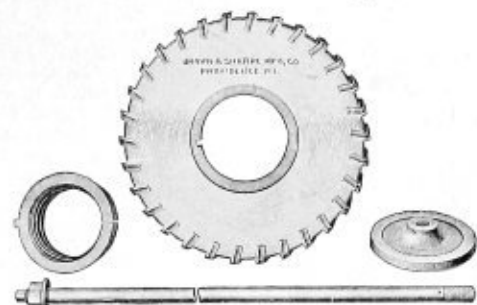


Diameter (D) of Hole	Width (W) of Keyway	Depth (D) of Keyway	Radius (R)
3/8 to 1/2	3/8	3/8	.020
1/2 to 3/4	3/8	3/8	.030
3/4 to 1	3/8	3/8	.035
1 to 1 1/4	3/4	3/4	.040
1 1/4 to 1 3/4	3/4	3/4	.050
1 3/4 to 2	3/4	3/4	.060
2 to 2 1/4	3/4	3/4	.060
2 1/4 to 3	3/4	3/4	.060

*1 1/4 inch, 1 inch and 2 inches. For all Gear Cutters of these diameters, use 3/8, 3/4, and 1/2 inch keys, respectively.

Gear Cutters with 1 1/4 inch hole also furnished with 3/8 inch keyway.

Inserted Tooth Face Milling Cutters



This face milling cutter embodies new and important features never before used in cutters of this type. Cutters may be quickly released from spindle, and the same cutter may be used on machines of different sizes of spindles by using special sleeves.

Cutter is made with a taper hole to fit a steel split sleeve that is screwed on spindle. Cutter is keyed to sleeve and drawn on taper of sleeve by a drawing-in bolt. As bolt is tightened sleeve contracts and grips spindle, thus furnishing full efficiency of drive to cutter at all times. Cutter is held close to spindle shoulder, increasing the working space.

Body, machinery steel. Blades, high speed steel.

Price List of Cutters

No.	Cutter only	Dia. of Cutter	Face A	Face B	Sm. Dia. of Taper Hole	Used with Sleeve No.
50	\$24.00	7	3	3 1/2	3	1
51	26.00	8	3	3 1/2	3	1
52	27.00	8	3 1/4	3 1/2	3 1/4	2 & 5
53	30.00	9	3 1/4	3 1/2	3 1/4	2 & 5
54	32.00	9	3 1/2	3 1/2	4 1/2	6 & 8
55	34.00	9	3 1/4	3 1/2	5	7, 9, & 10
56	37.00	10	3 1/4	3 1/2	3 1/4	2 & 5
57	40.00	10	3 1/2	3 1/2	4 1/2	6 & 8
58	43.00	10	3 1/4	3 1/2	5	7, 9, & 10
59	48.00	12	3 1/2	3 1/2	4 1/2	6 & 8
60	52.00	12	3 1/4	3 1/2	5	7, 9, & 10
61	70.00	15	3 1/4	3 1/2	5	7, 9, 10

Price List of Sleeves

No. of Sleeve	Price	Out-side Dia. of Sm. End	Length	Taper per ft. in Diam.	Bore	
					Diameter	Threads per inch
1	\$6.00	3	2	3 1/2	2 1/2	4, L. H., U. S. S.
2	6.50	3 1/4	2 1/4	3 1/2	2 1/2	4, L. H., U. S. S.
5	7.00	3 1/4	2 1/4	3 1/2	3 1/4	3 1/2, L. H., U. S. S.
6	7.50	4 1/2	2 1/2	3 1/2	3 1/4	3 1/2, L. H., U. S. S.
7	8.00	5	2 1/2	3 1/2	3 1/4	3 1/2, L. H., U. S. S.
8	8.00	4 1/2	2 1/2	3 1/2	4	3, L. H., U. S. S.
9	8.50	5	2 1/2	3 1/2	4	3, L. H., U. S. S.
10	9.00	5	2 1/4	3 1/2	4 1/2	2 1/4, L. H., U. S. S.

Price List of Clamping Plates

No. of Plate	Price	Used with Cutter	Diameter of Tapped Hole
1	\$1.00	50 & 51	5-8
2	1.00	52, 53 & 56	5-8
3	1.00	52, 53 & 56	11-16
4	1.00	54, 57 & 59	11-16
5	1.00	55, 58, 60 & 61	11-16

Drawing-in bolts for use with the cutters are furnished on short notice. When ordering, diameter of spindle hole and length of spindle over all must be given.

Price of Bolts and Nuts, \$1.50.

H. Channon Company Chicago

Metal Slitting Saws



These saws are thin Milling Cutters. They are ground on the sides and left a little thicker at the outer edge than near the center to give a proper clearance in cutting deep slots.

In ordering special saws please state for what purpose they are required.

PRICE EACH

No.	High Speed	Carbon Steel	Diameter Inches	Thickness Inches	Size of Hole, in.
G-50	\$ 2.50	\$1.00	2 1/2	3/8	7/8
G-51	2.40	.95	2 1/2	3/8	1
G-52	2.35	.90	2 1/2	3/8	1 1/8
G-53	2.35	.90	2 1/2	3/8	1 1/4
G-54	2.35	.90	2 1/2	3/8	1 1/2
G-55	2.35	.90	2 1/2	3/8	1 3/4
G-56	2.60	1.10	3	3/8	1 3/4
G-57	2.60	1.25	3	3/8	2
G-58	2.60	1.10	3	3/8	2 1/8
G-59	2.50	1.00	3	3/8	2 1/4
G-60	2.50	1.00	3	3/8	2 1/2
G-61	2.85	1.15	3	3/8	2 3/4
G-62	4.60	2.25	4	3/8	3
G-63	3.15	1.45	4	3/8	3 1/8
G-64	2.95	1.25	4	3/8	3 1/4
G-65	2.85	1.20	4	3/8	3 1/2
G-66	2.85	1.20	4	3/8	3 3/4
G-67	3.45	1.40	4	3/8	4
G-68	3.45	1.60	4	3/8	4 1/8
G-69	3.85	1.80	5	3/8	4 1/4
G-70	3.35	1.50	5	3/8	4 1/2
G-71	3.35	1.50	5	3/8	4 3/4
G-72	3.35	1.50	5	3/8	5
G-73	3.35	1.50	5	3/8	5 1/8
G-74	4.30	1.90	5	3/8	5 1/4
G-75	4.30	2.30	5	3/8	5 1/2
G-76	7.50	4.00	6	3/8	6
G-77	5.85	3.00	6	3/8	6 1/8
G-78	5.35	2.70	6	3/8	6 1/4
G-78A	5.35	2.70	6	3/8	6 1/2
G-79	6.45	3.50	6	3/8	6 3/4
G-79A	6.45	3.50	6	3/8	6 1/2
G-80	6.45	3.50	6	3/8	6 1/4
G-81	1.00	7.50	7	3/8	7
G-82	8.35	4.50	7	3/8	7 1/8
G-83	7.20	3.80	7	3/8	7 1/4
G-83A	9.05	5.10	7	3/8	7 1/2
G-83B	9.05	5.10	7	3/8	7 1/4
G-84	12.00	5.75	8	3/8	8
G-85	12.00	5.75	8	3/8	8 1/8
G-86	12.30	7.00	8	3/8	8 1/4
G-87	12.30	7.00	8	3/8	8 1/2

Circular Saws

For sawing thin metals, slotting screw heads, etc. Can furnish saws up to and including No. 35 B. & S. Wire Gauge. Standard size hole is 1/2 inch, but can furnish with 3/4, 5/8, or 1 inch hole. Has finer teeth than metal saw above.

PRICE EACH

Gauge No.	1/4	1	1 1/2	2	2 1/2	3	4	5	6	Thickness
8	.38	.39	.42	.46	.52	.60	.86	1.30	1.94	.128
9	.33	.34	.37	.41	.47	.55	.81	1.25	1.89	.114
10	.28	.29	.32	.36	.42	.50	.76	1.20	1.84	.102
11	.25	.26	.29	.33	.39	.47	.73	1.17	1.81	.091
12	.22	.23	.26	.30	.36	.44	.70	1.14	1.78	.081
13	.19	.20	.23	.27	.33	.41	.67	1.11	1.75	.072
14	.17	.18	.21	.25	.31	.39	.65	1.09	1.73	.064
15	.15	.16	.19	.23	.29	.37	.63	1.07	1.71	.057
16	.13	.14	.17	.21	.27	.35	.61	1.05	1.69	.051
17	.12	.13	.16	.20	.26	.34	.60	1.04	1.68	.045
18	.11	.12	.15	.19	.25	.33	.59	1.03	1.67	.040
19	.10	.11	.14	.18	.24	.32	.58	1.02	1.66	.035

All saws thinner than No. 19 gauge are same price as No. 19.

Screw Slotting Cutters



These Cutters have a fine pitch of teeth especially adapted for the slotting of screw heads and similar work.

They are not ground on the sides. 2 3/4-in. diam. by 1-in. hole seen on sizes shown except when otherwise specified.

Trade No.	Price Each	Diam. of Screw Head to be Slotted, Ins.	Gauge No.	Thickness of Cutter in Decimals	Diam. of Cutter Inches	Size of Hole, Inches
5	\$0.70	1 1/8	H-10	.182	2 3/4	1
6	.60	1 1/8	H-11	.162	2 3/4	1
7	.50	1 1/8	H-12	.144	2 3/4	1
8	.45	1 1/8	H-13	.128	2 3/4	1
9	.40	1 1/8	H-14	.114	2 3/4	1
10	.35	1 1/8	H-15	.102	2 3/4	1
11	.30	1 1/8	H-16	.091	2 3/4	1
12	.25	1 1/8	H-17	.081	2 3/4	1
13	.20	1 1/8	H-18	.072	2 3/4	1
14	.20	1 1/8	H-19	.064	2 3/4	1
15	.15	1 1/8	H-20	.057	2 3/4	1
16	.15	1 1/8	H-21	.051	2 3/4	1
17	.15	1 1/8	H-22	.045	2 3/4	1
18	.15	1 1/8	H-23	.040	2 3/4	1
19	.15	1 1/8	H-24	.035	2 3/4	1
20	.15	1 1/8	H-25	.032	2 3/4	1
21	.15	1 1/8	H-26	.028	2 3/4	1
22	.15	1 1/8	H-27	.025	2 3/4	1
23	.15	1 1/8	H-28	.023	2 3/4	1
24	.15	1 1/8	H-29	.020	2 3/4	1
25	.15	1 1/8	H-30	.018	2 3/4	1
26	.15	1 1/8	H-31	.016	2 3/4	1
27	.15	1 1/8	H-32	.014	2 3/4	1
28	.15	1 1/8	H-33	.012	2 3/4	1
29	.15	1 1/8	H-34	.010	2 3/4	1
30	.15	1 1/8	H-35	.008	2 3/4	1
31	.15	1 1/8	H-36	.006	2 3/4	1
32	.15	1 1/8	H-36A	.002	2 3/4	1
33	.15	1 1/8	H-36B	.001	2 3/4	1
34	.15	1 1/8	H-36C	.001	2 3/4	1
35	.15	1 1/8	H-36D	.072	2 3/4	1
36	.15	1 1/8	H-36E	.064	2 3/4	1
37	.15	1 1/8	H-36F	.057	2 3/4	1
38	.15	1 1/8	H-36G	.051	2 3/4	1
39	.15	1 1/8	H-36H	.045	2 3/4	1
40	.15	1 1/8	H-36I	.040	2 3/4	1
41	.15	1 1/8	H-36J	.035	2 3/4	1
42	.15	1 1/8	H-37	.032	2 3/4	1
43	.15	1 1/8	H-38	.028	2 3/4	1
44	.15	1 1/8	H-39	.025	2 3/4	1
45	.15	1 1/8	H-40	.023	2 3/4	1
46	.15	1 1/8	H-41	.020	2 3/4	1
47	.15	1 1/8	H-42	.018	2 3/4	1
48	.15	1 1/8	H-43	.016	2 3/4	1
49	.15	1 1/8	H-44	.014	2 3/4	1
50	.15	1 1/8	H-45	.012	2 3/4	1
51	.15	1 1/8	H-46	.010	2 3/4	1
52	.15	1 1/8	H-47	.008	2 3/4	1
53	.15	1 1/8	H-48	.006	2 3/4	1

Cutters varying from the list are made to order.

Formed Saws for Slitting Copper



Designed especially for slitting or sawing of metals that are of a soft or tenacious character.

The teeth are backed off and formed the same as in all milling cutters, sharpened by grinding the face, thus retaining the outline of the saw. Each alternate tooth is V shaped and, as the others are flat, the chip is split and forced out sideways, having less tendency to clog than where the ordinary saw is employed. The sides of these saws are ground concave for clearance.

Made to order of any desired size. Prices on application.

Coarse Tooth Spiral End Mills—High Speed



In Ordering, State Whether Right or Left Hand Mills Are Wanted

Number	Diam., Inches	Number of Taper	Length of Cut, Inches	Whole Length, Inches	High Speed Steel Cutters, Price Each
E-700	1/4	4	2 1/2	2 7/8	\$1.40
E-701	1/4	5	3	3 1/8	1.70
E-702	3/8	4	2 1/2	2 7/8	1.40
E-703	3/8	5	3	3 1/8	1.70
E-704	3/8	4	2 1/2	2 7/8	1.55
E-705	3/8	5	3	3 1/8	1.75
E-706	3/8	4	2 1/2	2 7/8	1.55
E-707	3/8	5	3	3 1/8	1.80
E-708	1/2	5	1	3 1/8	1.90
E-709	1/2	7	1 1/8	5 1/8	2.40
E-710	9/16	5	1 1/8	3 1/4	2.00
E-711	9/16	7	1 1/4	5 1/4	2.50
E-712	5/8	5	1 1/4	3 1/8	2.20
E-713	5/8	7	1 1/2	5 1/2	2.80
E-714	5/8	7	1 1/2	5 1/2	2.85
E-715	5/8	9	1 1/2	6 3/4	3.75
E-716	5/8	7	1 1/8	5 5/8	2.95
E-717	5/8	9	1 5/8	6 1/8	3.85
E-718	5/8	7	1 5/8	5 5/8	3.35
E-719	5/8	9	1 5/8	6 1/8	4.05
E-720	7/8	7	1 3/4	5 3/4	3.55
E-721	7/8	9	1 3/4	7	4.25
E-722	7/8	7	1 3/4	5 3/4	3.70
E-723	7/8	9	1 3/4	7	4.25
E-724	1	7	1 7/8	5 7/8	3.80
E-725	1	9	1 7/8	7 1/8	4.35
E-726	1 1/16	7	1 7/8	5 7/8	3.95
E-727	1 1/16	9	1 7/8	7 1/8	4.40
E-728	1 1/8	7	2	6	4.20
E-729	1 1/8	9	2	7 1/4	4.60
E-730	1 3/8	7	2	6	4.30
E-731	1 3/8	9	2	7 1/4	4.90
E-732	1 1/4	7	2	6	4.45
E-733	1 1/4	9	2	7 1/4	5.10
E-734	1 3/8	9	2 1/8	7 3/8	5.75
E-735	1 3/8	9	2 1/8	7 3/8	6.25
E-736	1 7/8	9	2 1/4	7 1/2	6.50
E-737	1 1/2	9	2 1/4	7 1/2	6.85
E-738	1 5/8	9	2 3/8	7 3/8	7.45
E-739	1 3/4	9	2 1/2	7 3/4	8.30

No. 4 taper fits A and J collets; No. 5, C, D. and K collets; No. 7, KK and E collets; No. 9, F, G, H, O, SS and T collets; Collets are listed elsewhere. See index.



In Ordering, State Whether Right or Left Hand Mills Are Wanted

Number	Diam., Inches	Number of Taper	Length of Cut, Inches	Whole Length, Inches	High Speed Steel Cutters, Price Each
E-750	1/4	1	1 1/2	3 1/2	\$1.70
E-751	1/4	1	1 1/2	3 3/4	1.70
E-752	3/8	1	1 1/2	3 3/4	1.75
E-753	3/8	1	1 1/2	3 3/8	1.85
E-754	3/8	2	1	4 1/2	2.25
E-755	1/2	1	1	3 7/8	1.90
E-756	1/2	2	1 1/2	4 5/8	2.30
E-757	9/16	1	1 1/2	3 5/8	2.00
E-758	9/16	2	1 1/4	4 3/4	2.40
E-759	5/8	2	1 1/2	5	2.50
E-760	5/8	2	1 1/2	5	2.75
E-761	3/4	2	1 5/8	5 3/8	2.85
E-762	3/4	3	1 5/8	6	3.45
E-763	5/8	2	1 5/8	5 3/8	3.05
E-764	5/8	3	1 5/8	6	3.50
E-765	7/8	2	1 3/4	5 1/4	3.40
E-766	7/8	3	1 3/4	6 1/8	3.85
E-767	7/8	2	1 3/4	5 1/4	3.45
E-768	7/8	3	1 3/4	6 1/8	3.85
E-769	1	2	1 7/8	5 3/8	3.40
E-770	1	3	1 7/8	6 1/4	4.00
E-771	1 1/16	2	1 7/8	5 3/8	3.75
E-772	1 1/16	3	1 7/8	6 1/4	4.05
E-773	1 1/8	3	2	6 3/8	4.25
E-774	1 1/8	3	2	6 3/8	4.45
E-775	1 1/4	3	2	6 3/8	4.65
E-776	1 1/4	4	2	7 3/8	5.00
E-777	1 5/8	3	2 1/8	6 1/2	5.10
E-778	1 5/8	4	2 1/8	7 1/2	5.40
E-779	1 3/8	3	2 1/8	6 1/2	5.20
E-780	1 3/8	4	2 1/8	7 1/2	5.60
E-781	1 7/8	3	2 1/4	6 5/8	5.50
E-782	1 7/8	4	2 1/4	7 5/8	6.10
E-783	1 1/2	3	2 1/4	6 5/8	5.65
E-784	1 1/2	4	2 1/4	7 5/8	6.25
E-785	1 5/8	4	2 3/8	7 3/4	7.05
E-786	1 3/4	4	2 3/8	7 3/4	7.80
E-787	1 7/8	4	2 1/2	7 7/8	8.55
E-788	2	4	2 1/2	7 7/8	9.35

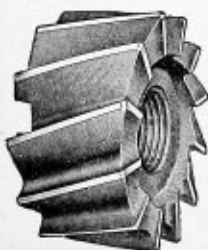
Coarse Tooth Spiral Shell End Mills

High Speed Steel

In ordering state whether right or left hand mills are wanted. See previous page for explanation of advantages of coarse tooth cutters.

Number	Diameter Inches	Length of Cut, Inches	Hole, Inches	Hole Tapped, Threads per Inch	Price
E-200	2 1/2	1 1/4	1	10	\$ 6.60
E-201	3	1 3/4	1 1/4	8	10.40
E-202	3 1/2	2	1 1/2	8	14.80
E-203	4	2	1 1/2	8	17.75
E-204	5	2	1 1/2	8	25.75
E-205	6	2	1 1/2	8	36.20

Number of arbors on which cutters can be used are as follows: E-200—arbors 128, 129, 130, 131, 132, 133, 134, 135, 138 and 139. E-201—arbors 142, 143, 146, 147, 150, 151, 154 and 155. E-202, E-204, E-205—arbors 158, 159, 162, 163, 166, 167, 170 and 171.



H. Channon Company Chicago



"Lathe" or "Hollow" Mills

Type A—Adjustable



Type B—Plain

Price Each

Size Hole	1/8	3/16	1/4	5/16	3/8	7/16	1/2	5/8	3/4	7/8	1
Out. Diam.	3/8	1/2	5/8	3/4	7/8	1	1 1/8	1 1/4	1 1/2	1 3/4	2
Length	1 1/2	1 3/4	1 1/2	1 3/4	1 1/2	1 3/4	1 1/2	1 3/4	1 1/2	1 3/4	1 1/2
Type A	\$1.60	\$1.60	\$1.60	\$1.60	\$1.60	\$1.60	\$1.60	\$1.60	\$1.60	\$1.80	\$1.80
Type B	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.50	1.50

Size Hole	1/8	3/16	1/4	5/16	3/8	7/16	1/2	5/8	3/4	7/8	1
Out. Diam.	3/8	1/2	5/8	3/4	7/8	1	1 1/8	1 1/4	1 1/2	1 3/4	2
Length	1 1/2	1 3/4	1 1/2	1 3/4	1 1/2	1 3/4	1 1/2	1 3/4	1 1/2	1 3/4	1 1/2
Type A	\$1.80	\$1.80	\$2.00	\$2.00	\$2.00	\$2.00	\$2.20	\$2.40	\$2.60	\$2.80	\$3.00
Type B	1.50	1.50	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00

Size Hole	1/8	3/16	1/4	5/16	3/8	7/16	1/2	5/8	3/4	7/8	1
Out. Diam.	3/8	1/2	5/8	3/4	7/8	1	1 1/8	1 1/4	1 1/2	1 3/4	2
Length	2	2	2	2	2	2	2	2	2	2	2
Type A	\$2.60	\$2.80	\$3.00	\$3.20	\$3.40	\$3.60	\$3.80	\$4.00	\$4.20	\$4.40	\$4.60
Type B	2.00	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50

End Mills and Spiral End Mills



Always
state
whether
Right or
Left
Hand is
wanted.

Can be fitted with Morse Taper at regular Morse Taper price.

No.	Price Each High Speed	Carbon Steel	Dia- meter Inches	Length of Cut Inches	Length Overall Inches	No. of Taper
E-10	\$1.40	\$1.00	1/8	1 1/2	2 1/4	4
E-11	1.70	1.15	1/8	1 1/2	2 1/4	5
E-12	1.40	1.00	1/8	1 1/2	2 1/4	4
E-13	1.70	1.15	1/8	1 1/2	2 1/4	5
E-14	1.55	1.10	1/8	1 1/2	2 1/4	4
E-15	1.75	1.20	1/8	1 1/2	2 1/4	5
E-16	1.55	1.10	1/8	1 1/2	2 1/4	4
E-17	1.80	1.25	1/8	1 1/2	2 1/4	5
E-18	1.90	1.30	1/8	1 1/2	2 1/4	5
E-19	2.40	1.45	1/8	1 1/2	2 1/4	7
E-20	2.00	1.35	1/8	1 1/2	2 1/4	5
E-21	2.50	1.50	1/8	1 1/2	2 1/4	7
E-22	2.20	1.45	1/8	1 1/2	2 1/4	5
E-23	2.80	1.70	1/8	1 1/2	2 1/4	7
E-24	2.85	1.75	1/8	1 1/2	2 1/4	9
E-25	3.75	1.90	1/8	1 1/2	2 1/4	7
E-26	2.95	1.80	1/8	1 1/2	2 1/4	7
E-27	3.85	1.95	1/8	1 1/2	2 1/4	7
E-28	3.35	1.90	1/8	1 1/2	2 1/4	7
E-29	4.05	2.00	1/8	1 1/2	2 1/4	7
E-30	3.55	2.10	1/8	1 1/2	2 1/4	7
E-31	4.25	2.25	1/8	1 1/2	2 1/4	7
E-32	3.70	2.10	1/8	1 1/2	2 1/4	7
E-33	4.25	2.25	1/8	1 1/2	2 1/4	7
E-34	3.80	2.15	1/8	1 1/2	2 1/4	7
E-35	4.35	2.30	1/8	1 1/2	2 1/4	7
E-36	3.95	2.15	1/8	1 1/2	2 1/4	7
E-37	4.40	2.35	1/8	1 1/2	2 1/4	7
E-38	4.20	2.25	1/8	1 1/2	2 1/4	7
E-39	4.60	2.40	1/8	1 1/2	2 1/4	7
E-40	4.30	2.25	1/8	1 1/2	2 1/4	7
E-41	4.90	2.50	1/8	1 1/2	2 1/4	7
E-42	4.45	2.25	1/8	1 1/2	2 1/4	7
E-43	5.10	2.55	1/8	1 1/2	2 1/4	7
E-44	5.75	2.75	1/8	1 1/2	2 1/4	7
E-45	6.25	2.75	1/8	1 1/2	2 1/4	7
E-46	6.50	3.00	1/8	1 1/2	2 1/4	7
E-47	6.85	3.00	1/8	1 1/2	2 1/4	7
E-48	7.45	3.25	1/8	1 1/2	2 1/4	7
E-49	8.30	3.50	1/8	1 1/2	2 1/4	7

No. 4 Taper fits A and J Collets; No. 5, C, D, and K Collets; No. 7, KK and E Collets; No. 9, F, G, H, O, SS and T Collets.

Straight Shank End Mills



These end mills are to be used with spring collets. The diameter of the shank is the same as the cut. All mills less than 3/8 diameter have straight teeth. In ordering state whether right or left hand mills are wanted.

Diameter	Length of Cut, Inches	Whole Length, Inches	Carbon Steel Cutters, Price Each	High Speed Cutters, Price Each
1/8	1/4	1 1/4	\$0.50	\$0.35
3/16	1/4	1 1/4	.60	.40
1/4	1/4	1 1/4	.70	.45
5/16	1/4	1 1/4	.80	.50
3/8	1/4	1 1/4	.90	.55
7/16	1/4	1 1/4	1.00	.60
1/2	1/4	1 1/4	1.10	.70
5/8	1/4	1 1/4	1.20	.75
3/4	1/4	1 1/4	1.30	.80
7/8	1/4	1 1/4	1.40	.85
1	1/4	1 1/4	1.50	1.00
1 1/8	1/4	1 1/4	1.70	1.25
1 1/4	1/4	1 1/4	1.90	1.35
1 1/2	1/4	1 1/4	2.10	1.50
1 3/4	1/4	1 1/4	2.30	1.60
2	1/4	1 1/4	2.50	1.70
2 1/4	1/4	1 1/4	2.75	1.80
2 1/2	1/4	1 1/4	3.00	1.90
2 3/4	1/4	1 1/4	3.25	2.00
3	1/4	1 1/4	3.50	2.05

End Mills with Center Cut



Always state whether Right or Left Hand Mills are wanted.

End mills are useful where it is desired to cut into work with end of mill and then move along, as in cams, grooves, etc., as the teeth are sharp on inside, and cut a path out from first entering point. Are also useful in taking heavy cuts, especially in cast iron.

Can be furnished with Morse Taper at regular Morse Taper price.

No.	Price Each High Speed	Carbon Steel	Dia- meter Inches	Length of Cut Inches	Length Overall Inches	No. of Taper
E-200	\$1.90	\$1.30	1/8	1	3 1/2	5
E-201	2.40	1.45	1/8	1 1/8	5 1/8	7
E-202	2.00	1.35	1/8	1 1/8	5 1/8	5
E-203	2.50	1.50	1/8	1 1/8	5 1/8	7
E-204	2.20	1.45	1/8	1 1/8	5 1/8	5
E-205	2.80	1.70	1/8	1 1/8	5 1/8	7
E-206	2.85	1.75	1/8	1 1/8	5 1/8	9
E-207	3.75	1.90	1/8	1 1/8	5 1/8	7
E-208	2.95	1.80	1/8	1 1/8	5 1/8	7
E-209	3.85	1.95	1/8	1 1/8	5 1/8	7
E-210	3.35	1.90	1/8	1 1/8	5 1/8	7
E-211	4.05	2.00	1/8	1 1/8	5 1/8	7
E-212	3.55	2.10	1/8	1 1/8	5 1/8	7
E-213	4.25	2.25	1/8	1 1/8	5 1/8	7
E-214	3.70	2.10	1/8	1 1/8	5 1/8	7
E-215	4.25	2.25	1/8	1 1/8	5 1/8	7
E-216	3.80	2.15	1/8	1 1/8	5 1/8	7
E-217	4.35	2.30	1/8	1 1/8	5 1/8	7
E-218	3.95	2.15	1/8	1 1/8	5 1/8	7
E-219	4.40	2.35	1/8	1 1/8	5 1/8	7
E-220	4.20	2.25	1/8	1 1/8	5 1/8	7
E-221	4.60	2.40	1/8	1 1/8	5 1/8	7
E-222	4.30	2.25	1/8	1 1/8	5 1/8	7
E-223	4.90	2.50	1/8	1 1/8	5 1/8	7
E-224	4.45	2.25	1/8	1 1/8	5 1/8	7
E-225	5.10	2.55	1/8	1 1/8	5 1/8	7
E-226	5.75	2.75	1/8	1 1/8	5 1/8	7
E-227	6.25	2.75	1/8	1 1/8	5 1/8	7
E-228	6.50	3.00	1/8	1 1/8	5 1/8	7
E-229	6.85	3.00	1/8	1 1/8	5 1/8	7

No. 5 Taper fits C, D and K Collets; No. 7, KK and E Collets; No. 9, F, G, H, O, SS and T Collets.

Slotting End Mills "Two Lipped" High Speed Steel



For rapidly milling slots in steel and iron from the solid, instead of drilling a series of holes and making several cuts in milling slot. Best results are obtained by maintaining a high surface speed. Depth of cut equal to one-half diameter of mill can usually be taken from solid stock.

No.	Price Each	Diam. Inches	No. of Taper Shank	Length of cut Inches	Length Over All Inches
E-597	\$1.40	1/4	4	3/8	2 1/2
E-598	1.70	1/4	5	3/8	2 1/2
E-599	1.70	1/4	6	3/8	2 1/2
E-600	2.00	1/4	7	3/8	2 1/2
E-601	2.10	1/4	7	3/8	2 1/2
E-602	2.15	1/4	7	3/8	2 1/2
E-603	2.25	1/4	7	3/8	2 1/2
E-604	2.40	1/4	7	3/8	2 1/2
E-605	2.40	1/4	7	3/8	2 1/2
E-606	2.50	1/4	7	3/8	2 1/2
E-607	2.80	1/4	7	3/8	2 1/2
E-608	2.85	1/4	7	3/8	2 1/2
E-609	2.95	1/4	7	3/8	2 1/2
E-610	3.85	1/4	9	1 1/2	5 1/2
E-611	2.35	1/4	7	3/8	2 1/2
E-612	4.05	1/4	9	1 1/2	5 1/2
E-613	3.55	1/4	7	3/8	2 1/2
E-614	4.25	1/4	9	1 1/2	5 1/2
E-615	4.35	1/4	9	1 1/2	5 1/2
E-616	4.40	1/4	9	1 1/2	5 1/2
E-617	4.60	1/4	9	1 1/2	5 1/2
E-618	4.90	1/4	9	1 1/2	5 1/2
E-619	5.10	1/4	9	1 1/2	5 1/2
E-620	5.75	1/4	9	1 1/2	5 1/2
E-621	6.25	1/4	9	1 1/2	5 1/2
E-622	6.50	1/4	9	1 1/2	5 1/2
E-623	6.85	1/4	9	1 1/2	5 1/2



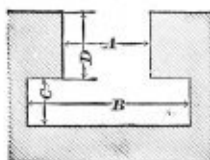
Shell End Mills

Furnished with straight or spiral flute.

Always specify whether right or left hand mill is wanted. Cut shows left hand mill.

Diameter Inches	High Speed Steel Cutters Price each	Carbon Steel Cutters Price each	Length of cut Inches	No. of Arbor on which Cutter can be used	Hole Inches
1/4	\$ 4.50	\$2.80	1 1/4	89	1/4
1/2	4.65	2.90	1 1/4	92	1/2
3/4	4.80	3.00	1 1/4	93	3/4
1	4.95	3.10	1 1/4	94	1
1 1/4	5.10	3.20	1 1/4	96	1 1/4
1 1/2	5.50	3.90	1 1/4	97	1 1/2
1 3/4	5.70	3.95	1 1/4	101	1 3/4
2	5.90	4.00	1 1/4	103	2
2 1/4	6.10	4.05	1 1/4	91	2 1/4
2 1/2	6.30	4.10	1 1/4	95	2 1/2
2 3/4	6.50	4.15	1 1/4	98	2 3/4
3	6.70	4.20	1 1/4	100	3
3 1/4	6.90	4.30	1 1/4	102	3 1/4
3 1/2	7.10	4.35	1 1/4	104	3 1/2
3 3/4	7.30	4.40	1 1/4	105	3 3/4
4	7.50	4.50	1 1/4	1	4
4 1/4	8.00	4.90	2 1/4	1	4 1/4
4 1/2	8.25	4.95	2 1/4	1	4 1/2
4 3/4	8.55	5.00	2 1/4	1	4 3/4
5	8.85	5.05	2 1/4	1	5
5 1/4	9.15	5.10	2 1/4	1	5 1/4
5 1/2	9.45	5.20	2 1/4	1	5 1/2
5 3/4	9.75	5.35	2 1/4	1	5 3/4
6	10.05	5.50	2 1/4	1	6
6 1/4	10.40	5.65	2 1/4	1	6 1/4
6 1/2	10.70	5.80	2 1/4	1	6 1/2
6 3/4	11.05	5.95	2 1/4	1	6 3/4
7	11.40	6.10	2 1/4	1	7
7 1/4	11.75	6.30	2 1/4	1	7 1/4

Standard "T" Slot Cutters



Always state whether Right or Left Hand Cutters are wanted. Cutters are made 1/2" larger in diameter and 1/8" greater in thickness than figures given, to allow for sharpening.

Other sizes made to order.

No. of Cutter	High Speed Steel Cutters Price each	Carbon Steel Cutters Price each	Width of Slot A Inches	Diameter of Neck of Cutter B Inches	Width of Slot C Inches	Depth of Slot D Inches	Extreme Limit D Inches	No. of Taper
4	\$2.10	\$1.50	1/4	1/4	1/4	1/4	1/4	4
7	2.25	1.60	1/4	1/4	1/4	1/4	1/4	5
10	2.60	1.80	1/4	1/4	1/4	1/4	1/4	6
13	3.25	2.10	1/4	1/4	1/4	1/4	1/4	7
16	2.90	2.00	1/4	1/4	1/4	1/4	1/4	8
19	3.35	2.20	1/4	1/4	1/4	1/4	1/4	9
22	3.65	2.35	1/4	1/4	1/4	1/4	1/4	10
25	4.25	2.50	1/4	1/4	1/4	1/4	1/4	11
28	4.15	2.60	1/4	1/4	1/4	1/4	1/4	12
31	4.80	2.80	1/4	1/4	1/4	1/4	1/4	13
34	5.55	3.10	1/4	1/4	1/4	1/4	1/4	14
37	6.35	3.45	1/4	1/4	1/4	1/4	1/4	15
40	7.75	3.75	1/4	1/4	1/4	1/4	1/4	16
43	8.95	4.00	1	1	1	1	1	17

Woodruff Keyway Cutters



Right Hand Cutters furnished unless otherwise ordered.

For milling key seats, for use with Woodruff type of key seats.

*Nos. 1 and 2 are not made of high speed steel.

No.	High Speed Steel Price each	Carbon Steel Price each	Diameter Inches	Thick Inches	(Shank) Inches
*1		\$0.95	1/2	1/8	1/2
*2		.95	1/2	1/8	1/2
3	\$1.20	.95	1/2	1/8	1/2
4	1.40	1.10	1/2	1/8	1/2
5	1.40	1.10	1/2	1/8	1/2
6	1.40	1.10	1/2	1/8	1/2
7	1.60	1.20	3/4	1/8	3/4
8	1.60	1.20	3/4	1/8	3/4
9	1.60	1.20	3/4	1/8	3/4
10	1.60	1.20	3/4	1/8	3/4
11	1.95	1.40	3/4	1/8	3/4
12	1.95	1.40	3/4	1/8	3/4
A	1.95	1.40	3/4	1/8	3/4
13	1.95	1.40	3/4	1/8	3/4
14	2.35	1.55	1	1/8	1
15	2.35	1.55	1	1/8	1
16	2.35	1.55	1	1/8	1
17	2.75	1.75	1 1/4	1/8	1 1/4
18	2.75	1.75	1 1/4	1/8	1 1/4
C	2.75	1.75	1 1/4	1/8	1 1/4
19	3.20	1.90	1 1/4	1/8	1 1/4
20	3.20	1.90	1 1/4	1/8	1 1/4
21	3.20	1.90	1 1/4	1/8	1 1/4
D	3.20	1.90	1 1/4	1/8	1 1/4
E	3.20	1.90	1 1/4	1/8	1 1/4
22	3.80	2.15	1 3/4	1/8	1 3/4
23	3.80	2.15	1 3/4	1/8	1 3/4
F	3.80	2.15	1 3/4	1/8	1 3/4
24	3.95	2.15	1 3/4	1/8	1 3/4
25	3.95	2.15	1 3/4	1/8	1 3/4
G	3.95	2.15	1 3/4	1/8	1 3/4

These cutters are of special design and can be sharpened when dull by grinding the faces of the teeth. This manner of sharpening will not alter the form of the tooth which the cutter makes. This feature makes them much more economical than ordinary cutters used for the same purpose.

Orders should be given by following tables, stating number of cutter and Diametral Pitch required. By Diametral Pitch is meant number of teeth per inch in diameter on pitch circle of any wheel. In ordering cutters for worm wheels, give number of teeth in wheel, diameter of worm and number of threads per inch.

Special attention is called to center line on gear cutters, which is convenient in setting cutters central with work spindle. All gears of same pitch cut with these cutters are interchangeable.

Eight cutters are regularly made for each pitch as follows:

- | | |
|-----------------------------------------------|--------------------------------------------|
| No. 1 will cut wheels from 135 teeth to rack. | No. 5 will cut wheels from 21 to 25 teeth. |
| No. 2 will cut wheels from 55 to 134 teeth. | No. 6 will cut wheels from 17 to 20 teeth. |
| No. 3 will cut wheels from 35 to 54 teeth. | No. 7 will cut wheels from 14 to 16 teeth. |
| No. 4 will cut wheels from 26 to 34 teeth. | No. 8 will cut wheels from 12 to 13 teeth. |

We furnish to order gear cutters from 2 to 8 pitch, inclusive, of half numbers, to accommodate those who require a finer division of number of teeth to be cut with each cutter than can be cut with the regular number.

The half numbers are as follows:

- | | | | | | | | |
|--------------------|-----------|----------|----------|----------|----------|----------|----|
| No. of Cutter..... | 1½ | 2½ | 3½ | 4½ | 5½ | 6½ | 7½ |
| Range, teeth..... | 80 to 134 | 42 to 54 | 30 to 34 | 23 to 25 | 19 to 20 | 15 to 16 | 13 |

Diametral Pitch	Price, Each		Diameter of Carbon Steel Cutter inches	Diameter of High Speed Cutter inches	Size of Hole, inches	Diametral Pitch	Price, Each		Diameter of Carbon Steel Cutter inches	Diameter of High Speed Cutter inches	Size of Hole, inches	Diametral Pitch	Price, Each		Diameter of Carbon Steel Cutter inches	Diameter of High Speed Cutter inches	Size of Hole, inches
	High Speed	Carbon Steel					High Speed	Carbon Steel					High Speed	Carbon Steel			
*1	\$85.00	\$45.00	8 1/2	8 1/2	2	6	\$8.00	\$4.30	3	3 1/4	1	28	\$3.00	\$1.80	1 1/4	1 1/4	3/8
*1 1/2	70.00	38.00	7 3/4	7 3/4	2	7	7.00	4.10	2 3/4	3 1/2	1	30	3.00	1.80	1 1/4	1 1/4	3/8
*1 3/4	55.00	32.00	7	7	1 1/4	8	6.00	3.90	2 1/2	3 3/4	1	*32	3.00	1.80	1 1/4	1 1/4	3/8
*2	45.00	24.00	6 1/2	6 1/2	1 1/4	9	5.50	3.70	2 1/4	3 3/4	1	*34	3.00	1.80	1 1/4	1 1/4	3/8
*2 1/2	35.00	16.00	5 1/4	5 1/4	1 1/4	10	5.00	3.50	2 1/4	3 3/4	1	*36	3.00	1.80	1 1/4	1 1/4	3/8
*2 3/4	28.00	13.00	5 1/4	5 1/4	1 1/4	11	4.50	3.30	2 1/4	3 3/4	1	*38	3.00	1.80	1 1/4	1 1/4	3/8
*3	23.00	11.00	5 1/2	5 1/2	1 1/4	12	4.25	3.10	2 1/4	3 3/4	1	*40	3.00	1.80	1 1/4	1 1/4	3/8
*3 1/2	20.00	10.00	5 1/2	5 1/2	1 1/4	13	4.00	2.90	2 1/4	3 3/4	1	*42	3.00	1.80	1 1/4	1 1/4	3/8
*3 3/4	18.00	8.00	4 3/4	4 3/4	1 1/4	14	3.75	2.70	2 1/4	3 3/4	1	*44	3.00	1.80	1 1/4	1 1/4	3/8
*4	16.00	7.00	4 3/4	4 3/4	1 1/4	15	3.60	2.60	2 1/4	3 3/4	1	*46	3.00	1.80	1 1/4	1 1/4	3/8
*4 1/2	14.00	6.75	4 3/4	4 3/4	1 1/4	16	3.50	2.50	2 1/4	3 3/4	1	*48	3.00	1.80	1 1/4	1 1/4	3/8
*4 3/4	13.00	6.50	4 3/4	4 3/4	1 1/4	18	3.40	2.40	2 1/4	3 3/4	1	*50	3.00	1.80	1 1/4	1 1/4	3/8
*5	12.00	6.00	3 3/4	3 3/4	1 1/4	20	3.30	2.30	2 1/4	3 3/4	1	*52	3.00	1.80	1 1/4	1 1/4	3/8
*5 1/2	11.00	5.50	3 3/4	3 3/4	1 1/4	22	3.20	2.20	2 1/4	3 3/4	1	*54	3.00	1.80	1 1/4	1 1/4	3/8
	10.00	5.00	3 3/4	3 3/4	1 1/4	24	3.10	2.10	2 1/4	3 3/4	1	*56	3.00	1.80	1 1/4	1 1/4	3/8
	9.00	5.00	3 3/4	3 3/4	1 1/4	26	3.00	2.00	2 1/4	3 3/4	1	*58	3.00	1.80	1 1/4	1 1/4	3/8
												*60	3.00	1.80	1 1/4	1 1/4	3/8
												*62	3.00	1.80	1 1/4	1 1/4	3/8
												*64	3.00	1.80	1 1/4	1 1/4	3/8
												*66	3.00	1.80	1 1/4	1 1/4	3/8
												*68	3.00	1.80	1 1/4	1 1/4	3/8
												*70	3.00	1.80	1 1/4	1 1/4	3/8
												*72	3.00	1.80	1 1/4	1 1/4	3/8
												*74	3.00	1.80	1 1/4	1 1/4	3/8
												*76	3.00	1.80	1 1/4	1 1/4	3/8
												*78	3.00	1.80	1 1/4	1 1/4	3/8
												*80	3.00	1.80	1 1/4	1 1/4	3/8
												*120	3.00	1.80	1 1/4	1 1/4	3/8

Patent Involute Cutters for Teeth of Gear Wheels For Use on No. 3 Automatic Gear Cutting Machines

Diameter Pitch	Price, Each		Diameter of Carbon Steel Cutter inches	Diameter of High Speed Cutter inches	Size of Hole, inches	Diameter Pitch	Price, Each		Diameter of Carbon Steel Cutter inches	Diameter of High Speed Cutter inches	Size of Hole, inches
	High Speed	Carbon Steel					High Speed	Carbon Steel			
4	\$12.00	\$5.50	3%	3%	1	18	3.75	2.65	2 3/8	2 3/8	1
*4 1/2	11.00	5.00	1 3/8	3 1/2	1	20	3.65	2.55	2 3/8	2 3/8	1
5	10.00	4.75	3 1/8	3 1/2	1	22	3.55	2.45	2 3/8	2 3/8	1
*5 1/2	9.00	5.00	3 3/8	3 1/2	1	24	3.45	2.35	2 3/8	2 3/8	1
6	8.00	4.30	3	3 1/2	1	*26	3.30	2.25	2 3/8	2 3/8	1
7	7.00	4.10	2 3/4	2 3/4	1	*28	3.30	2.05	2 3/8	2 3/8	1
8	6.00	3.90	2 3/4	2 3/4	1	*30	3.30	2.05	2 3/8	2 3/8	1
9	5.50	3.70	2 3/4	2 3/4	1	*32	3.30	2.05	2 3/8	2 3/8	1
10	5.30	3.60	2 3/4	2 3/4	1	*34	3.30	2.05	2 3/8	2 3/8	1
11	4.95	3.50	2 3/4	2 3/4	1	*36	3.30	2.05	2 3/8	2 3/8	1
*12	4.70	3.35	2 3/8	2 3/8	1	*38	3.30	2.05	2 3/8	2 3/8	1
*13	4.40	3.15	2 3/8	2 3/8	1	*40	3.30	2.05	2 3/8	2 3/8	1
*14	4.15	2.95	2 3/8	2 3/8	1	*44	3.30	2.05	2 3/8	2 3/8	1
*15	4.00	2.85	2 3/8	2 3/8	1	*48	3.30	2.05	2 3/8	2 3/8	1
16	3.85	2.75	2 3/8	2 3/8	1						

Cutters marked * are not kept in stock, but are made to order

Cutters for use on No. 4 Automatic Gear Cutting Machines

Diametral Pitch	Price, Each		Diameter of Carbon Steel Cutter, inches	Diameter of High Speed Cutter, inches	Size of Hole, inches
	High Speed	Carbon Steel			
3	\$18.00	\$8.00	4 1/4	4 1/4	1 1/4
* 3 1/4	16.00	7.00	4 1/4	4 1/4	1 1/4
* 3 3/8	14.00	6.75	4 1/4	4 1/4	1 1/4
3 1/2	13.00	6.50	4	4 3/8	1 1/4
* 4	12.00	6.00	3 3/4	4 1/4	1 1/4
* 4 1/4	11.00	5.50	3 1/4	4	1 1/4
* 4 1/2	10.00	5.00	3 3/8	3 3/4	1 1/4
* 5	9.00	3.00	3 3/8	3 3/4	1 1/4
5 1/4	8.40	4.80	3 1/2	3 3/4	1 1/4
5 1/2	8.80	4.60	3 3/4	3 3/4	1 1/4
6	7.30	4.40	3 1/4	3 1/4	1 1/4
7	6.65	4.20	3 3/8	3 3/4	1 1/4
8	6.00	4.00	3	3	1 1/4
9	5.40	3.80	2 7/8	2 7/8	1 1/4
10	5.10	3.60	2 7/8	2 7/8	1 1/4
11	4.80	3.40	2 7/8	2 7/8	1 1/4
12	4.50	3.20	2 7/8	2 7/8	1 1/4
* 13	4.20	3.00	2 7/8	2 7/8	1 1/4
* 14	4.00	2.80	2 3/4	2 3/4	1 1/4
* 15	4.35	3.10	2 3/4	2 3/4	1 1/4
* 16	4.20	3.00	2 3/4	2 3/4	1 1/4
* 18	4.10	2.90	2 3/4	2 3/4	1 1/4
* 20	4.00	2.80	2 3/4	2 3/4	1 1/4

Patent Involute Cutters for the Teeth of Gear Wheels—(Continued)

For Use on No. 5 Automatic Gear Cutting Machines

Diam- etral Pitch	PRICE EACH		Diam. Carbon Steel Cutter inches	Diam. High Speed Cutter inches	Size of Hole inches
	High Speed	Carbon Steel			
2	\$35.00	\$16.00	5 1/2	5 1/2	1 1/2
*2 1/2	28.00	13.00	5 1/2	5 1/2	1 1/2
2 1/2	23.00	11.00	5 1/2	5 1/2	1 1/2
*2 3/4	20.00	10.00	5 1/2	5 1/2	1 1/2
3	19.00	9.00	5	5	1 1/2
*3 1/2	17.80	8.00	4 1/2	5	1 1/2
*3 3/4	15.40	7.50	4 1/2	4 1/2	1 1/2
4	14.30	7.00	4 1/2	4 1/2	1 1/2
*4 1/2	13.20	6.50	4 1/2	4 1/2	1 1/2
5	12.10	6.00	4	4 1/2	1 1/2
*5 1/2	11.00	5.50	3 3/4	4 1/2	1 1/2
6	10.00	5.30	3 3/4	3 3/4	1 1/2
7	8.25	5.10	3 3/4	3 3/4	1 1/2
*8	7.50	4.90	3 3/4	3 3/4	1 1/2
*9	7.00	4.70	3 3/4	3 3/4	1 1/2
*10	6.50	4.70	3 3/4	3 3/4	1 1/2

For Use on No. 6 Automatic Gear Cutting Machines

Diam- etral Pitch	PRICE EACH		Diam. Carbon Steel Cutter inches	Diam. High Speed Cutter inches	Size of Hole inches
	High Speed	Carbon Steel			
1 1/2	\$45.00	\$24.00	6 1/2	6 1/2	1 1/2
2	42.00	17.00	6 1/2	6 1/2	1 1/2
*2 1/2	33.60	13.50	6 1/2	6 1/2	1 1/2
2 1/2	26.00	11.50	5 7/8	6 1/2	1 1/2
*2 3/4	23.00	10.50	5 7/8	5 7/8	1 1/2
3	22.00	9.50	5 7/8	5 7/8	1 1/2
*3 1/2	20.00	8.50	5 1/4	5 1/2	1 1/2
*3 3/4	16.80	7.75	5	5 1/4	1 1/2
4	15.60	7.50	4 3/4	5	1 1/2
*4 1/2	14.40	7.00	4 3/4	4 3/4	1 1/2
5	13.20	6.50	4 3/4	4 3/4	1 1/2
*5 1/2	12.00	6.00	4 3/4	4 3/4	1 1/2
6	10.80	5.80	4 1/2	4 1/2	1 1/2
*7	9.10	5.60	4 1/2	4 1/2	1 1/2
*8	7.80	5.40	4	4	1 1/2

Cutters for Mitre and Bevel Gears

For Use on No. 13 Automatic Gear Cutting Machines

Diam- etral Pitch	PRICE EACH		Diam. Carbon Steel Cutter inches	Diam. High Speed Cutter inches	Size of Hole inches
	High Speed	Carbon Steel			
4	\$12.00	\$5.50	3 1/2	3 1/2	7/8
5	10.00	4.75	3 1/2	3 1/2	7/8
6	8.00	4.30	3	3 1/2	7/8
7	7.00	4.10	2 3/4	2 3/4	7/8
8	6.00	3.90	2 3/4	2 3/4	7/8
10	5.30	3.60	2 3/4	2 3/4	7/8
12	4.70	3.35	2 1/2	2 1/2	7/8
14	4.15	2.95	2 1/2	2 1/2	7/8
16	3.85	2.75	2 1/2	2 1/2	7/8
20	3.65	2.55	2 1/4	2 1/4	7/8
24	3.45	2.35	2 1/4	2 1/4	7/8

Cutters marked * are not kept in stock but are made to order.

Eight cutters made for each pitch. Three pitch and coarser made in cast iron, and four pitch and coarser in steel, require two cuts to insure accuracy.

Cutters for Mitre and Bevel Gears

Diam- etral Pitch	PRICE EACH		Diam. Carbon Steel Cutter inches	Diam. High Speed Cutter inches	Size of Hole inches
	High Speed	Carbon Steel			
3	\$15.00	\$7.50	4	4	1 1/4
4	12.00	5.50	3 1/2	3 1/2	1 1/4
5	10.00	4.75	3 1/4	3 1/4	1 1/4
6	8.00	4.30	3	3 1/4	1 1/4
7	7.00	4.10	2 3/4	2 3/4	1 1/4
8	6.00	3.90	2 3/4	2 3/4	1 1/4
10	5.00	3.50	2 1/4	2 1/4	1 1/4
12	4.25	3.10	2 1/8	2 1/4	1 1/4
14	3.75	2.70	2	2 1/4	1 1/4
16	3.50	2.50	2	2 1/4	1 1/4
20	3.30	2.30	1 3/4	2	1 1/4
24	3.10	2.10	1 3/4	1 3/4	1 1/4

Cutters for pitches not given in the above list will be made to order.

These cutters are thin enough to cut any bevel gear whose tooth face is not longer than one-third distance from its outer end to point where shaft centre lines meet. This makes tooth thickness at inner end not less than two-thirds that at outer end.

In ordering cutters for bevel gears, if number of teeth in each gear, pitch and length of face are given, also angle of shafts, if different from a right angle, we can select proper cutter to send.

When extra length of face is wanted, requiring an especially thin cutter, length should be specified in order.

Eight cutters are made for each pitch and numbered from 1 to 8.

Improved Stocking Cutter for Involute Gears



These cutters are used for roughing or cutting away surplus stock, leaving the regular gear cutter to finish the work. Heavy cuts at fast speed and coarse feeds can be taken because of the easier cutting action. Greater part of cutting is done by plain teeth. Stepped teeth project beyond outline of plain teeth only enough to break up the chips.

Diam- etral Pitch	PRICE EACH		Diam. Carbon Steel Cutter inches	Diam. High Speed Cutter inches	Size of Hole inches
	High Speed	Carbon Steel			
*1	\$85.00	\$45.00	8 1/2	8 1/2	2
*1 1/2	70.00	38.00	7 3/4	7 3/4	2
*1 1/2	55.00	32.00	7	7	1 1/2
1 1/2	45.00	24.00	6 1/2	6 1/2	1 1/2
2	35.00	16.00	5 3/4	5 3/4	1 1/2
*2 1/2	28.00	13.00	5 3/4	5 3/4	1 1/2
*2 1/2	23.00	11.00	5 3/4	5 3/4	1 1/2
*2 3/4	20.00	10.00	5 1/2	5 1/2	1 1/2
*3	18.00	8.00	4 3/4	4 3/4	1 1/2
*3 1/2	16.00	7.00	4 3/4	4 3/4	1 1/2
*3 3/4	14.00	6.75	4	4 1/4	1 1/2
4	13.00	6.50	3 3/4	4 1/4	1 1/2
*4 1/2	12.00	6.00	3 3/4	4	1 1/2
5	11.00	5.50	3 3/4	3 3/4	1 1/2
*5 1/2	10.00	5.00	3 3/4	3 3/4	1 1/2
6	8.00	4.30	3	3 1/4	1 1/2
7	7.00	4.10	2 3/4	2 3/4	1 1/2
8	6.00	3.90	2 3/4	2 3/4	1 1/2

Cutters marked * are not kept in stock but are made to order

List continued on next page.

Improved Stocking Cutter for Involute Gears

(Continued from preceding page)

For Use on No. 3 Automatic Gear Cutting Machines

Diameter Pitch	PRICE EACH		DIAMETER		Size of Hole inches	Size of Key-way inches
	High Speed	Carbon Steel	Carbon Steel Cutter	High Speed Cutter		
4	\$12.00	\$5.50	3 1/2	3 3/8	1	3/8 x 3/8
*4 1/2	11.00	5.00	3 3/8	3 1/2	1	3/8 x 3/8
5	10.00	4.75	3 1/4	3 1/4	1	3/8 x 3/8
*5 1/2	9.00	4.50	3 1/8	3 1/4	1	3/8 x 3/8
6	8.00	4.30	3	3 1/8	1	3/8 x 3/8
7	7.00	4.10	2 7/8	2 7/8	1	3/8 x 3/8
8	6.00	3.90	2 7/8	2 7/8	1	3/8 x 3/8

For Use on No. 4 Automatic Gear Cutting Machines

3	\$18.00	\$8.00	4 3/8	4 1/4	1 1/4	3/8 x 3/8
*3 1/2	14.00	6.75	4 1/8	4 1/2	1 1/4	3/8 x 3/8
4	12.00	6.00	3 7/8	4 1/4	1 1/4	3/8 x 3/8
*4 1/2	11.00	5.50	3 3/4	4	1 1/4	3/8 x 3/8
5	10.00	5.00	3 5/8	3 3/4	1 1/4	3/8 x 3/8
*5 1/2	9.00	5.00	3 5/8	3 3/4	1 1/4	3/8 x 3/8
6	8.40	4.80	3 1/2	3 1/2	1 1/4	3/8 x 3/8
7	8.00	4.60	3 3/8	3 3/8	1 1/4	3/8 x 3/8
8	7.30	4.40	3 3/4	3 3/4	1 1/4	3/8 x 3/8

For Use on No. 5 Automatic Gear Cutting Machines

2	\$35.00	\$16.00	5 1/4	5 1/4	1 1/2	3/8 x 3/8
*2 1/4	28.00	13.00	5 3/4	5 3/4	1 1/2	3/8 x 3/8
2 1/2	23.00	11.00	5 1/2	5 3/4	1 1/2	3/8 x 3/8
*2 3/4	20.00	10.00	5 1/8	5 1/2	1 1/2	3/8 x 3/8
3	19.00	9.00	5	5 1/4	1 1/2	3/8 x 3/8
*3 1/4	17.80	8.00	4 3/4	5	1 1/2	3/8 x 3/8
3 1/2	15.40	7.50	4 5/8	4 7/8	1 1/2	3/8 x 3/8
*3 3/4	14.30	7.00	4 3/8	4 3/8	1 1/2	3/8 x 3/8
4	13.20	6.50	4 1/4	4 1/2	1 1/2	3/8 x 3/8
*4 1/2	12.10	6.00	4 1/8	4 1/8	1 1/2	3/8 x 3/8
5	11.00	5.50	4	4 1/4	1 1/2	3/8 x 3/8
*5 1/2	10.00	5.50	3 7/8	4 1/8	1 1/2	3/8 x 3/8
6	9.00	5.30	3 3/4	3 7/8	1 1/2	3/8 x 3/8
7	8.25	5.10	3 5/8	3 5/8	1 1/2	3/8 x 3/8
8	7.50	4.90	3 1/2	3 1/2	1 1/2	3/8 x 3/8

For Use on No. 6 Automatic Gear Cutting Machines

1 3/4	\$45.00	\$24.00	6 1/2	6 1/2	1 3/4	3/8 x 3/8
2	42.00	17.00	6 1/2	6 1/2	1 3/4	3/8 x 3/8
*2 1/4	33.60	13.50	6 1/4	6 1/4	1 3/4	3/8 x 3/8
2 1/2	26.00	11.50	5 7/8	6 1/8	1 3/4	3/8 x 3/8
*2 3/4	23.00	10.50	5 5/8	5 7/8	1 3/4	3/8 x 3/8
3	22.00	9.50	5 3/8	5 5/8	1 3/4	3/8 x 3/8
*3 1/4	20.00	8.50	5 1/4	5 1/4	1 3/4	3/8 x 3/8
3 1/2	16.80	7.75	5	5 1/4	1 3/4	3/8 x 3/8
*3 3/4	15.60	7.50	4 3/4	5	1 3/4	3/8 x 3/8
4	14.40	7.00	4 5/8	4 3/4	1 3/4	3/8 x 3/8
*4 1/2	13.20	6.50	4 1/2	4 3/8	1 3/4	3/8 x 3/8
5	12.00	6.00	4 3/8	4 3/8	1 3/4	3/8 x 3/8
*5 1/2	10.80	6.00	4 3/8	4 3/8	1 3/4	3/8 x 3/8
6	10.40	5.80	4 1/4	4 1/4	1 3/4	3/8 x 3/8
*7	9.10	5.60	4 1/8	4 1/8	1 3/4	3/8 x 3/8
8	7.80	5.40	4	4	1 3/4	3/8 x 3/8

Cutters marked * are not kept in stock, but are made to order.

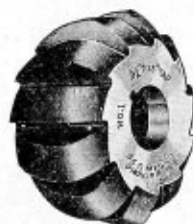


Cutters For Making Twist Drills

These cutters can be sharpened by grinding without changing their form. In ordering always give number.

No.	Cutter No.	PRICE EACH		Diameter of Drill	Dia. of Circle Made by Cutter	Diameter of Cutter	Hole in Cutter
		High Speed	Carbon Steel				
L-100	1	\$2.15	\$1.50	1/8	.06	2	1
L-101	2	2.40	1.70	1/8	.08	2	1
L-102	3	2.70	1.90	1/8	.11	2	1
L-103	4	3.00	2.10	1/8	.15	2	1
L-104	5	3.35	2.30	1/8	.19	2 1/4	1
L-105	6	3.50	2.40	3/8	.23	2 1/4	1
L-106	7	3.80	2.60	1/2	.27	2 1/4	1
L-107	8	4.10	2.80	5/8	.31	2 1/4	1
L-108	9	4.45	3.00	3/4	.35	2 3/4	1
L-109	10	4.75	3.20	5/8	.39	2 3/4	1
L-110	11	5.05	3.40	1 1/8	.44	2 3/4	1
L-111	12	5.40	3.60	3/4	.50	2 1/2	1
L-112	13	5.70	3.80	1 1/8	.56	2 1/2	1
L-113	14	6.20	4.00	7/8	.62	2 3/4	1
L-114	15	6.55	4.20	1 1/8	.70	2 3/4	1
L-115	16	7.20	4.50	1	.77	3	1
L-116	17	8.20	5.00	1 1/8	.85	3	1

Cutters for Grooving Taps

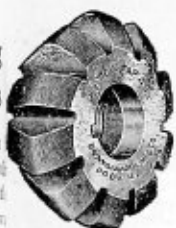


These cutters are not suitable for fluting reamers.

They can be sharpened without changing their form.

In ordering always state number of cutter.

No.	Cutter No.	PRICE EACH		Diameter of Tap	Diameter of Cutter	Hole in Cutter
		High Speed	Carbon Steel			
L-50	1	\$2.85	\$2.00	0 to 1/8	2	1
L-51	2	3.00	2.10	1/8 to 1/4	2	1
L-52	3	3.15	2.20	1/4 to 3/8	2 1/8	1
L-53	4	3.55	2.40	3/8 to 5/8	2 1/4	1
L-54	5	3.70	2.40	1/2 to 3/4	2 3/8	1
L-55	6	4.30	2.70	3/4 to 1 1/4	2 1/2	1
L-56	7	4.45	2.70	1 1/8 to 1 1/2	2 5/8	1
L-57	8	5.25	3.00	1 1/2 to 2	2 7/8	1
L-58	9	5.50	3.40	2 1/8 to 2 1/2	3 1/8	1
L-59	10	6.00	3.80	2 1/2 to 3	3 3/8	1



Cutters for Grooving Taps and Reamers

These cutters can be sharpened by grinding without changing their form.

In ordering these cutters always give catalog number.

For Grooving Taps

Catalogue No.	Cutter No.	Price Each		Diameter of Tap, Inches	Number of Teeth in Tap	Diameter of Cutter, inches	Hole in Cutter
		High Speed Steel Cutters, Price each	Carbon Steel Cutters, Price each				
L-10T	1	\$2.85	\$2.00	0 to 1/4	4	1/4	1
L-11T	2	3.00	2.10	1/4 to 3/8	4	3/8	1
L-12T	3	3.20	2.20	3/8 to 1/2	4	1/2	1
L-13T	4	3.60	2.40	1/2 to 3/4	4	3/4	1
L-14T	5	3.70	2.40	3/4 to 1	4	1	1
L-15T	6	4.30	2.70	1 to 1 1/4	4	1 1/4	1
L-16T	7	4.55	2.70	1 1/4 to 1 1/2	4	1 1/2	1
L-17T	8	5.30	3.00	1 1/2 to 2	4	2	1

For Grooving Reamers

These cutters can also be used for fluting reamers, for which purpose it is only necessary to cut one or more grooves of a less depth in order to flute evenly.

Catalogue No.	Cutter No.	Price Each		Diameter of Reamer, Inches	Number of Teeth in Reamer	Diameter of Cutter, inches	Hole in Cutter
		High Speed Steel Cutters, Price each	Carbon Steel Cutters, Price each				
L-10R	1	\$2.85	\$2.00	1/4 to 1/4	6	1/4	1
L-11R	2	3.00	2.10	1/4 to 3/8	6	3/8	1
L-12R	3	3.20	2.20	3/8 to 1/2	6	1/2	1
L-13R	4	3.60	2.40	1/2 to 3/4	6 to 8	3/4	1
L-14R	5	4.30	2.70	3/4 to 1	8 to 10	1	1
L-15R	6	4.55	2.70	1 to 1 1/4	10	1 1/4	1

Cutters for Fluting Reamers

Cut shows a form of cutter which makes a tooth that allows chips to be removed more readily and has greater strength than the form made by cutters for grooving taps and reamers.

Always state number of cutter wanted.

Catalogue No.	Cutter No.	Price Each		Diameter of Reamer, Inches	Number of Teeth	Hole in Cutter
		High Speed Steel Cutters, Price each	Carbon Steel Cutters, Price each			
L-75	1	\$3.10	\$2.00	1/4 to 1/4	6	1
L-76	2	3.10	2.10	1/4 to 3/8	6	1
L-77	3	3.30	2.20	3/8 to 1/2	6	1
L-78	4	3.60	2.40	1/2 to 3/4	6 to 8	1
L-79	5	3.75	2.40	3/4 to 1	8	1
L-80	6	4.15	2.70	1 to 1 1/4	10	1
L-81	7	4.30	2.70	1 1/4 to 1 1/2	12	1
L-82	8	4.75	3.00	1 1/2 to 1 3/4	14	1
L-83	9	5.20	3.30	1 3/4 to 2	14	1
L-84	10	5.70	3.70	2 to 2 1/4	14 to 16	1



Angular Cutters

We keep in stock Angular Cutters of 45°, 50°, 60°, 70° and 80° angle, both right and left hand, suitable for cutting the teeth of cutters and mills.

Always state degree wanted, and whether right or left hand.

Number	Price Each		Diameter, Inches	Thickness, Inches	Hole, Inches
	High Speed	Carbon			
J-10	\$4.10	\$2.65	2 1/2	1/2	3/8
J-11	4.45	2.80	3 1/4	1/2	1
J-12	5.40	3.35	3	1/2	1 1/4
J-13	6.15	3.75	3 1/4	1/2	1 1/2

Angular Cutters with Threaded Holes

Cutters are 60° angle and are made right and left hand.

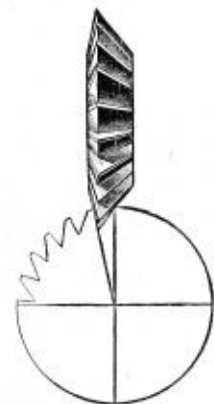
No.	High Speed Steel Cutters, Price Each	Carbon Steel Cutters, Price Each	Diameter, Inches	Thickness, Inches	Hole, Inches	Thread
J-25	\$3.15	\$2.25	1 1/4	7/16	3/8	20 L
J-26	3.50	2.50	1 1/4	7/16	1/2	16 L



Double Angle Cutters

We carry in stock cutters of 45°, 60° or 90° included angle.

No.	Price Each		Diameter, Inches	Thickness, Inches	Hole, Inches
	High Speed	Carbon			
J-100	\$4.10	\$2.65	2 1/2	1/2	3/8
J-101	4.45	2.80	3 1/4	1/2	1
J-102	5.40	3.35	3	1/2	1 1/4



Cutters for Spiral Mills

These cutters are especially adapted to the cutting of spiral mills, either 40°, 48° or 53° angle on one side and 12° on the other.

The cut illustrates a right hand cutter at work, in the position required in cutting the teeth of a spiral cutter.

Right and left hand cutters carried in stock. In ordering specify what degree and whether Right or Left Hand.

No.	Price Each		Diameter, Inches	Thickness, Inches	Hole
	High Speed	Carbon			
J-150	\$4.10	\$2.65	2 1/2	1/2	3/8
J-151	4.45	2.80	3 1/4	1/2	1
J-152	5.40	3.35	3	1/2	1 1/4
*J-153	6.15	3.75	3 1/4	1/2	1 1/2

*Can be furnished 40° on one side and 12° on the other, or 53° on one side and 12° on the other.

Convex and Concave Cutters

For Milling Half Circles

These Cutters can be sharpened by grinding without changing their outline.



Convex



Concave

Always state whether convex or concave is wanted.

No.	Price Each		Price Each		Diam. of Circle, inches	Diam. of Cutter, inches	Size of Hole, in.
	Convex		Concave				
	High Speed	Carbon Steel	High Speed	Carbon Steel			
C-10	\$2.85	\$2.00	\$3.50	\$2.40	1 1/2	2	7/8
C-11	2.90	2.25	3.95	2.70	1 3/4	2	1
C-12	3.20	2.50	4.40	3.00	1 7/8	2	1 1/8
C-13	4.10	2.80	5.00	3.35	2	2 1/4	1 1/4
C-14	4.55	3.10	5.55	3.70	2 1/8	2 1/4	1 1/2
C-15	4.95	3.35	6.00	4.00	2 1/4	2 1/4	1 3/4
C-16	5.35	3.60	6.50	4.30	2 1/2	2 1/4	2
C-17	5.95	4.00	7.85	4.80	2 3/4	2 1/4	2 1/8
C-18	7.10	4.40	8.75	5.25	3	3	2 1/4
C-19	8.00	4.80	10.00	5.75	3 1/8	3 1/4	2 1/2
C-20	8.80	5.25	11.00	6.30	3 1/2	3 1/4	2 3/4
C-21	9.90	5.75	12.50	6.90	1 1/4	4	1 1/2
C-22	10.80	6.25	13.60	7.50	1 1/2	4	1 3/4
C-23	12.20	7.00	15.70	8.40	1 3/4	4 1/4	1 3/4
C-24	13.90	7.75	17.25	9.30	1 7/8	4 1/4	1 3/4

Sprocket Wheel Cutters

For Block Center Chains

We carry in stock a form of Sprocket Wheel Cutter for the ordinary 1-inch pitch chain.

The cutters for the smaller sized wheels are for cutting a curved form of tooth, to prevent the chain from mounting the sprocket, while the cutters for the larger sized wheels make a straight sided tooth.

Cutters of special forms, or to cut two teeth at one time, are made to order.



No. of Teeth of Sprocket	High Speed		Carbon Steel		Diam. of Cutter, inches	Size of Hole, inches
	Price Single Cutter	Price Double Cutter	Price Single Cutter	Price Double Cutter		
6	\$9.45	\$20.00	\$6.00	\$13.00	2 1/4	1
7	9.45	20.00	6.00	13.00	2 1/4	1
8	9.45	20.00	6.00	13.00	2 1/4	1
9	9.45	20.00	6.00	13.00	2 1/4	1
10 and 11	9.45	20.00	6.00	13.00	2 1/4	1
12 and 13	9.45	20.00	6.00	13.00	2 1/4	1
14 to 16	9.45	20.00	6.00	13.00	2 1/4	1
17 to 20	9.45	20.00	6.00	13.00	2 1/4	1
21 and over	9.45	20.00	6.00	13.00	2 1/4	1

Corner-Rounding Cutters



Left Hand



Double



Right Hand

These cutters have side as well as radical clearance and can be ground without changing their outline.

In ordering state whether double or single cutter is wanted and if single cutters, state whether Right or Left Hand is wanted.

No.	High Speed		Carbon Steel		Diam. of Cutter, inches	Diam. of Cutter, inches	Size of Hole, in.
	Price Single Cutter	Price Double Cutter	Price Single Cutter	Price Double Cutter			
C-100	\$2.90	\$3.50	\$2.00	\$2.40	1 1/2	2	7/8
C-101	3.30	3.95	2.25	2.70	1 3/4	2	1
C-102	3.65	4.40	2.50	3.00	1 7/8	2	1 1/8
C-103	4.05	4.95	2.70	3.35	2	2 1/4	1 1/4
C-104	4.35	5.50	2.90	3.70	2 1/8	2 1/4	1 1/2
C-105	4.65	6.00	3.10	4.00	2 1/4	2 1/4	1 3/4
C-106	4.95	6.45	3.30	4.30	2 1/2	2 1/4	2
C-107	5.70	7.65	3.50	4.80	2 3/4	3	2 1/8
C-108	5.90	8.65	3.70	5.25	3	3 1/4	2 1/4
C-109	6.35	9.75	3.90	5.75	3 1/8	3 1/4	2 1/2
C-110	6.80	11.00	4.20	6.30	3 1/2	3 1/4	2 3/4
C-111	8.10	12.45	4.50	6.90	3 3/4	4	2 3/4
C-112	9.00	13.50	5.00	7.50	4	4 1/4	2 3/4
C-113	10.40	15.40	5.75	8.40	4 1/4	4 1/4	3
C-114	11.80	17.00	6.50	9.30	4 1/2	4 1/4	3 1/4

Sprocket Wheel Cutters

For Roller Chains and Block Centre Chains

We furnish at short notice Sprocket Wheel Cutters for Roller Chains and Block Centre Chains.

Cutters for Roller Chains

Circular Pitch, inches	High Speed Steel Cutters Price Each	Carbon Steel Cutters Price Each	Diameter of Rolls, inches	Diam. of Cutter, inches	Hole in Cutter, inches
1 1/2	\$9.00	\$6.00	.305 or .308	2 1/4	1
1 3/4	9.60	6.25	.401	3	1
2	10.30	6.50	.47	3 1/4	1
2 1/4	11.65	7.00	.5625	3 3/4	1
2 1/2	11.65	7.00	.5625 or .625	3 3/4	1
2 3/4	12.95	7.50	.625 or .750	3 3/4	1 1/4
3	14.85	8.00	.75 or .875	4 1/4	1 1/4
3 1/4	20.00	10.00		4 1/4	1 1/4
4	24.00	12.00		5	1 1/4

In ordering specify the number of teeth in the sprocket and the diameter of the roller.

"Whitney Standard."

Cutters for Block Centre Chains

Circular Pitch, inches	High Speed Steel Cutters Price Each	Carbon Steel Cutters Price Each	Thickness of Block, inches	Diam. of Cutter, inches	Centre to Centre of Block, inches	Hole in Centre, inches
1 1/2	\$12.90	\$7.50	.4375	3 1/4	.5313	1 1/4
1 3/4	14.35	8.00	.4732	3 1/4	.5625	1 1/4

Nine Cutters are made for each pitch, for Nos. of teeth as follows: 8, 9, 10 and 11, 12 and 13, 14 to 16, 17 to 20, 21 to 34, 35 to 79, 80 and over.

Collets for Milling and Gear Cutting Machines



Style 2A. Similar to Style 2, but no threaded hole.
Style 3A. Similar to Style 3, but no threaded hole.
Style 4A. Straight hole through, front end 60° taper.

Mark	Price	Outside Taper	Inside Taper	Style	Collet to Spindle in.	Diameter of Threaded Hole in.
LL	\$1.50	6	2	4	1 1/2	
A	2.00	7	4	1	1 1/2	3/8, 16, L. H.
J	2.00	7	4	2	2 1/2	
N	2.00	7	5	1	2 1/2	3/8, 16, L. H.
R	2.00	7	5	2	2 1/2	
C	3.00	9	5	1	2 1/2	
D	2.75	9	5	1	2 1/2	
K	2.75	9	5	2	2 1/2	1/8, 14, L. H.
KK	3.25	9	7	1	2 1/2	
RR	3.25	9	7	2	2 1/2	1/8, 14, L. H.
EE	3.50	10	5	1	2 1/2	
MM	3.50	10	6	4A	3 1/2	
DD	3.50	10	7	1	2 1/2	
E	3.50	10	7	1	1 1/2	
BB	4.00	10	7	2	1 1/2	1/2, 14, L. H.
Z	4.00	10	7	2A	1 1/2	1/2, 14, L. H.
F	4.00	10	9	1	1 1/2	
FF	4.50	10	9	2	1 1/2	
Q	5.00	11	7	1	1 1/2	
G	5.25	11	9	1	2 1/2	3/8, 12, L. H.
O	6.00	11	9	2	2 1/2	3/8, 12, L. H.
H	6.00	11	9	3	1 1/2	
GG	6.00	11	10	3A	2 1/2	3/8, 12, L. H.
SS	6.50	12	9	3A	1 1/2	
T	6.50	12	10	2	2 1/2	3/8, 12 R. H.
V	6.50	11	10	1	1 1/2	
P	6.50	12	10	2A	1 1/2	
PP	6.50	12	11	2	1 1/2	3/8, 12, R. H.
VV	6.75	12	11	3A	1 1/2	
TT	8.00	12	9	3	1 1/2	3/8, 12, L. H.
UU	8.00	14	10	2	2 1/2	3/8, 12, R. H.
WW	8.00	14	11	2	2 1/2	3/8, 12, R. H.
W	10.00	16	11	2	2 1/2	3/8, 10, R. H.
XX	10.00	16	12	2	2 1/2	3/8, 10, R. H.
X	11.50	18	11	2	2 1/2	1, 10, R. H.
YY	13.00	18	14	2	2 1/2	1, 10, R. H.
Y						

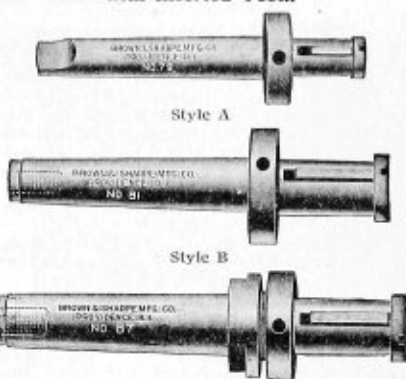
Arbors for Shell End Mills



No. of Arbor	Price	No. of Taper	Diameter of Arbor	Diameter Mills Arbor will take	Style
89	\$4.50	7	1 1/2"	1 1/2" to 1 1/2"	A
90	4.50	9	1 1/2"	1 1/2" to 2 1/2"	A
91	4.75	9	1 1/2"	2 1/2" to 3"	A
92	4.50	9	1 1/2"	1 1/2" to 1 1/2"	B
93	4.50	9	1 1/2"	1 1/2" to 1 1/2"	A
96	4.50	9	1 1/2"	1 1/2" to 2 1/2"	B
105	4.50	9	1 1/2"	2 1/2" to 3"	F
94	4.75	10	1 1/2"	1 1/2" to 2 1/2"	A
95	5.25	10	1 1/2"	2 1/2" to 3"	A
97	5.25	10	1 1/2"	1 1/2" to 2 1/2"	B
98	5.50	10	1 1/2"	2 1/2" to 3"	B
99	5.50	11	1 1/2"	1 1/2" to 2 1/2"	A
100	5.75	11	1 1/2"	2 1/2" to 3"	A
101	5.50	11	1 1/2"	1 1/2" to 2 1/2"	B
102	5.75	11	1 1/2"	2 1/2" to 3"	B
103	6.00	12	1 1/2"	1 1/2" to 2 1/2"	B
104	6.25	12	1 1/2"	2 1/2" to 3"	B

In ordering, state whether Arbor is for R. H. or L. H. Mill. Morse Taper furnished when desired.

Arbors for Face Milling Cutters with Inserted Teeth



Style D. Similar to Style C, but no threaded hole.

No. of Arbor	Price	No. of Taper of Shank	No. of Taper for Mill	Style
79	\$ 8.00	10	10	A
82	10.00	11	12	A
81	10.00	11	12	B
80	12.00	11	12	C
82	12.00	11	12	C
87	12.00	12	12	C
84	12.00	11	12	D
85	12.00	12	12	D
86	12.00	12	10	C

Screw Slotting Cutter Arbors



These Arbors are for use with screw slotting cutters and are adapted for use on centers. The following sizes are carried in stock: 3/8-in., 1/2-in., 5/8-in., 3/4-in., 1-in., 1 1/2-in.
 Price, each \$3.50

Collet Blanks



Price Includes Turning Plug and Knockout Key.

Diameter	Price	Length Over All	No. of Taper Hole
3/8	\$1.50	5 1/2	4
1 1/2	2.00	8 1/2	5
1 1/2	2.50	10	7
1 1/2	3.50	12	9
2	4.50	14	10

Standard Taper Holes

To find number of taper hole in spindle, measure diameter of large end of hole and corresponding taper may be found in the following list:

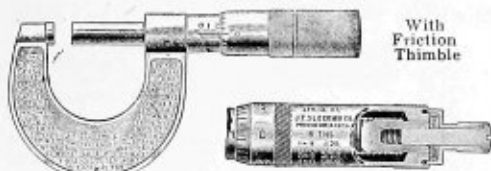
No. of Taper	Approximate Diameter at Large End	No. of Taper	Approximate Diameter at Large End
6	1 1/2	12	1 1/2
7	1 1/2	14	2 1/2
9	1 1/2	16	2 1/2
10	1 1/2	18	3 1/2
11	1 1/2		

Practical Mechanical Handbooks

Modern Estimator and Contractors' Guide. For pricing all Builders' work. By Fred T. Hodgson, F. A. I. C. 318 pages. 100 illustrations. 12mo Cloth. New Edition.....	1.50
Builders' Architectural Drawing Self-Taught. By Fred T. Hodgson, F. A. I. C. 336 pages. 250 illustrations and 18 folding plates. 12mo Cloth.....	2.00
Concretes, Cements, Mortars, Plasters and Stuccos. How to make and how to use them. By Fred T. Hodgson, F. A. I. C. 520 pages. 150 illustrations. Large 12mo Cloth.....	1.50
Practical Bricklaying Self-Taught. By Fred T. Hodgson, F. A. I. C. 277 pages. 300 illustrations, 12mo Cloth.....	1.00
20th Century Bricklayer and Stone Masons' Assistant. By Fred T. Hodgson, F. A. I. C. 305 pages. 450 illustrations. 12mo Cloth.....	1.50
The Modern Painter's Cyclopedia. By F. Maire, Head instructor at the Chicago School of Painting, Decorating and Paperhanging. Illustrated, 12mo, Cloth, decorative cover in gold and inks. Price.....	1.50
Modern Electrical Construction. New enlarged Edition. By Horstman and Touseley. Treats entirely on practical electrical work. 440 pages. 173 diagrams. Pocket, Leather.....	1.50
Electrical Wiring and Construction Tables. By Horstman and Touseley. For estimating cost of electrical equipment. Complete with diagrams and tables. Pocket, Leather.....	1.50
Modern Wiring Diagrams and Descriptions. Revised and enlarged edition. By Horstman and Touseley. Standard authority on electrical wiring of all kinds. 308 pages. 200 illustrations. Leather, Pocket.....	1.50
Dynamo Tending or Electricity for Steam Engineers. By Horstman and Touseley. 210 pages. 100 illustrations. 12mo Cloth.....	1.50
Handy Vest Pocket Electrical Dictionary. By Wm. L. Weber, M. E. Concise definitions of 4,800 words, terms and phrases. 225 pages. Illustrated. Cloth Indexed.....	.24
Leather, gold edges, Indexed.....	.50
Easy Electrical Experiments and How to Make Them. For beginners. By L. P. Dickinson. 220 pages. 110 illustrations. 12mo Cloth.....	1.00
Electricity Made Simple. By C. C. Haskins. For beginners. 233 pages. 108 illustrations. 12mo Cloth.....	1.00
20th Century Machine Shop Practice. By L. Elliott Brookes. Latest and most practical work on modern machine shop practice. 650 pages. 400 illustrations. 12mo Cloth.....	2.00
Treatise on Milling Machines. Edition of 1910. This work describes the construction and use of Milling Machines. Fully illustrated. Cardboard.....	2.00
Construction and Use of Automatic Screw Machines. This book is published to assist those who are not familiar with the construction and use of the Automatic Screw Machine.....	1.00
Construction and Use of Universal Grinding Machines. Edition of 1909. This work describes the construction and use of Universal Grinding Machines, as made by us. Fully illustrated. Cardboard.....	.50
Use of Plain Grinding Machines. Edition of 1910. This work describes the construction and use of Plain Grinding Machines. Fully illustrated. Cardboard.....	.50
Practical Treatise on Gearing. Edition of 1907. This book, with its tables and illustrations, is written for those in practical life, who wish to obtain practical explanations and directions in making Gear Wheels. Cloth .75; Cardboard.....	2.00
Formulas in Gearing. Edition of 1907. This work supplements the "Practical Treatise on Gearing" and contains formulas for solving the problems that occur in gearing. Cloth.....	3.00
Hand Book for Apprenticed Machinists. Edition of 1907. This book, illustrated, is for learners in the use of Machine Tools. The present edition has been carefully revised and enlarged. Cloth.....	1.00
Pattern Making and Foundry Practice. By L. H. Hand. Especially prepared for pattern makers and foundries. 145 pages. 100 illustrations. Leather, Pocket.....	1.50
Complete Examination Questions and Answers for Marine and Stationary Engineers. By Calvin F. Swingle, M. E. A complete guide for engineers. 367 pages. 212 illustrations. Leather.....	1.50
Steam Boilers, Their Construction, Care and Operation. With questions and answers. By Calvin F. Swingle, M. E. 190 pages. 126 illustrations. Leather, Pocket.....	1.50
The Calculation of Horse Power Made Easy. By L. Elliott Brookes. Size, 5x7 1/2. 80 pages, illustrated. Cloth.....	.75
Modern Sheet Metal Workers' Instructor. By Joseph H. Rose. Useful information for sheet metal workers. 310 pages. 200 illustrations. Large 12mo, Cloth.....	2.00
Practical Up-to-date Plumbing. By George B. Clow. 319 pages. 250 illustrations. Large 12mo, Cloth.....	1.50
Johnson's Handy Manual. For plumbers, steam fitters, architects and engineers. A practical book for practical men. Revised Edition. Price.....	2.00
Modern Hot Water Heat, Steam and Gas Fitting. By Wm. Donaldson. 250 pages. 100 illustrations. Cloth.....	1.50
Practical Gas and Oil Engine Hand Book. A manual on the care, maintenance and repairs of gas and oil engines. By L. E. Brookes. 232 pages. 70 illustrations. Cloth, New Edition.....	1.00
Leather.....	1.50
Traction Farming and Traction Engineering. Gasoline-Alcohol-Kerosene. By James H. Stephenson, M. E. A practical handbook for the owners and operators of gas and oil engines on the farm. 330 pages. 151 illustrations. 12mo Cloth.....	1.50
20th Century Toolsmith and Steel Worker. By H. Holford. For all mechanics connected with steel and tool manufacture. 240 pages. 130 illustrations. 12mo Cloth.....	1.50
Practical Hand Book for Millwrights. By Calvin F. Swingle, M. E. Large 12mo, Cloth, decorative cover, in gold and inks, fully illustrated. Price.....	2.00
Modern Locomotive Engineering. With questions and answers. By Calvin F. Swingle, M. E. 825 pages. 350 illustrations. Leather, Gold edges, pocket.....	3.00
Modern Air Brake Practice. Its Use and Abuse. With questions and answers. Treats on both Westinghouse and New York systems. By Frank H. Dukessmith and Calvin F. Swingle, M. E. 400 pages. 150 illustrations, including seven folding plates. 12mo Cloth.....	1.50
20th Century Hand Book for Steam Engineers and Electricians. By Calvin F. Swingle, M. E. 1,500 pages. 350 illustrations. Leather, pocket, gold edges.....	3.00
Modern Blacksmithing. Rational Horseshoeing and Wagon Making. By J. G. Holmstrom. 225 pages. 75 illustrations. 12mo Cloth, New Edition.....	1.00
The Automobile Mechanician's Catechism. Over 400 questions and answers. Illustrated with 3 large folding charts with all parts fully and correctly numbered. By Calvin F. Swingle, M. E. Pocket Edition, 16mo. Full leather, round corners, red edges, stamped in gold, over 100 pages.....	1.50
The Automobile Handbook. Giving care, construction, operation of electric and gasoline automobiles. By L. E. Brooks, M. E. 720 pages. 320 illustrations. Leather.....	2.00

Slocumb Micrometers

Micrometer Caliper No. 26 one inch. English or Metric Measure



Detail of Friction Stop

Furnished with or without friction stop, also with friction thimble. Friction stop enables an accurate measurement to be made, and does not have the clicking action of other ratchet stop micrometer. Friction thimble is made similarly to the friction stop but has a sleeve under thimble which slips when more than a certain pressure is applied. The friction thimble extends from end of barrel to white line. Frame is made of I section drop forged tool steel, giving strength and rigidity. Measures all sizes up to 1 inch by thousandths.

No. 26P—Without Friction Stop. Price Each. \$5.00

No. 26F—With Friction Stop. Price Each. \$5.50

No. 26T—With Friction Thimble. Price Each. \$6.00

Graduated to read to 10,000ths, extra. 1.00

Micrometer Caliper No. 25 Pattern

English or Metric Measure



Frame is I section drop forged tool steel, finished in black enamel. Decimal equivalents stamped on thimble. Measures all sizes by 1/1000 of an inch.

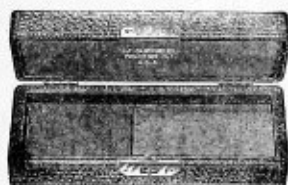
Inches	Without Friction Stop	With Friction Stop	Inches	Without Friction Stop	With Friction Stop
0 to 1/2	\$3.50	\$4.00	6 to 7	\$ 8.00	\$ 8.50
0 to 1	4.00	4.50	7 to 8	8.50	9.00
1 to 2	4.00	4.50	8 to 9	9.00	9.50
2 to 3	5.00	5.50	9 to 10	9.50	10.00
3 to 4	5.50	6.00	10 to 11	10.00	10.50
4 to 5	6.00	6.50	11 to 12	11.50	12.00
5 to 6	7.00	7.50			

All sizes up to 6 inch graduated to read to 10,000ths, extra. \$1.00

All sizes of No. 26 or 25 micrometers can be furnished in the Metric Measure at the same price.

Morocco Cases

For Micrometers



These cases are covered with genuine Morocco leather and lined with velvet.

No. 61 for 1 inch Micrometers. Price each. \$0.75

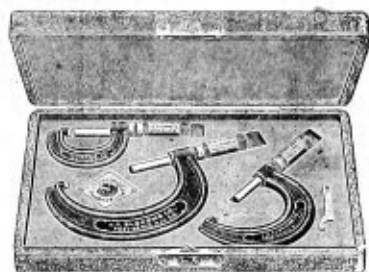
No. 62 for 2 inch Micrometers. Price each. 1.00

No. 63 for 3 inch Micrometers. Price each. 1.00

No. 64 for 4 inch Caliper. Price each. 1.75

Micrometer Sets

English or Metric Measure



No. 21. Range 0 to 3 Inches

Set consists of 3 Micrometers. No. 25 Pattern, ranging from 0 to 3 inch, graduated to read to thousandths of an inch. Case is velvet lined, morocco covered, dimensions 9 1/2 x 6 3/4 x 1 1/2 inches.

Also furnished in the Metric to measure from 0 to 75 millimeters by hundredths of a millimeter.

Price each, without friction stops. \$14.30

Price each, with friction stops. 15.80

Price of case only. 1.25

Graduated to read to 10,000ths, extra. 3.00

No. 19. Range 0 to 6 Inches

Set consists of 6 Micrometers, No. 25 Pattern, ranging from 0 to 6 inches, graduated to read to thousandths of an inch. Case is quartered oak, neatly finished and provided with lock and key. Size 14 1/4 x 5 1/4 x 7 inches. Micrometers are set with frames down, all being on an even plane at top.

Also furnished in the metric to measure from 0 to 150 millimeters by hundredths of a millimeter.

Price each, without friction stops. \$36.00

Price each, with friction stops. 39.00

Price of case only. 3.25

Graduated to read to 10,000ths of an inch. 6.00

Almond Micrometer



This micrometer is made by the manufacturers of the Almond Chuck. It is of correct design, well made and guaranteed accurate.

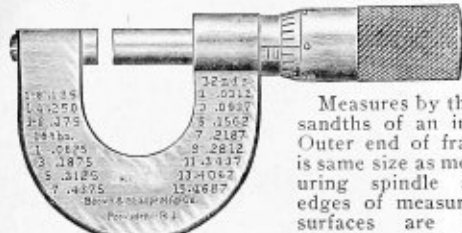
It is only furnished plain, having no ratchet stop or lock nut.

No. 140. For measurements by thousandths up to one inch. \$5.50

No. 140T. For measurements by ten thousandths 1/2 up to one inch. 6.50

Brown & Sharpe Tools

No. 5 Micrometer Caliper

English or Metric Measure. Range 0 to $\frac{1}{2}$ inch

Measures by thousandths of an inch. Outer end of frame is same size as measuring spindle and edges of measuring surfaces are left square. This tool

also made in the metric to measure all sizes less than 13 millimeters by hundredths of a millimeter, table of decimal equivalents being omitted. Provided with clamp ring, which clamps spindle and preserves setting.

Price each, regular\$4.50
Price each with ratchet stop 5.00
Price of Morocco Case65

No. 7 Micrometer Caliper

English Measure Only. Range 0 to $\frac{1}{2}$ inch

Differs from No. 5 only in being graduated to ten-thousandths, as well as thousandths of an inch.

Price each, regular\$6.00
Price each with ratchet stop 6.50
Price of Morocco Case65

No. 8 Micrometer Caliper

English or Metric Measure. Range 0 to 1 inch



Measures all sizes less than one inch by thousandths. Adjustment of measuring screw is made by an adjustable threaded nut which produces the necessary friction

by binding thread evenly on the angle. Provided with a Clamp Ring which clamps spindle and preserves the setting. Also made in the metric to measure all sizes less than 25 millimeters by hundredths of a millimeter; table of decimal equivalents being omitted.

Price each, regular\$6.00
Price each with ratchet stop 6.50
Price of Morocco Case65

No. 10 Micrometer Caliper

English Measure Only. Range 0 to 1 inch

Differs from No. 8 only in being graduated to read to ten thousandths of an inch by a vernier on front of barrel.

Price each, regular\$7.00
Price each with ratchet stop 7.50
Price of Morocco Case65

Micrometers always furnished without ratchet stop or case unless otherwise ordered.

Rex Micrometer Caliper

English or Metric Measure. Range 0 to 1 inch



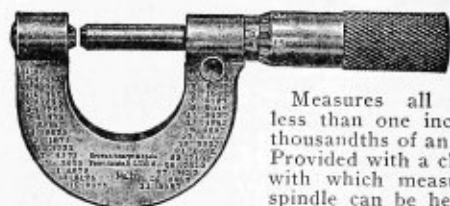
Measure all sizes less than one inch by hundredths of a millimeter. Made to meet the demand for an inexpensive yet accurate measuring tool. Graduations on hub which run parallel to axis of screw run alternatively one above and one below measuring line; those above indicate 0, 50, 100, 150, etc., and those below, 25, 75, 125, etc. This important feature enables reading of caliper at a glance and eliminates to a certain extent errors likely to arise from reading close graduations too rapidly. Adjustments of measuring screw to compensate for wear is made by a taper nut.

This tool also made in the metric to measure all sizes less than 25 millimeters by hundredths of a millimeter.

Price each, regular\$4.00
Price each, with ratchet stop 4.50
Price of Morocco Case65

No. 17 Micrometer Caliper

English or Metric Measure. Range 0 to 1 inch



Measures all sizes less than one inch by thousandths of an inch. Provided with a clamp, with which measuring spindle can be held in any desired position.

Ends of measuring surface are beveled. Also made in the metric to measure all sizes less than 25 millimeters, by hundredths of a millimeter; table of decimal equivalents being omitted.

Price each, regular\$6.00
Price each, with ratchet stop 6.50
Price of Morocco Case65

Can furnish this caliper with a wooden handle attached to bow; handle being $2\frac{3}{4}$ in. long, 1 in. largest diameter. When so fitted, clamp screw is provided with rings instead of a knurled head.

Price each, extra\$1.50

No. 18 Micrometer Caliper

English Measure Only. Range 0 to 1 inch

Differs from No. 17 only in being graduated to read to ten thousandths as well as thousandths of an inch.

Price each, regular\$7.00
Price each, with ratchet stop 7.50
Price of Morocco Case65

Brown & Sharpe Tools

No. 19 Micrometer Caliper

English or Metric Measure. Range 0 to 1 inch



Measures all sizes less than one inch by thousandths of an inch. Outer end of frame is same size as measuring spindle, and edges of measuring surface are not beveled, but left square. Also made in the metric to measure all sizes less than 25 millimeters by hundredths of a millimeter; table of decimal equivalents being omitted.

Price each, regular\$5.50
Price each, with ratchet stop 6.00
Price of Morocco Case65

No. 20 Micrometer Caliper

This Caliper differs from Micrometer Caliper No. 19, English, only in being graduated to read ten-thousandths, as well as to thousandths, of an inch.

Price\$6.50
With ratchet stop 7.00
Morocco Case65

No. 45 Micrometer Caliper

English or Metric Measure. Range 0 to 2 inches



This caliper measures all sizes less than 2 inches by thousandths of an inch. Provided with a Clamp Ring which clamps spindle and preserves the setting. Also made in the metric to measure all sizes less than 50 millimeters by hundredths of a millimeter, table of decimal equivalents being omitted.

Price each, regular\$8.50
Price each with ratchet stop 9.00
Price of Morocco Case75

A standard gauge to be used in adjusting caliper is furnished with each tool.

No. 46 Micrometer Caliper

English Measure Only. Range 0 to 2 inches

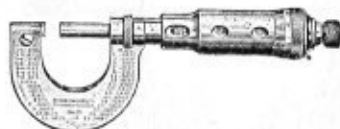
This caliper differs from No. 45 only in being graduated to read ten thousandths, as well as thousandths of an inch.

Price each, regular\$ 9.50
Price each, with ratchet stop 10.00
Price of Morocco Case75

A standard gauge to be used in adjusting caliper is furnished with each tool.

No. 25 Micrometer Caliper

English Measure Only. Direct Reading. Range 0 to 1 inch

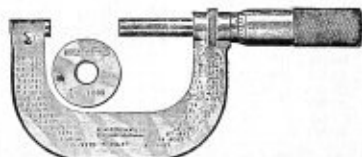


Thousandths of an inch may be read in exact figures, without calculating with the aid of graduation lines. Figures showing in opening nearest frame indicate tenths of an inch, those in next opening register hundredths, and in the other, thousandths. In addition, thimble on end of sleeve is graduated in connection with a line on sleeve to read thousandths. In this way, fractional parts of a thousandth may be estimated. Mechanism is constructed that dials are locked and micrometer cannot get out of adjustment and read incorrectly. Caliper may be adjusted for wear on anvil or for looseness in the thread.

Price each in Morocco Case\$12.00

No. 47 Micrometer Caliper

English or Metric Measure. Range 1 to 2 inches



Measures all sizes above 1 inch and less than 2 inches by thousandths of an inch. Outer end of frame is same size as measuring spindle and edges of measuring surfaces are left square. Provided with Clamp Ring, which clamps spindle and preserves the setting. Also made in the metric to measure all sizes above 25 and less than 50 millimeters, by hundredths of a millimeter; table of decimal equivalents being omitted.

Price each, regular\$6.50
Price each, with ratchet stop 7.00
Price of Morocco case75

A standard gauge to be used in adjusting caliper furnished with each tool.

No. 48 Micrometer Caliper

English Measure Only. Range 1 to 2 inches

This caliper differs from No. 47 only in being graduated to read ten thousandths as well as thousandths of an inch.

Price each, regular\$7.50
Price each, with ratchet stop 8.00
Price of Morocco Case75

A standard gauge to be used in adjusting caliper is furnished with each tool.

Brown & Sharpe's Tools

Nos. 61 to 84 Micrometer Calipers

English or Metric Measure



Made to meet the demand for an inexpensive, yet accurate measuring tool. More convenient for general use than the bar Micrometer or Vernier, being more readily set for different measures and easily handled where rapid measurements are required. Frame is an I section, combining great rigidity and strength with lightness. Will measure one-thousandth of an inch.

No.	Price Each Without Standards	Price Each With Standards	Range	
			English Measure Inches	Metric Measure Millimeters
61	\$ 5.00	\$ 6.00	1 to 2	25 to 50
*62	6.00	7.00	1 to 2	
63	6.00	7.00	2 to 3	50 to 75
*64	7.00	8.00	2 to 3	
65	6.50	7.65	3 to 4	75 to 100
67	7.25	8.60	4 to 5	100 to 125
69	8.00	9.50	5 to 6	125 to 150
71	9.00	10.60	6 to 7	150 to 175
72	10.00	11.70	7 to 8	175 to 200
73	11.00	12.80	8 to 9	200 to 225
74	12.00	13.90	9 to 10	225 to 250
75	13.00	15.00	10 to 11	250 to 275
76	14.00	16.10	11 to 12	275 to 300
77	15.50	17.70	12 to 13	300 to 325
78	17.00	19.30	13 to 14	325 to 350
79	19.00	21.40	14 to 15	350 to 375
80	21.00	23.50	15 to 16	375 to 400
81	23.00	25.60	16 to 17	400 to 425
82	25.00	27.70	17 to 18	425 to 450
83	27.00	29.80	18 to 19	450 to 475
84	30.00	32.90	19 to 20	475 to 500

*62 and *64 differ from the others only reading to ten-thousandths. For Ratchet Stop, add \$0.40 to above Prices.

Morocco Cases can be furnished as follows: Nos. 61 and 62, \$0.60 each; Nos. 63 and 64, \$0.80 each; No. 65, \$1.20 each; No. 67, \$1.40 each; No. 69, \$1.60 each.

No. 130 Micrometer Caliper Set

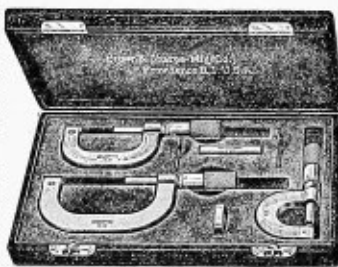
Three Calipers, English or Metric Measure
Range 0 to 3 inches

An inexpensive set of accurate and convenient reference tools for inspecting finished products; also general shop use.

Set consists of one No. 19 Caliper, range 0 to 1 inch; one No. 38, range 1 to 2 inches; one No. 50, range 2 to 3 inches; all reading thousandths of an inch.

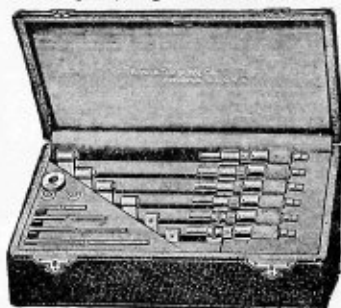
Price per set, regular \$17.50
Price per set, with ratchet stops 18.50
Price per set, with standards 19.00
Price per set, with ratchet stops and standards 20.00
Price of case extra 2.00

Furnished with standards, and in case, with ratchet stops unless otherwise ordered.



No. 135 Micrometer Caliper Set

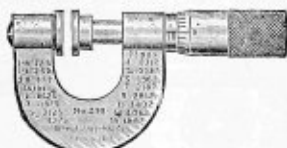
Six Calipers, English or Metric Measure



This set of Micrometer Calipers is very similar to No. 130, except that it is more elaborate. The 1 inch caliper is the standard type with decimal equivalents stamped on frame and provided with a clamp ring; the 2, 3, 4, 5 and 6 inch calipers have frames or I section. Each micrometer is graduated to read thousandths of an inch.

In the metric this set will measure all sizes less than 150 millimeters by hundredths of a millimeter. Price per set, regular \$36.00
Price per set, with ratchet stop 39.00
Price per set, with standards 42.00
Price per set, with ratchet stop and standards 45.00
Price of case extra 4.00

No. 230 Paper Gauge Micrometer Caliper

English or Metric Measure
Range 0 to $\frac{3}{8}$ inch

Measures all sizes less than $\frac{3}{8}$ of an inch by thousandths. In measuring paper, sheet rubber, or other yielding substances, it is advantageous to use discs or washers on the ends of measuring spindle and adjusting screw, as the larger surfaces have less tendency to compress the material being measured. Also made in the metric to measure hundredths of a millimeter, table of decimal equivalents being omitted.

Price each, regular \$5.50
Price each, with ratchet stop 6.00
Price of Morocco Case50

No. 231 Paper Gauge Micrometer Caliper

English Measure Only
Range 0 to $\frac{1}{4}$ inch

Similar in design to No. 230. Measures all sizes less than $\frac{1}{4}$ inch by thousandths. Especially suitable for carrying in the pocket.

Price each \$5.00
Price of Morocco Case50

Brown & Sharpe Tools

Inside Micrometer Gauges English or Metric Measure



Gauge consists of a holder with a micrometer screw and thimble graduated to read to .001 in. Extension rods are graduated by a series of angular grooves of a form and depth that allow the clamping fingers to spring in and the adjustments quickly and positively made.

No. 260 —5 rods—2 in. to 9 1/2 in., with case.....	\$5.25
Without	4.50
No. 261 —6 rods—2 in. to 12 1/2 in., with case.....	6.50
Without	5.50

No. 262 Inside Micrometer English or Metric Measure



Similar to Nos. 260 and 261, except that it has a greater range. Made in the metric to read hundredths of a millimeter.

No. 262 —8 rods. 8 to 36 inches, with case.....	\$9.00
Without	7.50
No. 262 —8 rods. 200 to 900 m/m, with case.....	9.00
Without	7.50

Micrometer Heads English or Metric Measure



No. 290, 1/2-inch, graduated to read to thousandths of an inch or hundredths of a millimeter; length from lower end of barrel to shoulder, 3/4-inch. Diameter of barrel, 5/16-inch.

Price, each, with or without ratchet stop.....\$3.00

No. 291, 1/2-inch. Same as No. 290 except being graduated to read to ten thousandths as well as thousandths of an inch. English Measure only.

Price, each, with or without ratchet stop.....\$4.00

No. 294, 1-inch, graduated to read to thousandths of an inch or hundredths of a millimeter; length from lower end of barrel to shoulder, 3/4-inch. Diameter, 5/16-inch.

Price, each, with or without ratchet stop....\$3.50

No. 295, 1-inch. Same as No. 294 except being graduated to read to ten thousandths as well as thousandths of an inch. English Measure only.

Price, each, with or without ratchet stop....\$4.50

These micrometer heads are readily attached to machines or tools when fine adjustments are required. Can be furnished with clamp screw when so ordered.

Soft Leather Cases For Micrometer Calipers

Convenient for those who wish to carry a micrometer Caliper in the pocket. Price, each..... \$0.25

No. 598 Height Gauge Attachment For Use with Inside Micrometers Nos. 260 and 261



For use in connection with inside micrometers, making a reliable height gauge. Measuring rod is inserted upwards through under side of base and clamping fingers. By turning knurled nut, rod is held firmly in an upright position. Micrometer is then adjusted and clamped to upper end of rod. Base has a V-shaped groove in bottom, adapting tool for cylindrical work.

Price, each..... \$1.75

Micrometer Calipers

Explanation and Method of Reading the Calipers with Ten-Thousandths Graduations



Readings in ten-thousandths of an inch are obtained by means of a Vernier or series of divisions on hub of Caliper. These divisions are ten in number, occupy same space as nine divisions on sleeve and for convenience in reading are figured 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 0.

When a line on sleeve coincides with first line of Vernier, next two lines to right differ from each other one-tenth of length of a division on sleeve; next lines differ by two-tenths, etc. See upper cut of graduations on hub and sleeve.

When Caliper is opened, sleeve is turned to left and when a division passes a fixed point on hub, it shows Caliper has been opened one-thousandth of an inch. Hence, when sleeve is turned that a line on sleeve coincides with second line (end of first division) of Vernier, sleeve has moved one-tenth of length of one of its divisions and Caliper opened one-tenth of one-thousandth, or one ten-thousandth of an inch. When a line on sleeve coincides with third line (end of second division) of Vernier, Caliper has been opened two ten-thousandths of an inch, etc. See lower cut of graduations, where a line on the sleeve coincides with fourth line (end of third division of Vernier) and reading is three ten-thousandths of an inch.

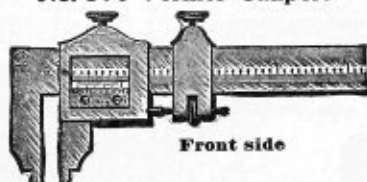
To read Caliper, note thousandths as usual, then number of divisions on Vernier, commencing at 0, until a line is reached with which a line on the sleeve is coincident. If second line, figured 1, add one ten-thousandth; if third, figured 2, two ten-thousandths, etc.

Calipers graduated to ten-thousandths should not be used commonly where fine measurements are not required, as a wear, which would be of comparatively slight consequence in a Caliper that reads only to thousandths, is perceptible and important in an instrument of this class.

H. Channon Company Chicago

Brown & Sharpe Tools

No. 570 Vernier Calipers



Front side

These calipers are graduated on the front to read, $\frac{1}{16}$ means of a vernier, to thousandths of an inch; on the back to 64ths of an inch. Will take inside as well as outside measurements. Points are placed on the bars and slides so that dividers can be set to transfer distances.

The smallest caliper is well adapted for carrying in the pocket, and is known as a pocket vernier.

No.	Size, Inches	Length of Jaws, Inches	Width of Jaws Closed, Inches	Price in Case
570	1½	¾	¼	\$13.25
	6	1¼	¼	19.00
	12	2¼	¼	25.75
	24	2¼	¾	36.00

No. 571 Vernier Calipers

These calipers differ from No. 570 only in reading to Metric Measure. Graduated to 1/50th of a millimeter on one side and 1/2 of a millimeter on the other.

No.	Size	Length of Jaws	Width of Jaws Closed	Price in Case
571	38m/m	19m/m	6m/m	\$13.25
	150	31	6	19.00
	300	57	6	25.75
	600	57	6	36.00

No. 572 Vernier Calipers

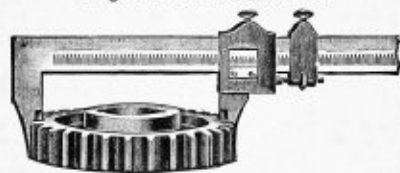
These calipers differ from No. 571 only in reading to both Metric and English Measure. Graduated to read to 1/50th of a millimeter on one side and to .001 inch on the other.

No.	Size	Length of Jaws	Width of Jaws Closed	Price in Case
572	1½	¾	¼	\$13.25
	6	1¼	¼	19.00
	12	2¼	¼	25.75
	24	2¼	¾	36.00

A standard is furnished when desired for testing the accuracy of the adjustment of the Calipers.

Price\$3.00

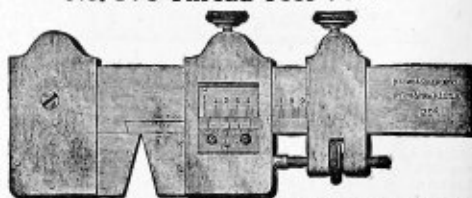
No. 573 Vernier Calipers English or Metric Measure



This tool is used for determining accurately, the depth of gear teeth, and is found especially valuable in the automobile shop for measuring transmission gears where it is impossible to use the regular vernier calipers on account of the thickness of the jaws. Except for the measuring jaws, this tool is exactly like the 12-inch Vernier Caliper No. 570 and can be used as such. Depth of jaws 1½ inch; width of measuring surface ½ inch.

Price each\$24.00

No. 576 Thread Tool Vernier



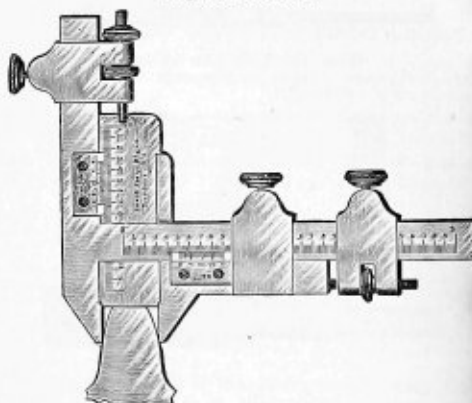
An extremely economical tool for measuring thread tools of different pitches, as it does away with the large number of gauges formerly necessary.

When in use, sliding jaw is set for width of point of tool of required pitch. Thread is then ground so that point bottoms on hardened steel strip inserted in blade and sides rest against jaws of tool.

Jaws or measuring surfaces are carefully hardened and ground, the angle being carefully tested for accuracy. Vernier reads to thousandths of an inch on one side of tool and to 50ths of a millimeter on other side.

Price 60°, 55° or 29° thread tool vernier with morocco case, price each\$18.00

No. 580 Gear Tooth Vernier English Measure



This Caliper is for the purpose of accurately measuring the distance from top to pitch line, and thickness at pitch line of gear teeth. By the use of this caliper compensation may be made for variation or error in size of blank.

All pitches from 20 diametral to 1 diametral can be measured.

The sliding jaw moves upon a bar graduated to read, by means of a Vernier, to thousandths of an inch. A tongue, moving at right angles with the jaws is graduated in the same manner. Both sliding jaw and tongue are provided with adjusting screws.

Price each 20 to 2 diametral pitch\$27.50
Price each 10 to 1 diametral pitch40.00

No. 581 Gear Tooth Vernier Metric Measure

This caliper differs from No. 580, only in reading to Metric Measure. Graduated to read to 1/50th of a millimeter. Range 1¼ millimeter to 12 millimeters.

Price each\$27.50

Browne & Sharpe Tools

No. 605 Micrometer Depth Gauge

English or Metric Measure

The 2 and 4-inch base Micrometer Depth Gauges will measure all distances to $\frac{1}{2}$ inches by .001 inch.

Screw in each of these Gauges has a movement of $\frac{1}{2}$ inch. Graduations are of such a form and depth that clamping fingers, at end of gauge, spring in, allowing $\frac{1}{2}$ -inch adjustments of rod to be quickly and positively made. Base is about $\frac{1}{8}$ inch thick, and, together with point of rod, is hardened. Also made to measure all distances to 63 millimetres by hundredths of a millimetre.

The $4\frac{1}{2}$ -inch base Gauge measures all distances to 12 inches by .001 inch.

Screw has a movement of 1 inch. Rod is graduated in inches. Base is about $\frac{1}{8}$ inch thick, and, together with point of rod, is hardened.

Also made to measure all distances to 300 millimetres by hundredths of a millimetre.

ce each, 2-inch base	\$5.50
ra for Morocco case	.50
ce each, 4-inch base	6.00
ra for Morocco case	.75
ce each, $4\frac{1}{2}$ -inch base	7.00
ra for Morocco case	2.00

No. 610 Universal Depth Gauge

English Measure

A spiral spring in the barrel forces the blade against the bottom of the hole or recess. A friction clutch, free to move under pressure of the spiral spring, holds the blade without clamping. A clamp nut at the top of the barrel clamps the blade securely in position.

The blade is a narrow 6 in. tempered steel rule graduated to 64ths on one side and 100ths on the other. The blade can be swiveled completely around without disturbing the setting. The base is about 3 in. long, $\frac{1}{4}$ in. wide and carefully hardened and ground.

When desired, blades graduated to 32ds and 64ths or 50ths and 100ths. Can also be furnished in the Metric Measure to read to 1 millimeter on one side and to $\frac{1}{2}$ millimeter on the other. Measures to 95

limeters in depth.	
ce, each	\$3.00

No. 615 6-Inch Round Rule Depth Gauge

English Measure

Illustration shows the head and the blade of a 6-inch rule depth gauge.

The head can be conveniently held. It is made of steel $\frac{1}{8}$ inch thick, hardened.

The blade is a 6-inch narrow tempered steel rule.

The blade sent with the gauge is divided into 64ths and 100ths of inches.

Will furnish, if desired, blades divided into 32ds and 64ths, or 50ths and 100ths of inches.

This depth gauge is also furnished with a blade 15 centimeters long, graduated on one corner to $\frac{1}{5}$ millimeter and on the other corner to 1 millimeter.

Price	\$1.25
-------	--------

No. 585 Vernier Height Gauge

English, Metric, and English and Metric Measure

For obtaining the height of projections from a plane surface or the location of bushing in jigs, etc. Bar is 10 inches long, admits of measurements up

to 8 inches in height and is graduated to read, by means of a Vernier, to thousandths of an inch. Reads on one side to outside measurements and on the other to inside. Jaws are about 2 inches long and 1 inch wide when closed. Fixed jaw is 1 inch thick, allowing gauge to stand upright, and rounded on end for use close to a projection. An extension for movable jaw is furnished.

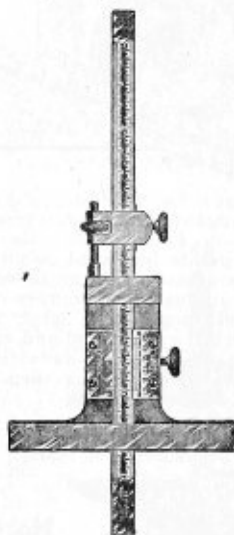
Graduated in the metric to read to 1/50 m/m on one side and to $\frac{1}{2}$ m/m on the other. Graduated in the English and Metric to read to 1/50 m/m on one side and thousandths of an inch on the other.

Price each, in Morocco Case	\$31.75
-----------------------------	---------

Can furnish 18-inch height gauge at special price.

No. 600 Vernier Depth Gauge

English, Metric, or English and Metric Measure

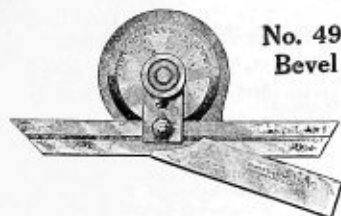


This Depth Gauge is used in obtaining the depth of holes, recesses in dies, distance from a plane surface to a projection, etc. The blade is 5 inches long, $\frac{1}{4}$ inch wide, and is graduated on the front to read, by means of a vernier, to thousandths of an inch, and to 64ths of an inch.

This Depth Gauge is also furnished graduated to read to 1/50th of a m/m on one side and to $\frac{1}{2}$ m/m on the other corner of the same side; or 1/50th of a m/m on one side, and by means of a vernier, to 1/1000th of an inch on the other side.

Price, in Morocco Case	\$12.00
------------------------	---------

Brown & Sharpe Tools

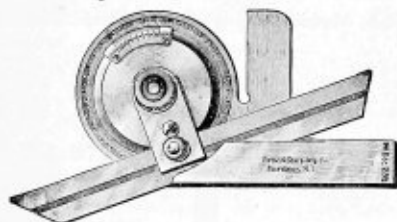


No. 493 Improved
Bevel Protractor

For all classes of work, where angles are to be laid out which do not require such a fine degree of accuracy as is possible with a protractor having a vernier. One side of stock is flat, that it may be laid flat on work. Dial is graduated to degrees over an arc of 180° . Blade is about $\frac{1}{8}$ inch thick, can be moved back and forth its entire length and clamped independently of dial, thus adapting protractor for work where others cannot be used.

Protractor with 6 in. blade.....	\$7.00
In leatherette case.....	7.75
Protractor with 12 in. blade.....	8.00
In leatherette case.....	9.00
Protractor with both 6 and 12 in. blades.....	8.50
In leatherette case.....	9.50

No. 495 Improved Universal Bevel Protractor



This protractor has a vernier scale which adds materially in obtaining fine measurements. Reads to 5 minutes or $1/12$ degree. By means of a small thumb pinion furnished as an attachment, extremely fine adjustments can be secured. Dial is accurately graduated to degrees of the entire circle. Swivel turns on a large central stud which is hardened and ground and can be rigidly clamped by thumbscrew. Graduation lines are below the surface, protecting them from wear.

Protractor with 6 in. blade.....	\$10.00
In Morocco case.....	11.00
Protractor with 12 in. blade.....	11.00
In Morocco case.....	12.50
Protractor with both 6 and 12 in. blades.....	11.75
In leatherette case.....	13.75



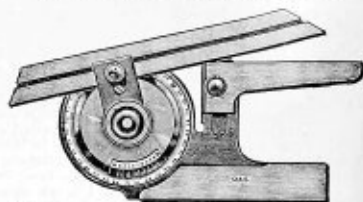
No. 499
Improved Universal
Bevel

Provided with an offset blade that admits of the measurements of all angles. Length of head and tongue 3 in. Case is solid on top for $1\frac{1}{2}$ inches from square end.

Price each	\$1.50
------------------	--------

No. 496 Improved Universal Bevel
Protractor

With Acute Angle Attachment



For all classes of work where angles are to be laid out, and with the attachment, a new feature extremely small angles can be easily and quickly established. Dial is accurately graduated and alignments are perfect.

A vernier, which reads to 5 minutes or $1/12$ of a degree, adds materially to the fineness with which angles can be laid out. A fine adjustment is provided by means of a small thumb screw furnished as an attachment.

Protractor with 6 in. blade.....	\$12.00
In Morocco case.....	13.00
Protractor with 12 in. blade.....	13.00
In Morocco case.....	14.00
Protractor with 6 and 12 in. blades.....	13.50
In leatherette case.....	14.50

No. 510 Draughtsmen's Protractor

This Protractor can be quickly set to any angle. It can be used either side up and on either of the two outside edges of the frame. Also can be used to advantage in dividing a circle, transferring angles or laying off a given angle, without resetting, on either side of a line.

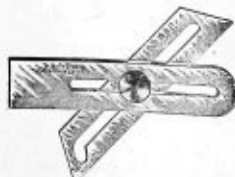
The Vernier reads to five minutes.

It forms a convenient extension of a T square and frequently takes the place of 45° and 60° angles.

Price each without case.....	\$1.00
Price each with case.....	1.25



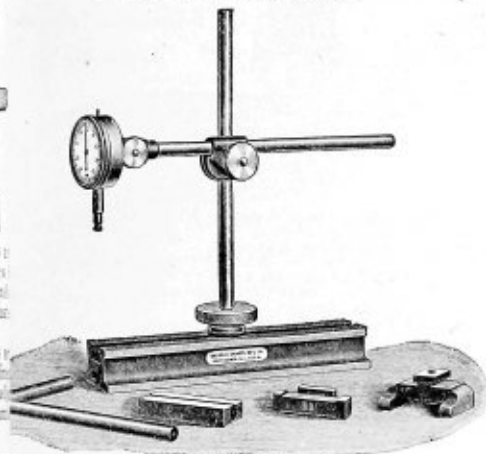
No. 498 Universal Bevels



Length of tongue and head, inches.....	3
Width of tongue and head, inches.....	$\frac{3}{4}$
Price each	\$1.25

Brown & Sharpe Tools

No. 730 Dial Test Indicator English or Metric Measure



Especially serviceable in erecting or inspecting machines determine any inaccuracy in a surface or in the movement of a spindle, arbor, etc. Parts are adjustable to any angle. Points are removable from the post and used independently. Points are removable to permit use of different angles. The movement of the measuring surface that bears on the work is magnified a number of times and indicated by the pointer. The dial, about 1 1/4 in. in diameter, has to .001 in., has a white enamel face and is adjustable to allow the setting of the zero to any required position. The spindle has a movement of 1/4 in. The base is 8 1/2 in. long; width 2 1/4 in., the post 9 in. high.

For use on the under side of the base, a split block and an angular post are furnished.

Each tool is packed in a substantial box fitted to hold various parts when not in use.

Metric Measure. Also made with metric Dial and reads 0.1-100 m/m.

English Measure. Price each.....\$20.00

Metric Measure. Price each.....20.00

No. 735 Test Indicator English or Metric Measure



This Indicator is especially useful to those erecting or erecting machines. Parts are adjustable to any angle. Movement of point is magnified a number of times by length of index finger and its movement may be read upon the graduations shown. Indexing finger may be brought to zero by knurl headed screw shown, whatever the position of the indicator. A split block and angular post are furnished with indicator.

Also made in metric measure to read to 1-50 m/m. Length of base 8 in. Height of post 9 in. Price, each, \$15.00

No. 750 V Blocks And Clamps

Designed particularly for laying out work accurately in connection with a surface plate and knee. Made of tool steel hardened and have sides ground parallel and V grooves carefully ground central and parallel to bottom and sides. Sold only in numbered pairs, so that V grooves in blocks of the same numbers are always in alignment. Each block is approximately 1 1/4 x 1 1/2 x 1 3/8 in. in size and will take work to 1 1/8 in. diameter.

Price, per pair.....\$5.50



Blocks are not sold singly.

No. 752 Toolmakers' Vise



A reliable and handy tool for use in drilling, fitting, and laying out work on surface plates. Screw will hold jaws rigidly in place. Drop-forged and case-hardened, thus adapting it for hard usage without danger of damaging. It is light and convenient to handle, being frequently held in the hand during operations. The distinctive feature in this tool is the V groove in under side of base. This adds to its utility, as it can be used as a V block. Greatest capacity of Vise is 2 in. Each Vise is furnished with two steel jaws that slip on and off the end of screw.

Price, each.....\$1.25

No. 754 Improved Toolmakers' Clamps

These Clamps are designed and proportioned throughout to insure the greatest strength and rigidity. The jaws are rounded on the ends to allow clamping under a shoulder or recess. The spring attachment holds the "loose" jaw tightly and prevents its dropping or sliding while opening or closing the clamp.

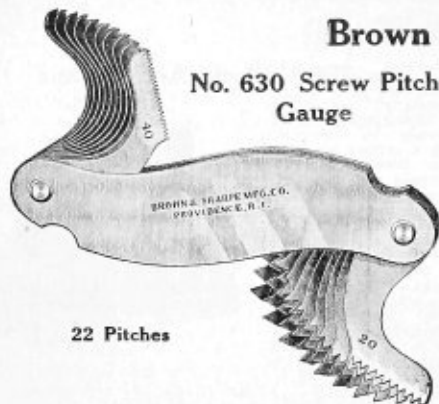
They are very convenient where a large number of pieces of the same size are to be clamped for drilling, as the spring attachment holds the jaws at the required distance for removing and inserting each piece.



No.	Opening of Jaws	Length of Jaws	Price Each
754	1 3/8"	1 1/2"	\$0.60
	1 1/2"	2 1/8"	.70
	1 3/4"	2 3/4"	.85
	2 1/4"	3 3/8"	1.00
	3 1/8"	4 1/2"	1.10
	3 3/8"	5"	1.75

Brown & Sharpe Tools

No. 630 Screw Pitch Gauge



22 Pitches

This Screw Pitch Gauge will measure the threads of nuts as well as of screws and contains the pitches 9, 10, 11, 11½, 12, 13, 14, 15, 16, 18, 20, on one end, and 22, 24, 26, 28, 30, 32, 34, 36, 38 and 40, on the other end. Price, each\$1.00

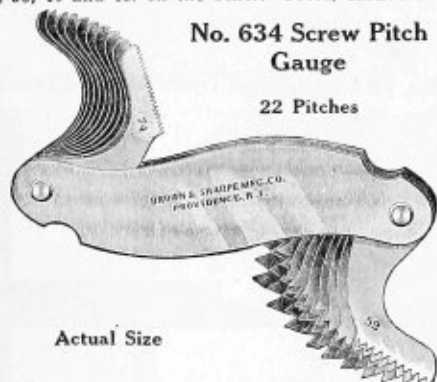
No. 631 Screw Pitch Gauge

This Screw Pitch Gauge is the same in design as No. 20. It contains 24 blades with pitches 4, 4½, 5, 5½, 6, 7, 8, 9, 10, 11, 11½ and 12, on one end, and 13, 14, 15, 16, 18, 20, 22, 24, 26, 27, 28, and 30, on the other. Price, each\$1.25

No. 632 Screw Pitch Gauge

Similar to No. 630. Contains 30 blades with pitches 4, 4½, 5, 5½, 6, 7, 8, 9, 10, 11, 11½, 12, 13 and 14 on one end and 16, 18, 20, 22, 24, 26, 27, 28, 30, 32, 34, 38, 40 and 42, on the other. Price, each....\$1.50

No. 634 Screw Pitch Gauge



22 Pitches

Actual Size

Designed especially for bicycle manufacturers, electricians and others using screws with fine V-threads. Contains 22 blades with pitches 32, 34, 36, 38, 40, 42, 44, 46, 48, 50 and 52 on one end and 54, 56, 58, 60, 62, 64, 66, 68, 70, 72 and 74 on the other. Price, each\$1.00

No. 635 Screw Pitch Gauge

Similar to No. 634. Contains 26 blades with pitches 2½, 2¾, 3, 3¼, 3½, 3¾, 4, 4½ and 5 on one end, and 5½, 6, 7, 8, 9, 10, 11, 12, 13, 14, 16, 18 and 20 on the other. It also contains a blade with a gauge for grinding Thread Tools. Price, each\$1.50

No. 636 Screw Pitch Gauge

International System

17 Pitches



Made after the French System of the Society of Encouragement for National Industry. Same in design as No. 634, and can be used for measuring outside as well as inside threads. Contains blades with pitches ½, ¾, 1, 1¼, 1½, 1¾, 2, 2½, 3, 3½, 4, 4½, 5, 5½, 6, 6½, and 7 millimeters per inch. Also contains a blade with gauge for grinding the tools. Price each\$1.00

No. 633 Screw Pitch Gauge

"V" Threads

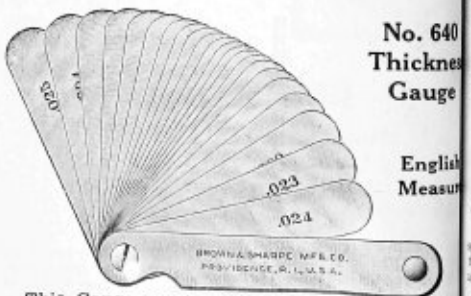
The triangular form of the face of this screw pitch gauge permits a compact holding of blades to measure threads of nuts as well as screws.



Three per inch
4, 4½, 5½, 6, 8, 9, 10, 11, 11½, 12, 13, 15, 16, 18, 20, 22, 24, 26, 27, 30, 32, 34, 36, 38, 40, 42, 44, 50, 52, 54, 56, 58, 60, 62, 64, 68, 70, 72, 74, 76, 78, 80, 82, 84.
Price each\$1.00

No. 640 Thickness Gauge

English Measure



This Gauge consists of a set of 22 steel blades varying in thickness from .004 to .025 of an inch by thousandths. The blades may be used singly or in combination, as may be desired. Plain figures easily read, indicate the thickness of each blade. Also furnished in the Metric Measure. Price, each\$1.00

Brown and Sharpe Tools

No. 835 Hermaphrodite Firm Joint Caliper Tempered

With Adjustable Point		With Solid Point	
Size, Inches	Price	Size, Inches	Price
4	\$0.65	4	\$0.50
6	.80	6	.65
8	1.00	8	.85

No. 736 Lathe Test Indicator



The Lathe Test Indicator is new in design and is for use in setting centrally any point or hole in a piece of work to be operated upon in a lathe or upon a face plate. It is also well adapted for testing lathe centers, shafting or other work held between centers, the inside or outside of cylinders, pulleys, etc., and all work of a similar class.

Finger holder is furnished with two fingers, either one of which can be quickly attached; one finger ground to an angle of 60°; the other is bent for inside and outside testing. A spiral spring is provided for holding finger against work with an even pressure.

Price, each.....\$3.00

No. 738 B. & S. Indicator English or Metric Measure



For setting centrally any point or hole in a piece of work to be operated upon in lathe or upon face-plate, testing lathe centers, shafting and other work held between centers and inside and outside diameters of pulleys, etc. Shank is hardened steel, designed to be held in tool post of a lathe. Indicator point is hardened steel, made spherical to allow pressure to be brought upon it by work from any angle. Scale is graduated to 1000ths of an inch and reads .007 in. either side of zero.

Also made to read in metric measurement to approximately 1 m/m either side of zero by hundredths of a m/m. Price each.....\$5.75 In Morocco case.....\$6.20

No. 748 B. & S. Speed Indicator



For determining velocity of shafts and spindles running in either direction. Registers on either side, front side used to determine velocity of shafts and spindles running in one direction; reverse side speed of those running in opposite direction, avoiding all confusion and errors.

Dials register units and tens by means of a revolving pointer and, in addition, front dial registers hundreds up to 5000 by means of a rotating disk in the centre. This disk will register when either side is used.

Quick use is greatly facilitated by means of a small knurled wheel on side of case which, when turned, reverses the rotating disk on the front dial to starting point.

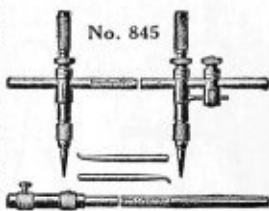
Price each.....\$5.50 In Morocco case.....\$6.00

Improved Steel Beam Trammels

The adjustable points are held by spring chucks and can be removed easily and replaced by pencil or other special points.

A pair of caliper points is furnished with these trammels.

Trams are clamped by knurled nuts to beam, which is flattened on top, and thrust taken by washers to prevent marring bearing surfaces. A spring friction holds trams in place when nuts are loosened for setting. One tram has adjusting screw and slide, convenient for fine adjustment of points.



Price Each

With 9 inch beam, will describe an 18 in. circle.....\$3.00
With 13 inch beam, will describe a 26 in. circle..... 3.00
With 27 inch beam, will describe a 54 in. circle..... 3.50
Single extension beam for 13 inch size, extra..... 1.00

Standard End Measuring Rods No. 655 With Spherical Ends



For measuring rings, cylinders, etc., setting calipers, comparing gauges, or work of like character and especially useful for measuring parallel surfaces. Made of steel, ends hardened and ground, so that the ends are sections of true spheres of diameter equal to length of rod.

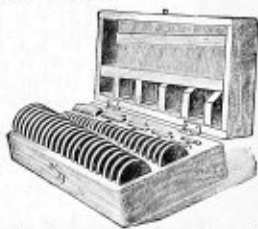
Rods 3 to 6 in. long are 3/8 in. diameter, larger 1/2 in.

Length in.	3	4	5	6	7	8	9
Price, each.	\$1.40	\$1.60	\$1.80	\$2.00	\$2.20	\$2.40	\$2.60
Length in.	10	11	12	13	14	15	16
Price, each.	2.80	3.00	3.20	3.40	3.60	3.80	4.00

Can also furnish in the Metric Measure.

Standard Reference Disks English Measure

For reference sizes in shop practice, such as testing measuring tools, setting calipers, etc. Generally used without handles. With handles, however, they may be used in place of Standard Cylindrical Gauges, but are not recommended for constant use as substitutes for them, being designed to serve principally as reference, not as working gauges.



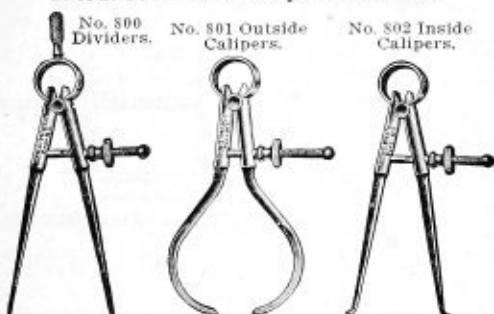
Disks are hardened, ground and accurately lapped to size; width of measuring surfaces are suitably proportioned to size of Disk. They are furnished singly of any desired size, but are usually furnished in sets, consisting of 45 Disks from 1-4 inch to 3 inches, varying by 16ths, including 6 handles.

Size in.	1/4	5/16	3/8	7/16	1/2	5/8	3/4	7/8
Price each	\$1.50	\$1.50	\$0.90	\$0.90	\$1.00	\$1.00	\$1.00	\$1.00
Size in.	1	1 1/8	1 1/4	1 1/2	1 3/4	1 7/8	2	2 1/8
Price each	1.05	1.05	1.05	1.05	1.10	1.10	1.10	1.10
Size in.	1 1/2	1 3/4	1 7/8	2	2 1/4	2 1/2	2 3/4	2 7/8
Price each	1.10	1.25	1.25	1.25	1.25	1.40	1.40	1.40
Size in.	2 1/2	2 3/4	2 7/8	3	3 1/8	3 1/4	3 1/2	3 3/4
Price each	1.40	1.55	1.55	1.55	1.55	1.65	1.65	1.65
Size in.	3 1/2	3 3/4	3 7/8	4	4 1/8	4 1/4	4 1/2	4 3/4
Price each	1.65	1.65	1.80	1.80	1.80	1.80	1.80	1.95
Size in.	4 3/4	4 7/8	5	5 1/8	5 1/4	5 1/2	5 3/4	5 7/8
Price each	1.95	1.95	2.10	2.10	2.25	2.25	2.25	2.25

H. Channon Company Chicago

Brown & Sharpe Tools

B. & S. Tool Makers Calipers and Dividers

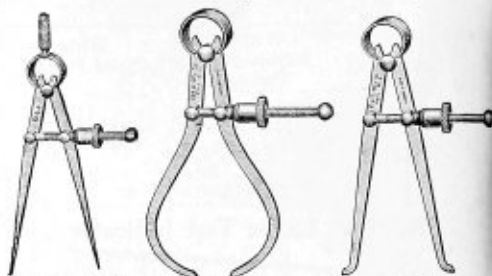


These Calipers and Dividers present features not previously embodied in tools of this class. Fulcrum stud is hardened. Spring is unusually stiff and of a construction that insures rigidity, prevents side deflection of legs and gives uniform pressure. Legs are steel, round and highly polished; measuring points come together evenly. Especial attention is called to the 2-inch sizes, as they are convenient for small, light work and for the pocket.

Size, inches.....	2	3	4	5	6
Price each.....	\$1.00	\$1.25	\$1.50	\$1.50	\$1.75

Rex Spring Calipers and Dividers

No. 810 Divider, No. 811 Outside Caliper, No. 812 Inside Caliper.

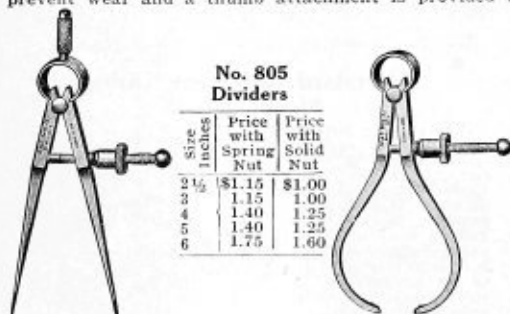


These Calipers and Dividers are somewhat lighter than those shown below, but the same care is taken in their construction as in the more expensive line, same spring, fitted to the legs in a somewhat different manner, is used and same Spring Nut. Rex Calipers are neat and attractive in appearance, and durable. Adjusting screw is hardened to prevent wear, and thumb attachment is provided for Spring Dividers.

Size, inches.....	2 1/2	3	4	5	6	8
With spring nut.....	\$0.80	\$0.85	\$0.90	\$0.95	\$1.00	\$1.15
With solid nut.....	.65	.70	.75	.80	.85	1.00

B. & S. Spring Calipers and Dividers

These Calipers and Dividers combine lightness and durability. Legs are steel drop forgings. Spring is unusually stiff and of improved form, with convex ends that fit into concave grooves, milled in ends of legs insuring great rigidity. Spring nut is constructed on the principle of a spring chuck with jaws hardened. It is positive in action when closing, thread engaging screw on slightest pressure. When pressure is with drawn nut is released at once and slides freely on screw. It is dust proof and combines all the advantages of the solid nut with that of quick adjustment. There are no loose pieces. Screw is steel hardened to prevent wear and a thumb attachment is provided for Spring Dividers.



No. 805
Dividers

Size Inches	Price with Spring Nut	Price with Solid Nut
2 1/2	\$1.15	\$1.00
3	1.15	1.00
4	1.40	1.25
5	1.40	1.25
6	1.75	1.60

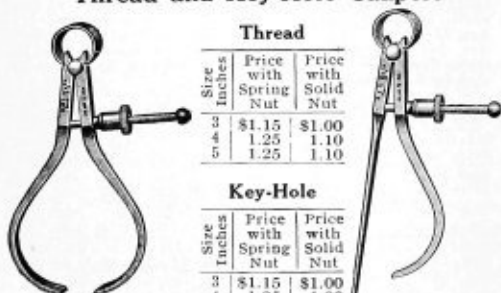
No. 806
Outside
Caliper

Size Inches	Price with Spring Nut	Price with Solid Nut
2 1/2	\$1.15	\$1.00
3	1.15	1.00
4	1.25	1.10
5	1.25	1.10
6	1.50	1.35

No. 807
Inside
Calipers

Size Inches	Price with Spring Nut	Price with Solid Nut
3	\$1.15	\$1.00
4	1.25	1.10
5	1.25	1.10
6	1.50	1.35

Thread and Key-Hole Calipers



Thread

Size Inches	Price with Spring Nut	Price with Solid Nut
3	\$1.15	\$1.00
4	1.25	1.10
5	1.25	1.10

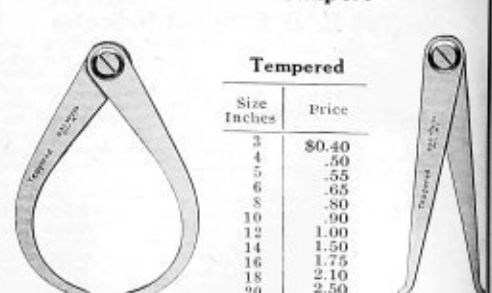
Key-Hole

Size Inches	Price with Spring Nut	Price with Solid Nut
3	\$1.15	\$1.00
4	1.25	1.00

No. 808 Thread.

No. 809 Key-Hole.

Firm Joint Calipers



Tempered

Size Inches	Price
3	\$0.40
4	.50
5	.55
6	.65
8	.80
10	.90
12	1.00
14	1.50
16	1.75
18	2.10
20	2.50
24	3.00

No. 821 Outside.

No. 822
Inside.

Brown & Sharpe Tools

No. 770. Automatic Center Punches

The tool is of steel entirely self-contained, the striking mechanism being enclosed in the knurled handle, which is of such a size and form as to be held conveniently in the hand.

A downward pressure releases the striking block and makes the impression.

The points can be taken out for grinding and are easily replaced if broken.

Style 1. $4\frac{1}{2}$ inches long, $\frac{3}{8}$ inch in diameter. Price, each.....\$1.25

Style 2. $5\frac{1}{2}$ inches long, $\frac{3}{8}$ inch in diameter. Price, each.....1.50

Style 3. 6 inches long, $\frac{3}{8}$ inch in diameter. Price, each.....2.50

Style 3 differs from 2 in being slightly heavier in construction and capable of striking a much heavier blow.

Style 4. $11\frac{1}{2}$ inches long, $1\frac{1}{8}$ inches in diameter. Price each \$25.00 For use in rolling mills for testing the hardness of metals.

Extra points can be furnished as follows: Style 2 and 3, each \$0.15; style 4, \$0.25.

No. 771. Adjustable

This is similar to Styles 2 and 3, but has an adjustable stroke.

$5\frac{1}{2}$ inches long, $\frac{3}{8}$ inch in diameter.

Price each.....\$2.00

Extra points, each......15

No. 778. B. & S. Scribes



These Scribes are made with the intention that they shall be a little better than the ordinary requirements of such a tool.

The points are of tool steel, finely tempered. They are threaded to screw into the holder and knurled for a finger grip. The knurled holder has long bearings to support the points firmly when in place and is of a suitable size to be held conveniently.

Style 1, shown by top illustration is for carrying in the pocket. Point is held in handle, by a 4-lawed chuck by which it can be set and held in any position. Point may be reversed and scribe closed to about $8\frac{1}{2}$ inches.

Style 1—Single point. Price each.....\$0.40

Style 2—Single point. Price each......30

Style 3—Double point. Price each......35

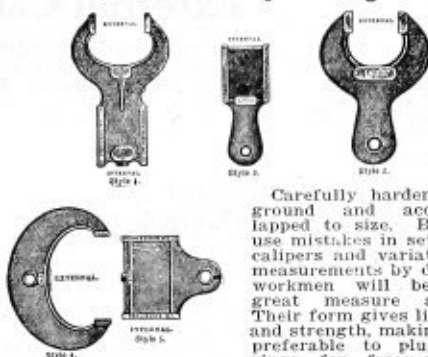
No. 790. Mercury Plumb Bobs



These Plumb Bobs are made from a solid steel rod, bored out and filled with mercury, or quick-silver, which makes them unusually heavy in proportion to their size. The center of gravity is low. The comparatively small diameters allow them to be used close to corners and walls. They are not easily affected by draughts of air and are convenient to be carried or packed in small spaces. The points are hardened and the bodies and points are ground. The Plumb Bobs are nickelplated and each is furnished with a braided silk line.

Weight, ozs.	Length, in.	Diameter, in.	Price each.
3 $\frac{1}{2}$	4	$\frac{1}{2}$	\$1.25
6	4 $\frac{1}{2}$	$\frac{3}{8}$	1.75
12	5 $\frac{1}{2}$	$\frac{3}{8}$	2.25
16	6	1	2.75

Standard Caliper Gauges



Carefully hardened and ground and accurately lapped to size. By their use mistakes in setting of calipers and variations in measurements by different workmen will be in a great measure avoided. Their form gives lightness and strength, making them preferable to plugs and rings for frequent use. Measuring surfaces are

amply large to insure accurate measurements and maintenance of Gauge sizes. As furnishing convenient and reliable standard sizes for every-day use in the workshop, they are of great advantage, and their use will contribute to uniformity in production of working parts of machinery.

No. 665. English Measure Style 1

Size Inches	Price Each.	Size Inches	Price Each.	Size Inches	Price Each.
$\frac{1}{4}$	\$2.50	$1\frac{1}{2}$	\$2.85	$2\frac{1}{2}$	\$4.00
$\frac{3}{8}$	2.50	$1\frac{3}{4}$	2.90	$2\frac{3}{4}$	4.10
$\frac{1}{2}$	2.50	$1\frac{7}{8}$	2.95	$2\frac{7}{8}$	4.20
$\frac{5}{8}$	2.50	$1\frac{9}{16}$	3.00	$2\frac{9}{16}$	4.30
$\frac{3}{4}$	2.50	$1\frac{11}{16}$	3.05	$2\frac{11}{16}$	4.40
$\frac{7}{8}$	2.50	$1\frac{13}{16}$	3.10	$2\frac{13}{16}$	4.50
1	2.50	$1\frac{15}{16}$	3.20	$2\frac{15}{16}$	4.60
$1\frac{1}{8}$	2.50	$1\frac{17}{16}$	3.30	$2\frac{17}{16}$	5.00
$1\frac{1}{4}$	2.55	$1\frac{19}{16}$	3.40	$2\frac{19}{16}$	5.25
$1\frac{3}{8}$	2.60	$1\frac{21}{16}$	3.50	$2\frac{21}{16}$	5.50
$1\frac{1}{2}$	2.65	$1\frac{23}{16}$	3.60	$2\frac{23}{16}$	5.50
$1\frac{3}{4}$	2.70	$1\frac{25}{16}$	3.70	$2\frac{25}{16}$	6.00
$1\frac{7}{8}$	2.75	$1\frac{27}{16}$	3.80	$2\frac{27}{16}$	6.00
$1\frac{5}{8}$	2.80	$1\frac{29}{16}$	3.90	$2\frac{29}{16}$	6.00
		$1\frac{31}{16}$	3.95		.....

No. 667. English Measure

Style 3 up to and including 3-inch, balance are style 5

No. 669. English Measure

Style 2 up to and including 3-inch, balance are style 4

Size Inches	Price Each	Size Inches	Price Each	Size Inches	Price Each
$\frac{1}{4}$	\$1.40	$1\frac{1}{2}$	\$1.65	$2\frac{1}{2}$	\$2.90
$\frac{3}{8}$	1.40	$1\frac{3}{4}$	1.70	$2\frac{3}{4}$	3.00
$\frac{1}{2}$	1.40	$1\frac{7}{8}$	1.75	$2\frac{7}{8}$	3.00
$\frac{5}{8}$	1.40	$1\frac{9}{16}$	1.80	$2\frac{9}{16}$	3.30
$\frac{3}{4}$	1.40	$1\frac{11}{16}$	1.90	$2\frac{11}{16}$	3.30
$\frac{7}{8}$	1.40	$1\frac{13}{16}$	2.00	$2\frac{13}{16}$	3.30
1	1.40	$1\frac{15}{16}$	2.00	3	3.30
$1\frac{1}{8}$	1.40	$1\frac{17}{16}$	2.10	3 to $3\frac{1}{2}$	3.50
$1\frac{1}{4}$	1.45	$1\frac{19}{16}$	2.10	3 to $3\frac{3}{4}$	3.75
$1\frac{3}{8}$	1.45	$1\frac{21}{16}$	2.20	3 to 4	4.00
$1\frac{1}{2}$	1.45	$1\frac{23}{16}$	2.20	4 to 5	4.25
$1\frac{3}{4}$	1.50	$1\frac{25}{16}$	2.20	5 to 6	4.50
$1\frac{7}{8}$	1.50	$1\frac{27}{16}$	2.30	6 to 7	4.75
$1\frac{5}{8}$	1.55	$1\frac{29}{16}$	2.30	7 to 8	5.00
$1\frac{1}{2}$	1.55	$1\frac{31}{16}$	2.40	* 8 to 9	5.65
$1\frac{3}{4}$	1.60	$1\frac{33}{16}$	2.40	* 9 to 10	6.25
$1\frac{5}{8}$	1.60	$1\frac{35}{16}$	2.50	* 10 to 11	7.00
$1\frac{1}{2}$	1.65	$1\frac{37}{16}$	2.50	* 11 to 12	8.00
		$1\frac{39}{16}$	2.80		.....

*These sizes not made in No. 667. Can also furnish in the metric measure.



Single End, Unfinished

Williams' "Vulcan" External Caliper Gauges

These are drop-forged from either mild steel, suitable for case-hardening, or from Crucible Tool Steel. We will supply directions for hardening, or case harden to order, but cannot undertake machining.



Double End, Unfinished

Single End Prices and Dimensions

No.	Capacity	Extreme Dimensions		Dimensions of Measuring Pad		Price Unfinished	
		Length	Width	Length	Width	Mild Steel	Crucible Tool Steel
22	3 to 3 1/4	5 1/4	5 3/4	1 1/2	3/4	\$1.00	\$2.00
24	3 1/4 to 4	5 5/8	6 1/2	1 5/8	3/4	1.20	2.40
26	4 to 4 1/2	6 1/4	7 1/8	1 5/8	3/4	1.45	2.90
28	4 1/2 to 5	6 3/4	7 3/4	2 1/4	5/8	1.75	3.50
30	5 to 5 1/2	7 1/4	8 1/4	2 3/4	5/8	2.10	4.20
32	5 1/2 to 6	7 3/4	9 1/4	2 3/4	5/8	2.50	5.00
34	6 to 6 3/4	8 1/4	10	2 1/2	3/4	3.25	6.50
36	6 3/4 to 7 1/2	9 1/4	11	2 3/4	3/4	4.00	8.00

Williams' "Vulcan" Internal Caliper Gauges Double End, Unfinished



These are drop-forged from either mild steel, suitable for case-hardening, or crucible tool steel. We will supply directions for hardening, or case-harden to order, but cannot undertake machining.

The lettering-panels and sides of jaws are on same plane and may be finished by a single grinding or polishing operation.

Small bosses at ends of internal gauges provide ready means of centering for lathe turning.

The special size of the measuring-jaw or pad provides for unusual advantages; four classes of gauges may be made from one forging:

1. Plain gauge; same dimension both ends.
2. Gauge with one end of exact dimension, other end for two limits allowed.
3. Gauge with any two dimensions within range of table limits.
4. Gauge of the "go in" and "not go in" variety; two combinations.

Furnished unfinished only, packed half dozen in box. Crucible tool steel gauges are stamped "T" to indicate their grade.

No.	Capacity	Extreme Dimensions		Dimen's of Measuring Pad		Lgth. Center Pad	Price Unfinished	
		Lgth.	W'th	Lgth.	W'th		Mild Steel	Crucible Tool Steel
110	1 to 1 1/4	3	1 1/4	1	3/4	5/8	\$0.30	\$0.60
112	1 1/4 to 1 1/2	3 1/4	1 1/2	1 1/4	3/4	5/8	.40	.80
114	1 1/2 to 1 3/4	4 1/4	1 3/4	1 3/4	5/8	5/8	.55	1.10
116	1 3/4 to 2	4 3/4	2 1/4	1 3/4	5/8	5/8	.70	1.40
118	2 to 2 1/4	5 1/4	2 1/4	1 5/8	5/8	5/8	.90	1.80
120	2 1/4 to 3	6 1/4	3 1/4	2 1/4	5/8	1	1.20	2.40

Double End Prices and Dimensions

No.	Capacity	Extreme Dimensions		Dimensions of Measuring Pad		Price Unfinished	
		Length	Width	Length	Width	Mild Steel	Crucible Tool Steel
2	1/4 to 3/8	2 1/4	5/8	3/4	5/8	\$0.20	\$0.40
4	3/8 to 1/2	2 1/2	1 1/8	3/4	5/8	.22	.44
6	1/2 to 3/4	2 3/4	1 1/4	3/4	5/8	.25	.50
8	3/4 to 1	3 1/4	1 1/2	3/4	5/8	.30	.60
10	1 to 1 1/4	4 1/4	2 1/8	3/4	5/8	.39	.78
12	1 1/4 to 1 1/2	5	2 3/4	3/4	5/8	.53	1.06
14	1 1/2 to 1 3/4	5 1/4	3	3/4	5/8	.72	1.44
16	1 3/4 to 2	6 1/4	3 1/2	1	5/8	.96	1.92
18	2 to 2 1/4	7 1/4	4	1 1/4	5/8	1.25	2.50
20	2 1/4 to 3	8 1/4	5 1/4	1 1/2	5/8	1.60	3.20

Williams' "Vulcan" Tool Post Fittings Unfinished



Tool Posts

Openings Punched Out

Number.....	5	10	20	30	40	50	60
Extreme length.....	2 3/4	4 1/4	4 3/4	5 1/4	6 1/4	7 1/4	8 1/4
Diameter of body.....	1 1/2	1 1/2	1 3/4	1 3/4	2 1/4	2 1/4	2 3/4
Length of body.....	2	2 1/4	3 1/4	3 3/4	4 3/4	5	6
Diameter of base.....	1 1/2	1 1/2	2 1/4	2 1/4	2 3/4	2 3/4	3 1/4
Thickness of base.....	1 1/2	1 1/2	1 3/4	1 3/4	2 1/4	2 1/4	2 3/4
Distance base to opening.....	1 1/2	1 1/2	1 3/4	1 3/4	2 1/4	2 1/4	2 3/4
Size of opening.....	1 1/2 x 3/4	1 1/2 x 3/4	1 3/4 x 3/4	2 1/4 x 3/4	2 3/4 x 3/4	2 3/4 x 3/4	3 1/4 x 3/4
For use with wedge.....	5	10	15 & 18	18 & 20	30 & 40	40	60
For use with ring.....	5	10	11	20	30 & 40	40	60
Price.....	\$0.20	\$0.30	\$0.45	\$0.60	\$0.80	\$1.00	\$2.00

Tool Post Wedges



For Changing Angles of Lathe Tools

Several sets of dies are available for other similar wedges. Blue prints and prices on application.

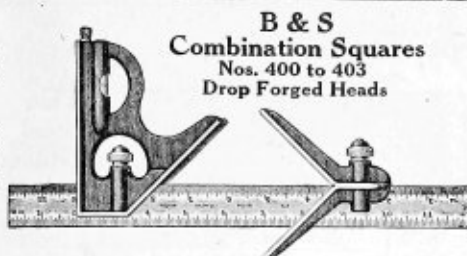
Number.....	5	10	11	15	18	20	30	40	60	65
Length.....	2 3/4	3	3 1/4	3 3/4	3 3/4	3 3/4	4 1/4	4 1/4	5 1/4	5 1/4
Width.....	3 1/4	3 1/4	3 1/4	3 1/4	3 1/4	3 1/4	4 1/4	4 1/4	5 1/4	5 1/4
Extreme thickness.....	3 1/4	3 1/4	3 1/4	3 1/4	3 1/4	3 1/4	4 1/4	4 1/4	5 1/4	5 1/4
Radius.....	3	2 1/4	4 1/4	4 1/4	4 1/4	4 1/4	5 1/4	5 1/4	6	6
For use with post.....	5	10	20	20	20 & 30	30	40	40	50	50
For use with ring.....	5	10	11	11	11 & 20	20	30	40	60	60
Price.....	\$0.04	\$0.07	\$0.09	\$0.09	\$0.10	\$0.10	\$0.12	\$0.14	\$0.18	\$0.21

Tool Post Rings



For Changing Angles of Lathe Tools

Number.....	5	10	11	20	30	40	60
Diameter, outside.....	2 1/4	2 1/4	3	3 1/4	3 1/4	4	4 1/4
Diameter, hole.....	1 3/4	1 3/4	1 3/4	1 3/4	1 3/4	2	2 1/4
Thickness, outside edge.....	3 1/4	3 1/4	3 1/4	4 1/4	4 1/4	5 1/4	5 1/4
Radius of concave.....	3	2 1/4	4 1/4	4 1/4	4 1/4	5 1/4	5 1/4
For use with post.....	5	10	20	30	40	40	50
For use with wedge.....	5	10	11 & 15	18 & 20	30	40	60
Price.....	\$0.10	\$0.14	\$0.15	\$0.20	\$0.22	\$0.27	\$0.33



English Measure

With Hardened Heads and Tempered Blades				With Soft Heads and Tempered Blades			
No.	Size, in.	With Centre Head	No.	Size, in.	Without Centre Head	No.	Size, in.
401	6	\$2.50	401	6	\$1.50	403	6
	9	2.75		9	2.25		9
	12	3.00		12	2.50		12
	18	3.75		18	3.25		18
	24	4.25		24	3.75		24

The blades have Nos. 1, 2, 4 and 7 Graduations.

B & S

Combination Squares Nos. 412 to 415

These Combination Squares differ from Nos. 400 to 403 in having heavier blades and heads.

English Measure

With Hardened Head and Tempered Blades				With Soft Heads and Tempered Blades			
No.	Size, in.	With Centre Head	No.	Size, in.	Without Centre Head	No.	Size, in.
413	18	\$6.25	413	18	\$4.75	415	18
	24	7.25		24	5.75		24

The blades have Nos. 1, 2, 4 and 7 Graduations.

B & S Combination Sets

Drop Forged Heads



Reverse Side of Head, Showing Level.

English Measure

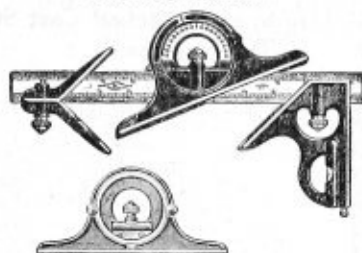
With Square Heads Hardened and Tempered Blades				With Soft Heads and Tempered Blades			
No.	Size, in.	Price	No.	Size, in.	Price	No.	Size, in.
425	9	\$4.75	426	9	\$4.25		
	12	5.00		12	4.50		
	18	5.75		18	5.25		
	24	6.25		24	5.75		
427	18	8.75	428	18	8.25		
	24	9.50		24	8.75		

Nos. 427 and 428 differ from Nos. 425 and 426 only in having extra heavy blades.

The blades are made with Nos. 1, 2, 4 and 7 Graduations. (Graduations are listed on another page.)

B & S Combination Sets

With Reversible Protractor Head Drop Forged Heads



Reverse Side of Head, Showing Level. English Measure

With Square Heads Hardened and Tempered Blades				With Soft Heads and Tempered Blades			
No.	Size, in.	Price	No.	Size, in.	Price	No.	Size, in.
438	9	\$5.25	439	9	\$4.75		
	12	5.50		12	5.00		
	18	6.25		18	5.75		
	24	6.75		24	6.25		
440	18	9.25	441	18	8.75		
	24	10.25		24	9.50		

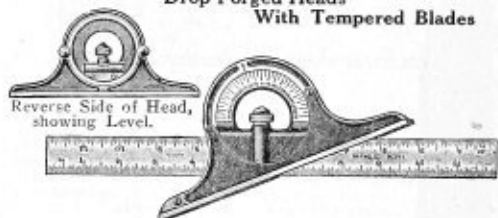
Nos. 440 and 441 differ from Nos. 438 and 439 only in having extra heavy blades and heads.

The blades are made with Nos. 1, 2, 4 and 7 Graduations.

B & S Protractors

Drop Forged Heads

With Tempered Blades



Reverse Side of Head, showing Level.

English Measure

No.	Size, in.	Price	No.	Size, in.	Price
450	9	\$3.00	450	18	\$4.00
	12	3.25		24	4.50

Protractor Head with Level for the 9 inch, Price... \$2.00

Protractor Head with Level for the 12 inch, Price... 2.00

12-inch Protractor Head is also suitable for use with the 18-inch and 24-inch.

No.	Size, in.	Price
451	18	\$5.50
	24	6.25

Differs from No. 450 only in having extra heavy blade and head. Head is about 9 inches long and 1/2-inch thick.

Protractor Head with Level for the 18 inch, Price... \$2.50

Protractor Head with Level for the 24 inch, Price... 2.50

With Reversible Head

No.	Size	Price	No.	Size	Price
456	9	\$3.50	456	18	\$4.50
	12	3.75		24	5.00

Protractor Head with Level for the 9 inch, Price... \$1.90

Protractor Head with Level for the 12 inch, Price... 1.90

12-inch Protractor Head is also suitable for use with the 18-inch and 24-inch.

No.	Size, in.	Price
457	18	\$6.00
	24	6.75

This Protractor differs from those above only in having an extra heavy blade and a heavy reversible head.

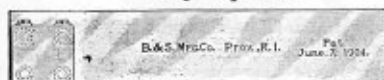
Protractor Head with Level for the 18 inch, Price... \$3.00

Protractor Head with Level for the 24 inch, Price... 3.00

The blades are made with Nos. 1, 2, 4 and 7 Graduations

Brown & Sharpe Tools

No. 541 Improved Hardened Cast Steel Try Squares

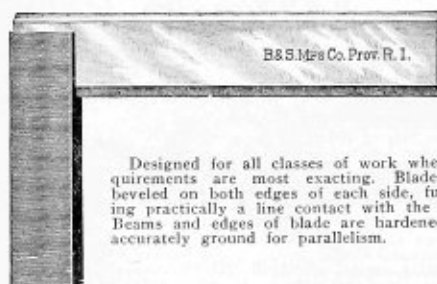


This improvement in making large Try Squares consists in securing the blade to the beam by means of screws, whereby they are made more permanent and accurate and can be more readily and economically repaired.

The length of blade, as given, is from the inner edge of beam to end of blade. The screws should be adjusted only at the factory. Substantial wood cases furnished with these squares.

Number	Length of Blade, inches	Length of Beam, inches	Price Each
541	24	13 1/2	\$30.00
	30	16 1/2	40.00
	36	19 1/2	50.00

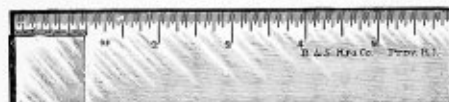
No. 542 Hardened Steel Squares with Beveled Edges



Designed for all classes of work where requirements are most exacting. Blades are beveled on both edges of each side, furnishing practically a line contact with the work. Beams and edges of blade are hardened and accurately ground for parallelism.

Number	Length of Blades	Length of Beam	Price Each
542	1 1/2	1 1/2	\$2.75
	3	3 1/2	3.75
	4 1/2	3 3/4	5.50
	6	4 3/4	7.50

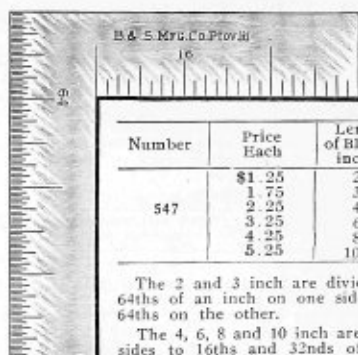
No. 544 Graduated Steel Squares Not Hardened



The length of blade, as given, is the extreme length over all.

Substantial Wooden Cases for protecting the Squares when not in use, furnished when desired, for the 9-inch and 12-inch.

Number	Length of Blades	Length of Beam	Price Each	Price of Case
544	3	2 1/2	\$2.50	-----
	4	2 1/2	3.75	-----
	6	3 3/4	5.00	-----
	9	5	8.00	\$0.50
	12	6 1/2	9.50	.75



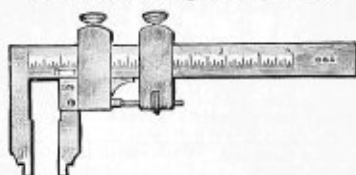
Thin Steel Squares

Number	Price Each	Length of Blades, inches	Width of Blades, inches
547	\$1.25	2	1/2
	1.75	3	3/4
	2.25	4	1
	3.25	6	1 1/2
	4.25	8	1 3/4
	5.25	10	1 1/2

The 2 and 3 inch are divided to 16ths and 64ths of an inch on one side and 32nds and 64ths on the other.

The 4, 6, 8 and 10 inch are divided on both sides to 16ths and 32nds of an inch.

No. 560 Caliper Squares



Convenient for a large class of work where extreme accuracy is not required. Also valuable for use in duplicating work when the number of pieces will not warrant the expense of fixed gauges.

Adjusting screw enables sliding head to be more accurately set to graduations than would be possible without its use.

The 4 in., 6 in. and 9 in. Caliper Squares take inside as well as outside measurements. The 6 in. and 9 in. Squares have hardened jaws.

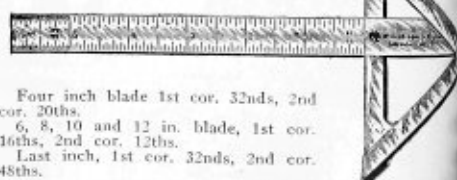
Size, inches 2 *4 4 6
Length of jaws, inches 3/4 1 1 1/2 2
Width of jaws, closed 1/4 1/4
Without adj. screw \$3.25 5.50 7.00 11.00
With adjusting screw 4.50 6.00 6.50 9.00 11.00

Graduated on one side to 64ths, on other to 100ths of an inch.

*For boiler makers, steamboat inspectors, etc., for measuring boiler plates. Jaws are designed for external measurements only.

Also made in the metric or English and Metric.

Universal or Centre Squares



Four inch blade 1st cor. 32nds, 2nd cor. 20ths.

6, 8, 10 and 12 in. blade, 1st cor. 16ths, 2nd cor. 12ths.

Last inch, 1st cor. 32nds, 2nd cor. 48ths.

Number	Price Each	Length of Blade, inches	Length of Head, inches
556	\$2.00	4	3
	2.50	6	4
	3.50	8	5 1/2
	5.00	10	7
	6.00	12	8 1/2

Brown & Sharpe Tools

No. 391 Steel Caliper Rules



Convenient for use in stock rooms or stores, in selecting feet or bar stock, wire, tubing, etc. Slide of 3 inch can be drawn out to measure 2 1/4 inches and the 4 inch to measure 3 1/4 inches.

The 3 inch rule can be furnished nickel plated when desired. Price 15c extra. Divided into Parts of an Inch as follows:

	A	B	C	D
cor. 8, 14, 28	8, 14, 28	8	8	8
cor. 12, 24, 48	12, 24, 48	16	16	16
cor. 16, 32, 64	16, 32, 64	32	32	32
cor. 20, 50, 100	20, 50, 100	64	64	64
cor. 32 & 64	64 & 100	32 & 64	64 & 100	

Price, each, 3-inch, \$2.50 4-inch, \$3.00
Can also furnish in the metric measure.

Triangular Metallic Scales.



These patent triangular metallic scales are of the size and shape of the common 12 in. triangular boxwood scales. They are made from brass tubing with the ends closed, polished with a dull finish and weigh less than 3 1/2 ounces. The liability of the wood scales to crack, warp or twist, the chipping of their edges and their variation from standard measurement, are well known to all who have used them. These objections are all overcome in the new scales. The ends of these scales are covered with hardened steel plates which slightly raise the scales from the surface.

No. 520. 12 in., divided to scales of 1/4, 1/2, 3/4, 1, 1 1/4, 2, 3 and 4 inches to the foot and 16ths of an inch.	
Price, each	\$2.50
No. 521. 12 in., divided to scales of 1/8, 3/8, 1/2, 5/8, 3/4, 7/8 and 3 inches to the foot and 16ths of an inch.	
Price, each	\$2.50
No. 522. 12 in., divided on one edge to 10ths, 20ths, 30ths, 40ths, 50ths and 60ths of an inch; 60ths and 80ths of an inch.	
Price, each	\$2.50
No. 523. Divided on one edge to 20ths, 30ths, 40ths, 50ths, 60ths and 80ths of an inch.	
Price, each	\$2.50

No. 525 Draughtsmen's Steel Straight Edge

B. & S. Mfg. Co. Prov. R. I.

Length, in.	15	18	24	30	36	42	48	60	72
Width, in.	1 1/4	1 1/2	1 3/4	2	2 1/4	2 1/2	2 3/4	3	3 1/4
Thickness, in. . . .	1/8	3/16	1/4	5/16	3/8	1/2	5/8	3/4	7/8
Price each	\$0.90	1.00	1.50	2.25	3.00	4.00	6.00	8.00	10.00

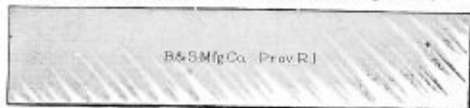
No. 526 Beveled Steel Straight Edge

B. & S. Mfg. Co. Prov. R. I.

Beveled edge is 1-16 inch thick. Beveled on one edge only.									
Length, inches. . . .	12	18	24	36	48	60	72		
Width, inches. . . .	1 1/4	1 1/2	1 3/4	2	2 1/4	2 1/2	2 3/4	3	3 1/4
Thickness, inches. . .	1/8	3/16	1/4	5/16	3/8	1/2	5/8	3/4	7/8
Price, each.	\$1.50	2.50	3.50	6.00	10.00	15.00	20.00		

No. 527 Hardened Steel Straight Edges

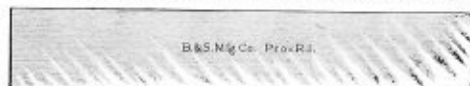
These straight edges are like the tongues of hardened steel try squares and are hardened on the edges only.



B. & S. Mfg. Co. Prov. R. I.

Length, inches.	3 1/2	5 1/2	7	10 1/4	14
Width, inches.	1 1/2	1 3/4	1 3/4	1 3/4	2 1/4
Thickness, inches. . . .	1/8	3/16	1/4	5/16	3/8
Price each.	\$0.60	\$1.00	\$1.25	\$2.00	\$3.00
Length, inches.	17	20	27	33	39
Width, inches.	2 1/4	2 3/4	3	3 1/4	3 3/4
Thickness, inches. . . .	1/8	3/16	1/4	5/16	3/8
Price each.	\$3.50	4.50	7.00	9.00	12.00

No. 528 Standard Steel Straight Edges



B. & S. Mfg. Co. Prov. R. I.

Length, ins.	6	9	12	18	24	36	48	60	72
Width, ins.	1	1 1/4	1 1/2	1 3/4	2	2 1/4	2 3/4	3	3 1/4
Thickness, ins.	1/8	3/16	1/4	5/16	3/8	1/2	5/8	3/4	7/8
Price each	\$0.60	.90	1.25	2.00	2.75	5.00	8.00	12.00	16.00

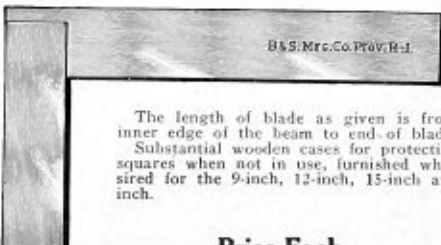
No. 530 Tool Makers Knife Edge Straight Edges

These Straight Edges are for work that requires extreme accuracy. They are made from the best quality of steel and every care is taken to insure their being straight and true.

No.	Length, in.	Width, in.	Price
530	2 1/4		\$2.75
	3 1/4		3.75
	4 1/2		4.75
	6 1/2		7.00

The above Straight Edges are furnished in cloth covered cases.

Hardened Cast Steel Try Squares



B. & S. Mfg. Co. Prov. R. I.

The length of blade as given is from the inner edge of the beam to end of blade.

Substantial wooden cases for protecting the squares when not in use, furnished when desired for the 9-inch, 12-inch, 15-inch and 18-inch.

Price Each

No.	Length of Blade, inches	Length of Beam, inches	Price	Price of Case
540	1 1/4	1 1/2	\$ 2.25	.....
	3	2 1/2	3.00	.....
	4 1/2	3 1/2	4.50	.....
	6	4 1/2	6.00	\$0.50
	9	5 1/2	9.00	.50
	12	7 1/2	12.00	.75
	15	8 1/2	20.00	1.00
	18	10 1/4	23.00	1.50

H. Channon Company Chicago

Brown & Sharpe Tools

No. 300 Tempered Steel Rules



These Rules are about 1-20" thick.

All rules with No. 4 graduations, furnished with patent end graduations. Can also furnish in the Metric or English and Metric Measure.

No.	Price Each	Length, Inches	Approximate Width, inches	Number of Graduations*
300	\$0.20	1	29-64	4 or 7
	.30	2	1-2	4, 7 or 9
	.40	3	35-64	1, 2, 4, 6 or 7
	.50	4	19-32	1, 2, 4, 6 or 7
	.65	6	11-16	1, 2, 4, 6 or 7
	1.00	9	53-64	1, 2, 4, 6 or 7
	1.25	12	31-32	1, 2, 4, 6 or 7
	2.00	18	1	1, 2, 4, 6 or 7
	2.50	24	1	1, 2, 4, 6 or 7
	5.00	36	1	1, 2, 4, 6 or 7

Graduations

Our rules, both standard and tempered, are divided in parts of an inch, as follows:

No. 1 Graduation	No. 2 Graduation	No. 4 Graduation
1st cor. 10, 20, 50, 100	8	8
2d cor. 12, 24, 48	10, 20, 50, 100	16
3d cor. 14, 28	12, 24, 48	32
4th cor. 16, 32, 64	16, 32, 64	64

No. 5 Graduation

1st cor.	11, 14, 15, 17, 18, 19, 20, 21, 22, 23, 24, 25
2d cor.	16, 32, 64
3d cor.	26, 27, 28, 29, 30, 31, 33, 34, 35, 36, 37, 38
4th cor.	39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 100

No. 6 Graduation	No. 7 Graduation	No. 9 Graduation
1st cor. 32	16	10, 20
2d cor. 48	32	16
3d cor. 50	64	32, 64
4th cor. 64	100	50, 100

No. 10 Graduation	No. 11 Graduation	No. 12 Graduation
1st cor. 32	64	50
2d cor. 64	100	100

No. 13 Graduation	No. 14 Graduation
1st cor. 8	8
2d cor. 16	32

Patent End Graduations



All Tempered and Standard Steel Rules 2 to 12 inches in length with No. 4 Graduations are furnished with Patent End Graduations, reading to 32ds of an inch on two ends of one side. This feature will be found advantageous in measuring the depth and width of grooves, countersinks and recesses of various kinds.

No. 303 Narrow Tempered Steel Rules

These rules are about 1-20th inch thick and 7-32 inch wide, graduated on one corner of each side only.

Length, inches	4	6	9
Price, each	\$0.50	.65	1.00

Furnished with No. 10, 11 or 12 Graduations.

Also furnished in the metric or English and Metric Measure.

No. 306 Flexible Steel Rules

Graduated on one side only.

Length, inches...	4	6	9	12	18	24
Approx. width.	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{3}{4}$
Price, each....	\$0.50	.65	1.00	1.25	2.00	2.50

Furnished with No. 10, 11, 12, 13, or 14 Graduations. Also furnished in the Metric or English and Metric Measures.

No. 315 Tempered Steel Rules

With Figured Graduations.



Furnished with 64th graduations number every eighth graduation line; as 8, 16, 24, etc. which assists the user in quickly ascertaining the number of 64ths in $\frac{1}{8}$, $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$ -inch, etc. Furnished with No. 4 Graduations only. Approximate thickness, 1/20-inch.

Length, inches 1	2	3	4	6	9	12	18
Width, inches.	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	$\frac{1}{2}$	1
Price, each..	\$0.20	.30	.40	.50	.65	1.00	1.25

No. 318 Tempered Steel Rules

With Beveled Edges.



Beveled on both edges of one side. Graduated on beveled edges only. No. 10 or 11 Graduation. Length, inches 1 2 3 4 6 9 12 18. Approx. width $\frac{3}{8}$ $\frac{1}{2}$ $\frac{5}{8}$ $\frac{3}{4}$ $\frac{7}{8}$ $\frac{1}{2}$ 1. Price, each..\$0.20 .30 .40 .50 .65 1.00 1.25 2.00

No. 320 Tempered Hook Rules



For measuring diameters of flanges, circular pieces, through hubs of pulleys, setting calipers, etc. Graduations, No. 1, 2, 4, 6 or 7.

Length, inches..	4	6	9	12	18	24
Approx. width.	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{3}{4}$
Price, each....	\$0.85	1.00	1.40	1.75	2.50	3.00

Brown & Sharpe Tools

No. 335 Steel Rules with Holder

The Rules and Holder are convenient where the ordinary rule cannot be used, as in measuring a recess or keyway, as well as the general class of tool and die work.

The holder takes either of the five sizes of rules. The barrel is knurled for finger grip. The rules are held in a split chuck, adjusted by a knurled nut at the top of the barrel, and can be set at various angles according to the work.

The rules are of tempered steel, graduated on both sides as follows: 32ds on one side and 64ths on the other, or 50ths on one side and 100ths on the other.

Also furnished graduated to millimeters on one side and half millimeters on the other.



Five Rules Interchangeable in One Holder

Length	Without Holder	With Holder
1/4 inch, or 5 mm/m.....	\$0.20	\$0.70
3/8 inch, or 10 mm/m.....	.20	.70
1/2 inch, or 15 mm/m.....	.20	.70
3/4 inch, or 20 mm/m.....	.20	.70
1 inch, or 25 mm/m.....	.20	.70

No. 252, Holder, Price.....\$0.50
Set complete, Holder and 5 rules, Price.....1.50

Tempered Steel Shrink Rules



Number	Price	Shrink per Foot, inches	Length inches	No. of Graduation
340	\$1.75	1/8	12 1/2	2
	1.75	1/8	12 1/2	4
	3.50	1/8	24 1/5	2
	3.50	1/8	24 1/5	4
	.75	1/8	6 1/2	2
341	.75	1/8	6 1/2	4
	.75	1/8	6 1/2	4
	1.75	1/8	12 1/2	2
	1.75	1/8	12 1/2	4
	3.50	1/8	24 1/5	2
342	3.50	1/8	24 1/5	4
	.75	1/8	6 1/2	2
	.75	1/8	6 1/2	4
	1.75	1/8	12 1/2	2
	1.75	1/8	12 1/2	4
343	3.50	1/8	24 1/5	2
	3.50	1/8	24 1/5	4
	.75	1/8	6 1/2	2
	.75	1/8	6 1/2	4
	1.75	1/8	12 1/2	2
344	1.75	1/8	12 1/2	4
	3.50	1/8	24 1/5	2
	3.50	1/8	24 1/5	4
	.75	1/8	6 1/2	2
	.75	1/8	6 1/2	4
345	1.75	1/8	12 1/2	2
	1.75	1/8	12 1/2	4
	3.50	1/8	24 1/5	2
	3.50	1/8	24 1/5	4
	.75	1/8	6 1/2	2
346	.75	1/8	6 1/2	4
	1.75	1/8	12 1/2	2
	1.75	1/8	12 1/2	4
	3.50	1/8	24 1/5	2
	3.50	1/8	24 1/5	4

*These sizes are graduated as Standard Rules on one side and Shrink Rules on the other, and to 32ds and 64ths on both sides. The others are graduated as Shrink Rules on both sides.

For List of Graduations See Preceding Page

No. 353 Narrow Steel Rule



We carry in stock a steel rule, not tempered, 6 in. long, about 1 1/2 in. wide and furnish it with Nos. 1, 2, 4, 6 or 7 graduations. This rule corresponds to the Standard Steel Rule but is lighter.

Price, each\$0.65

No. 374 Key Seat Rules



Parallel lines for key seats, mortises, etc., can be readily and accurately drawn with these rules on shafts not less than 1/8 inch in diameter.

The edges are beveled and graduated to 32ds of an inch. Also furnished in the metric measure.

Length, inches 4 6 8
Price, each \$2.50 \$3.00 \$3.75

No. 380 6-Inch Rule with Slide

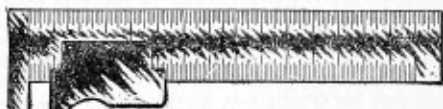


Rule is 6 inches long, about 1/8 inches wide, 1/8 inch thick and furnished with Nos. 1, 2, 4, 6 or 7 graduations. Metric rules graduated on three corners to millimeters and on one corner to half millimeters.

Price, each\$1.25

No. 385 Slide Caliper Rule

English or Metric Measure



The Slide Caliper Rule, shown in cut, is of steel, about 4 1/2 in. long and 1/8 in. thick. It is graduated on both corners to 32nds of an inch.

The jaws are 1/8 in. deep. The Metric rules are graduated to half-millimeters.

Price, each1.50

No. 388 Pocket Slide Caliper Rule

English or Metric Measure



Graduated on one corner of one side to read to 32ds. Other side graduated to 64ths and has a range of 2 inches. When slide is set far any particular measurement it can be securely clamped in position by a clamp nut.

Jaws are 3/4 inches deep. Nibs can be inserted in holes 1/8 inch in diameter.

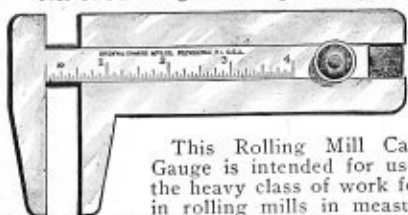
Metric Rules are graduated to millimeters and half-millimeters.

Price, each\$2.60

H. Channon Company Chicago

Brown & Sharpe Tools

No. 674 Rolling Mill Caliper Gauge



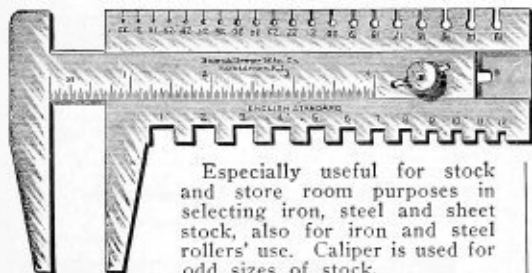
This Rolling Mill Caliper Gauge is intended for use on the heavy class of work found in rolling mills in measuring

sheet iron and steel but can be used equally well in stock and store rooms.

It is $5\frac{1}{4}$ in. long and $\frac{7}{8}$ in. thick. The jaws are $3\frac{1}{4}$ in. deep and can be drawn apart to measure 4 in. The tongue is graduated on one side to 32ds of an inch.

The caliper is made of tool steel, drop forged and is strong enough to withstand any strain to which it may be subjected. When the jaws are set they can be securely clamped so that measurements of different sheets of stock of the same thickness can be made without the necessity of resetting the caliper. Price each ... \$6.00

No. 677 Caliper and Wire Gauge—English or Birmingham Standard



Especially useful for stock and store room purposes in selecting iron, steel and sheet stock, also for iron and steel rollers' use. Caliper is used for odd sizes of stock.

Made of steel, $5\frac{1}{4}$ in. long and about $\frac{7}{8}$ in. thick. Jaws are 2 in. deep. The tongue is graduated on both sides to 32ds of an inch and can be drawn out to measure 4 in. Gauge numbers are those of the English or Birmingham Standard and run from 1 to 32.

Price, each \$7.00

No. 680 Caliper and Wire Gauge—U. S. Standard

This tool is similar in general design to the No. 677 with the exception that the gauge numbers which run from 1 to 32 are those of the U. S. Standard for sheet and plate iron and steel adopted by Congress, March 3, 1893.

Price each \$7.00

No. 725 Depth of Gear Tooth Gauges



Depth of Gear Tooth Gauges for all regular pitches, from 3 to 48 pitch inclusive

are carried in stock. One gauge answers for each pitch and indicates the extreme depth to be cut. Price each, \$0.25

Price, Sizes to 3 Pitch, made to order, \$0.75 each
Larger Sizes, \$1.25

No. 688 American Standard Wire Gauge

Adopted by the Brass Manufacturers Jan., 1858



These Gauges are made from the best steel and are tempered, adjusted, and warranted accurate.

Sizes 0 to 36 \$2.50

Sizes 5 to 36 2.00

In order to familiarize the users of the gauge with the decimal equivalents of the gauge numbers, these decimal equivalents expressed in thousandths, are stamped on the back, opposite to the regular gauge numbers.

No. 690 English Standard Wire Gauge

The Same as Stubs' Wire or Birmingham Gauge

1 to 36 \$2.00 6 to 36 \$2.50

No. 692 Washburn & Moen Standard Wire Gauge

Sizes 0 to 36. Price \$2.50

Same size and design as No. 688.

No. 694 U. S. Standard Gauge

Price \$2.50

The Gauge numbers, which run from 0 to 36 are those of the U. S. Standard Gauge for Sheet and Plate Iron and Steel, adopted by Congress March 3, 1893.

No. 700 Pocket Screw and Wire Gauge



This Gauge as shown is an angular gauge graduated on the front, on the left of slot, to show all sizes of the American standard screw gauge from 0 to 30, and is designed for the measurement of wire as well as of machine and wood screws.

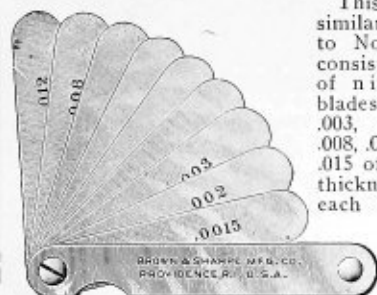
In addition to the gauge numbers, the front side of the Gauge is also graduated on the left of slot to 32nds of an inch.

The back side of Gauge is graduated as the old or English wire gauge, from 17 to 0000 on the right, and the new or American wire gauge from 15 to 0000 on the left of slot.

No. 700. Price \$2.50

Brown & Sharpe Tools

No. 642 Thickness Gauge English Measure



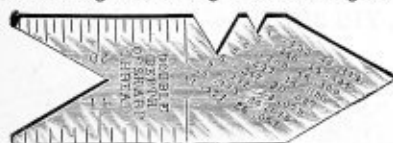
This Gauge is similar in design to No. 640, and consists of a set of nine steel blades, .0015, .002, .003, .004, .006, .008, .010, .012 and .015 of an inch in thickness. Price each\$1.00

No. 643 Thickness Gauge Metric Measure

This Gauge is of the same design as the No. 640, and consists of a set of nine steel blades of the following thicknesses: .04, .05, .08, .10, .15, .20, .25, .30 and .35 m/m. Price each.....\$1.00

Centre Gauges

For Grinding and Setting Screw Cutting Tools



Full Size

With table for determining the size of tap drills for 60° V threads

U. S. Standard, 60°

No. 650. Price\$0.25
Tempered, Price\$0.35

Whitworth or English Standard, 55°

No. 651. Price\$0.25
Tempered, Price\$0.35

Metric, 60°

No. 652. Price\$0.25
Tempered, Price\$0.35

Steel Music Wire Gauge Washburn & Moen Standard



Full Size

No. 695. Price. each.....\$1.50

Universal Surface Gauges

A wide range of adjustments can be quickly obtained by means of knurled adjusting screw. Maximum adjustment can be quickly obtained, and at the same time adjustment is so arranged that all moving parts can be firmly clamped in position when desired setting has been obtained.

Spindle passes through a bushing and bolt clamped by a knurled nut firmly to boss on base thereby removing any possibility of play in working parts when spindle has been clamped in position.

A V-shaped groove in the bottom of base especially adapts it for cylindrical work. Has two gauge pins in rear end that can be pushed down and used against edge of a plate or side of a T slot.

Spindle swivels, can be securely clamped in any position from the vertical to the horizontal, and the scriber may be used below the base as a depth gauge. For small work the spindle may be removed and the scriber inserted in a hole provided, where it is readily adjusted.



Universal Surface Gauge, No. 620

With 4-inch spindle, base not hardened, price each.....\$2.50
With 4-inch spindle, base hardened, price each.. 3.00
Size of base, 2 1/4 by 1 1/2 inches.

Universal Surface Gauge, No. 621

With 9-inch spindle, base not hardened, price each.....\$2.50
With 9-inch and 12-inch spindles, base not hardened, price each..... 2.85
With 9-inch spindle, base hardened, price each.. 3.50
With 9-inch and 12-inch spindles, base hardened, price each..... 3.85
Size of base, 3 1/8 by 2 1/2 inches.

Universal Surface Gauge, No. 622 Heavy Base

With 12-inch spindle, base not hardened, price each.....\$3.00
With 12-inch and 18-inch spindles, base not hardened, price each..... 3.50
With 12-inch spindle, base hardened, price each.. 4.00
With 12-inch and 18-inch spindles, base hardened, price each..... 4.50
Size of base, 4 by 3 3/8 inches

H. Channon Company Chicago

Brown & Sharpe Tools

Different Standards for Wire Gauges in use in the United States

Dimension of Sizes in Decimal Parts of an Inch.

Number of Wire Gauge	American or Brown & Sharpe	Birmingham or Stubbs' Iron Wire	Washington & Moore Worcester, Mass.	W. & M. Steel Music Wire	New American S. & W. Co. & Music Wire Gauge	Imperial Wire Gauge	Stubbs' Steel Wire	U. S. Standard Gauge for Sheet and Plate Iron and Steel	Number of Wire Gauge
00000000					0083				00000000
00000000					0087				00000000
00000000					0095	004	4687	4375	00000000
00000000					010	005	4375	4062	00000000
0000	460	454	3838	011	006	400	375	3437	0000
000	406	425	3625	012	007	372	3125	3125	000
00	3648	380	3310	0133	008	348	2812	2812	00
0	3248	340	3063	0144	009	324	2500	2500	0
1	2893	300	2830	0156	010	300	227	2272	1
2	2576	284	2625	0166	011	276	200	2000	2
3	2284	259	2347	0178	012	252	181	1812	3
4	2043	238	2153	0188	013	232	160	1600	4
5	1819	220	2070	0202	014	212	140	1400	5
6	1620	203	1920	0215	016	192	125	1250	6
7	1442	180	1770	023	018	176	109	1090	7
8	1284	165	1620	0243	020	160	97	9700	8
9	1144	148	1483	0256	022	144	86	8600	9
10	1018	134	1350	027	024	128	77	7700	10
11	0907	120	1206	0284	026	116	68	6800	11
12	0808	109	1055	0296	029	104	60	6000	12
13	0719	095	0915	0314	031	092	52	5200	13
14	0640	083	0800	0326	033	080	46	4600	14
15	0570	072	0720	0345	035	072	40	4000	15
16	0508	065	0625	036	037	064	35	3500	16
17	0452	058	0540	0377	039	056	30	3000	17
18	0403	049	0475	0395	041	048	26	2600	18
19	0358	042	0410	0414	043	040	22	2200	19
20	0319	035	0348	0434	045	036	19	1900	20
21	0284	032	0317	046	047	032	17	1700	21
22	0253	028	0286	0483	049	028	15	1500	22
23	0225	025	0258	051	051	024	13	1300	23
24	0201	022	0220	055	055	022	11	1100	24
25	0179	020	0204	0586	059	020	10	1000	25
26	0159	018	0181	0626	063	018	9	9000	26
27	0141	016	0173	0658	067	016	8	8000	27
28	0126	014	0162	072	071	014	7	7000	28
29	0112	013	0150	076	075	013	6	6000	29
30	0100	012	0140	080	080	012	5	5000	30
31	0089	010	0132		085	010	4	4000	31
32	0079	009	0128		090	009	3	3000	32
33	0070	008	0118		095	009	2	2000	33
34	0063	007	0104			008	1	1000	34
35	0056	005	0095			008	1	1000	35
36	005	004	0090			007	1	1000	36
37	0044					006	1	1000	37
38	0039					006	1	1000	38
39	0035					005	1	1000	39
40	0031					0048	097		40

No. 702 Long Screw and Wire Gauge



This Gauge is graduated on both sides of slot to show all sizes of the American Standard screw gauge from 0 to 30 and is designed for the measurement of wire as well as of machine and wood screws.

This Gauge can also be used to show the sizes of A. S. M. E. Standard screws.

Front of Gauge is also graduated on both edges to 8ths of an inch.

Back of the Gauge is graduated as old or English wire gauge from 17 to 0000, on right, and to 32ds of an inch on left of slot. Outer left hand edge is graduated to 32ds of an inch.

Price each \$3.50
Extra thick. Price each 4.50

No. 705 Twist Drill and Steel Wire Gauge



The Nos. 1 to 60 Gauge is about $\frac{1}{16}$ inch thick, $\frac{1}{4}$ inches wide and $5\frac{1}{4}$ inches long, with decimal equivalents stamped on reverse side. The Nos. 61 to 80 Gauge is about $\frac{1}{8}$ inch thick, $\frac{3}{4}$ inch wide and $\frac{1}{2}$ inches long. Black or polished, as desired.

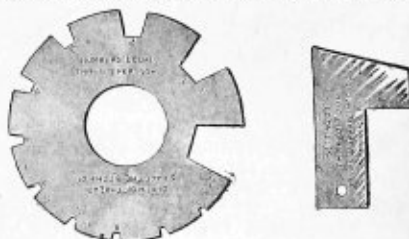
Price each, Nos. 1 to 60 \$1.25
Price each, Nos. 61 to 80 2.00

No. 710 Jobbers Drill Gauge



For gauging twist drills. Sizes $\frac{1}{16}$ to $\frac{1}{2}$ inch.
Price each \$2.50

No. 715 29° Screw Thread Tool Gauge



This Gauge furnishes a correct standard to which tools can be ground to cut threads, of a uniform angle, to take the place of square threads.

This Gauge is made of the best steel, tempered adjusted, and all angles accurately tested after hardening.

Price each \$2.75

No. 696 Steel Music Wire Gauge



American S. & W. Co.'s new standard.

Numbers 000000 to 33.

Decimal equivalent stamped on reverse side.

For table of different standards of wire gauges, see top of page.

Price each \$2.50

Starrett's Tools

No. 232 Short Anvil Micrometer English Measure, Range 0 to 1-2 inch



The anvil on this micrometer is shortened for use in places where ordinary anvil is too long to be inserted. Graduated to read by thousandths up to one-half inch. Has lock nut and ratchet stop.

Price, each \$5.50
Extra for Leather Case..... .65

No. 233 Short Anvil Micrometer

Same as No. 232 but made to read by ten thousandths of an inch.

Price, each \$6.50
Extra for Leather Case..... .65

No. 3 Micrometer English Measure, Range 0 to 1 Inch

For measurement by thousandths up to 1 inch. Has lock nut and ratchet stop.



Price, each \$6.50
Extra for Leather Case..... .65

No. 113 Micrometer

Same as above, but made to read by ten thousandths of an inch.

Price, each \$7.50
Extra for Leather Case..... .65

No. 203 Micrometer English Measure, Range 0 to 1 Inch



For measurements by thousandths up to 1 inch. Not provided with lock nut or ratchet stop.

Price, each \$5.50
Extra for Leather Case..... .65

No. 209 Micrometer

Same as No. 203, but made to read by ten thousandths of an inch.

Price, each \$6.50
Extra for Leather Case..... .65

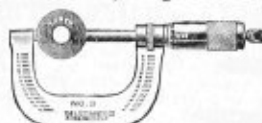
No. 263 Micrometer Heads English Measure, Range 0 to 1 Inch

These heads are easily attached to tools or machines when fine measurements are required. Furnished with or without ratchet stops and lock nuts as desired and are graduated to read to thousandths of an inch.



Price, each \$3.50

No. 2 Micrometer English Measure, Range 1 to 2 Inches



For measurements by thousandths from 1 to 2 inches. Has lock nut ratchet stop and 1 inch test gauge.

Price, each \$7.00
Extra for Leather Case..... .75

No. 213 Micrometer

Same as No. 2 but made to read to ten thousandths from 1 to 2 inches.

Price, each \$8.00
Extra for Leather Case..... .75

No. 212 Attachment for Two-Inch Micrometers

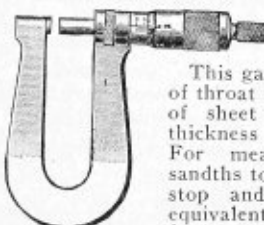
By means of this attachment any 2 inch Starrett micrometer may be instantly converted into a 1 inch tool.

Price, each ... \$2.00



No. 222 Micrometer Sheet Metal Gauge

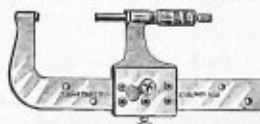
English Measure
Range 0 to 1/2 Inch



This gauge has a 2-inch depth of throat to reach over the edge of sheet metal to gauge its thickness nearer the center. For measurement by thousandths to 1/2 inch. Has ratchet stop and lock nut. Decimal equivalents are stamped on frame.

Price, each \$7.25
Extra for Leather Case..... .75

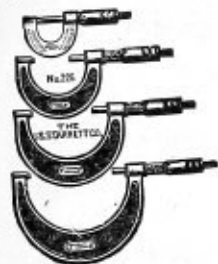
No. 128 Patent Six-Inch Micrometer



This micrometer will measure round work to 4 1/4 inches, and flat work to 6 inches. It can be quickly set to exact position, from 1 inch to 6 inches, by inserting a plug as shown. A valuable feature of this tool is a set of six independent holes through both the movable part and the beam, each hole being bushed with hardened steel bushings, ground and lapped to fit the plug, which locates to exactness the various inch settings.

Price \$20.00
In Leather Case..... 21.50

Starrett's Tools

No. 226 Micrometer Sets, English Measure
Range 1 to 6 inches

These micrometers meet the demand for accurate gauges at a low price.

Each micrometer is graduated to read by thousandths of an inch, is furnished with patent lock nut, and is sent with or without ratchet stop as desired.

The 1 inch has the decimal equivalents stamped on the frame. The other sizes are marked to show their capacity.

Standards for use in adjusting these micrometers will be furnished when desired.

Micrometers will be supplied singly or in sets as desired; and will be sent with ratchet stop and without leather case or standard unless otherwise ordered.

PRICE EACH.

1 inch, with decimal equivalents stamped on frame, without ratchet stop.....	\$5.50
1 inch, with decimal equivalents stamped on frame, with ratchet stop.....	6.00
2 inch, from 1 inch to 2 inches, without ratchet stop.....	4.50
2 inch, from 1 inch to 2 inches, with ratchet stop.....	6.00
1 inch standard.....	1.00
3 inch, from 2 inches to 3 inches, without ratchet stop.....	6.50
3 inch, from 2 inches to 3 inches, with ratchet stop.....	7.00
2 inch standard.....	1.00
4 inch, from 3 inches to 4 inches, without ratchet stop.....	7.00
4 inch, from 3 inches to 4 inches, with ratchet stop.....	7.50
3 inch standard.....	1.15
5 inch, from 4 inches to 5 inches, without ratchet stop.....	7.75
5 inch, from 4 inches to 5 inches, with ratchet stop.....	8.25
4 inch standard.....	1.35
6 inch, from 5 inches to 6 inches, without ratchet stop.....	8.50
6 inch, from 5 inches to 6 inches, with ratchet stop.....	9.00
5 inch standard.....	1.50

PRICES IN SETS

No. in Set	Includes Sizes	Description	Price without Case	Price with Case
3	1, 2 and 3	Without Ratchet Stop	\$18.00	\$20.00
3	1, 2 and 3	With " " "	19.50	21.50
6	1 to 6	Without " " "	41.25	45.25
6	1 to 6	With " " "	44.25	48.25

No. 226 Cases for Micrometers covered with Morocco leather and lined with velvet.

Case for Set of Six



Price Each, Cases Only.

For one inch only.....	\$0.50
For set of three Micrometers.....	2.00
For set of six Micrometers.....	4.00

No. 234 Standard End Measuring Rods

Made of steel, hardened and lapped spherical on ends with a radius of one-half length of rod. Handles are rubber, two-thirds length of rod, and guard against any expansion due to change in temperature when held in the hands, thereby maintaining their accuracy under adverse conditions. The one inch is in the form of a round disc, as shown in illustration.

2 to 6 in. are $\frac{1}{4}$ in. diameter with handles $\frac{1}{8}$ in. diameter.

6 to 12 in. are $\frac{3}{8}$ in. diameter with handles $\frac{1}{2}$ in. diameter.

Size, inches...	1	2	3	4	5	6
Price, each...	\$1.00	\$1.25	\$1.40	\$1.60	\$1.80	\$2.00
Size, inches...	7	8	9	10	11	12
Price, each...	2.20	2.40	2.60	2.80	3.00	3.20



No. 124 Inside Micrometer

Designed for internal measurements, such as measuring cylinders, rings; also for setting calipers, comparing gauges, etc. It is also useful in measuring parallel surfaces. Micrometer screw in head has $\frac{1}{2}$ in. movement in sets A and B, 1 in. in set C, and, by means of extension rods furnished, sizes as given below for each set can be obtained. Extension rods are provided with a collar.

against which rods are conveniently and accurately set in micrometer head. Contact surfaces are all hardened, and provision is made for adjustment, to compensate for wear of the screw and contact surfaces.

Set A has 6 rods and one $\frac{1}{2}$ -inch gauge, and measures from 2 inches to 8 inches.

Set B has 10 rods and one $\frac{1}{2}$ -inch gauge, and measures from 2 inches to 12 inches.

Set C has 4 rods and one 1-inch and two 2-inch gauges, and measures from 8 inches to 32 inches.

Set D comprises sets A and C, and measures from 2 inches to 32 inches.

PRICE EACH

Set A. Without case.....	\$4.50
With " " ".....	5.25
Set B. Without " " ".....	5.50
With " " ".....	6.50
Set C. Without " " ".....	6.50
With " " ".....	8.00
Set D. Without " " ".....	11.00
With " " ".....	12.50

Handle, extra, \$0.40

No. 206 Micrometer Stand



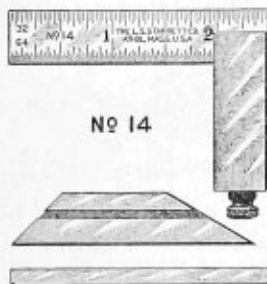
Where frequent reference is to be made to a micrometer that is set at a given size, or a number of pieces must be made the same size, it is often more convenient to bring the work to the micrometer than the micrometer to the work. This stand will be found very convenient for such conditions, holding micrometer securely and allowing both hands free.

Price each.....\$2.00

Starrett's Tools

No. 14 Double Steel Square

With Hardened Head and Blade



No 14

A double solid steel square, with a 2½-inch sliding scale; especially designed for fine tool-makers. Rule is narrow and instantly adjusted to any length, permitting its use where it would be impossible to use any square with a fixed blade. Scale is graduated on one side only, in 32ds and 64ths. An extra bevel blade with a hexagon and octagon angle is made to fit this stock; also a very narrow blade about ¼ inch wide, used by diemakers for squaring small holes.

No. 14A Square.....\$2.00
No. 14B Square with either bevel or narrow blade... 2.24
No. 14C Square, complete..... 2.48
No. 14C furnished unless otherwise ordered.

No. 60 "Reliable" Try Square

Graduated Blade, Not Hardened



The blade is not riveted or soldered to the stock, but is firmly held by patent bolt and nut by means of which the tool can be readily taken apart.

Length of blade, in.....	4	5	6	9	12
Length of beam, in.....	2 ½	3	3 ¾	5 ½	6
Price, each.....	\$0.80	\$0.92	\$1.00	\$1.60	\$2.20

No. 63 Steel Square

With Hardened Blade, Graduated

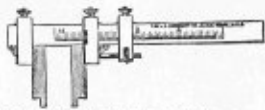


Square has concave depressions in each side of stock, which reduce its weight and make it more convenient to hold between thumb and finger. Stock is case hardened, graduated in 32ds of an inch on one side and 64ths on the other.

Blade, inches, 2	3	4	6	9	12
Beam, inches, 1 ½	2	2 ¾	3 ¾	5	6 ¾
Price, each...	\$1.20	\$1.60	\$2.00	\$2.80	\$4.40 \$5.20

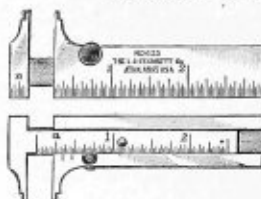
No. 25 Caliper Square

An improved tool for both outside and inside measure. The beam is graduated, 64ths on one side, 100ths on the other.



No. 25A	3-inch with adjusting screw.....	\$2.80
No. 25D	Without.....	2.40
No. 25B	4-inch with adjusting screws.....	3.20
No. 25E	Without.....	2.80
No. 25C	6-inch with adjusting screw.....	4.40
No. 25F	Without.....	4.00
With hardened jaws, extra.....	1.20	
In leatherette case, extra.....	.50	

Sent with adjusting screw and without case unless otherwise ordered.

No. 425 Pocket Slide Calipers
Graduated in 32ds and 64ths

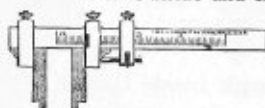
Price, Each

3-inch.....	\$1.60
5-inch.....	2.40

Also made graduated to 32ds on stock and 100ths on slide at same price. No. 425A.

No. 424 Slide Rule Caliper and Circumference Gauge

This gauge has a double function, being graduated to read circumference as well as diameter of thing measured, relation of circumference to diameter being shown by graduations on upper corners of rule (capacity 3½ inches, about 11 inches circumference). The jaws are 1½ inches deep and will caliper a cylinder to 2½ inches in diameter. Rule is graduated in 32ds standard and 16ths circumference measure. Circumference measure assists in calculating how many feet a minute cutting tool in a lathe is doing on any diameter within scope of gauge, and helps determine whether the tools should have a faster or slower speed. Price, each.....\$2.40

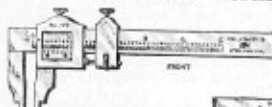
No. 28 Micrometer Caliper Square
For Outside and Inside Measure

This instrument enables one to enlarge or decrease work one or more thousandths from that calipered, and fills the bill for both a first-class caliper square and micrometer of large scope and quick adjustment. Jaws are 1½ inches long and open 4 inches. One side of beam is graduated in 64ths, the other in 40ths; either side may be used as a common caliper square, or, thru micrometer, to show 1,000ths full length, on either inside or outside work.

4-inch, with case.....	\$ 7.00	without, \$ 5.40
6-inch, with case.....	8.80	without, 8.00
9-inch, with case.....	12.20	without, 11.20
12-inch, with case.....	15.60	without, 14.40

Sent with case unless otherwise ordered.

No. 122 Vernier Calipers



Graduated for outside and inside measure, and warranted accurate. Points are placed on beams and slides for setting dividers to transfer distances and full directions for using the Vernier are sent with each caliper.

Jaws are carefully hardened and accurately ground. We can furnish a quarter inch cylindrical plug standard for testing the adjustment of the caliper when desired. Price, \$2.55.

Furnished in finely finished, plush lined, wooden case. Graduated on the front to read by means of the Vernier 1,000ths of an inch. Graduated in 64ths on the back.

Size, inches.....	4	6	9	12	24
Length of jaws, in.....	1 ½	1 ¾	2 ¾	2 ¾	2 ¾
Width of jaws, in.....	.25	.25	.3	.3	.3
Price, each.....	\$11.65	\$15.15	\$17.95	\$19.95	\$27.15

Starrett's Tools

No. 12 Improved Bevel Protractor With Hardened Blade



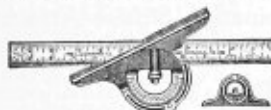
An adjustable rule, held firmly at any point by a thumb nut, passes through a revolving turret, graduated in degrees from 0 to 90, both right and left, and can be accurately adjusted to show any angle. A valuable auxiliary is made in the shape of a small level attached to head, forming an adjustable level to show any degree, thus greatly increasing the usefulness of the instrument.

Blades are the same as those used on the No. 11 squares. Head is 7 inches long.

Blades with No. 4 graduations furnished unless otherwise ordered.

Length of blade, inches	9	12	18	24
Price each	\$2.05	\$2.25	\$2.65	\$3.00
Protractor head only with level attachment	\$1.50			

No. 490 New Bevel Protractor With Reversible Hood and Hardened Blade.



Same general design as No. 12 with added feature of having head extend both sides of blade, thus the same angles may be transferred from either side of frame without resetting. Turret is graduated to read both ways from 0 to 180 degrees, enabling readings to be made from turret, indicating supplement of angle, as well as angle required. One zero line on frame shows clearly whether acute or obtuse angles are obtained. Head is 7 inches long, but will fit blades of Nos. 11 and 23 Combination Squares and Sets. Blades with No. 4 graduations furnished unless otherwise ordered.

Length of blade, inches	9	12	18	24
Price each	\$2.65	\$2.80	\$3.40	\$3.75
Protractor head only, with level	\$1.85			

No. 492 Bevel Protractor

Same as No. 12, except that head is made with smooth finish to match finish of No. 33 Combination Square; turret is graduated to read both ways from 0 to 180 degrees.

Length of blade, inches	9	12	18	24
Price each	\$2.25	\$2.45	\$3.00	\$3.40
Protractor head only, with level	\$1.50			

No. 9 Combination Set With Hardened Blade



Same as a combination square with the addition of a protractor head, making possible greater variety of uses in laying out and testing work than is possible with any other instrument used by the mechanic. Illustration shows Combination Square No. 11 with Center Head and 7 inch Bevel Protractor No. 12, all on a No. 11 square scale.

Length of blade, inches	9	12	18	24
Price each	\$2.67	2.84	3.39	3.74

No. 433 New Combination Set—With Hardened Blade

Set consists of No. 33 Combination Square with hardened drop forged stock and Center Head and No. 492 Protractor Head. Blades with No. 4 graduations furnished unless otherwise ordered.

Length of blade, inches	9	12	18	24
Price each	\$3.56	\$3.75	\$4.31	\$4.69

No. 434 New Combination Set—With Hardened Blade

Set consists of No. 33 Combination Square with hardened drop forged stock and Center Head and No. 490 Protractor Head. Blades with No. 4 graduations furnished unless otherwise ordered.

Length of blade, inches	9	12	18	24
Price each	\$3.94	\$4.13	\$4.69	\$5.06

No. 13 Patent Double Square—With Hardened Blade



A very practical tool for machinists and fine tool makers. Sliding scale, shortened or extended full length makes it more valuable than a full set of common squares. Blades are furnished with No. 1, 2, 4, 7 and 16 graduations; No. 4 being

furnished unless otherwise ordered. An extra bevel blade with a hexagon and octagon angle is made to fit the 4 and 6 inch sizes. The 6, 9 and 12 inch sizes are furnished with a level in the stock.

Length, inches	4	6	9	12
Price each	\$1.00	\$1.60	\$2.40	\$3.20
Price with extra bevel	\$1.32	\$2.00	.....	.....
Bevel blade with 4 and 6 inch furnished unless otherwise ordered.				

No. 13G Double Square

Same as No. 13 except that one side of stock is grooved, making tool convenient for use on round work without impairing its value for ordinary purposes.

Length, inches	4	6	9	12
Price each	\$1.20	\$1.88	\$2.80	\$3.60
Price with extra bevel	\$1.52	\$2.28	.....	.....

No. 21 Thin Steel Try Square—For Machinists and Draughtsmen



2-in., 1-20 in. thick grad. 16ths and 64ths on one side, 32nds and 64ths on other. Price each \$1.00
2-in., 1-20 in. thick grad. 16ths and 64ths on one side, 32nds and 64ths on other. Price each 1.40

4x3 in., $\frac{1}{16}$ in. thick, grad. 16ths and 32ds both sides	1.80
6x4 in., $\frac{1}{16}$ in. thick, grad. 16ths and 32ds both sides	2.60
8x6 in., $\frac{1}{16}$ in. thick, grad. 16ths and 32ds both sides	3.40
10x8 in., $\frac{1}{16}$ in. thick, grad. 16ths and 32ds both sides	4.20
12x8 in., $\frac{1}{16}$ in. thick, grad. 16ths and 32ds both sides	5.00

No. 20 Hardened Edge Solid Steel Squares—Not Graduated

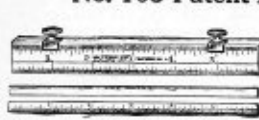


Blade Inside Beam	Full Length of Beam, Inches	Price Each
1	1	\$1.60
1 1/2	1 1/2	1.80
2	2	2.00
3	3	2.40
4 1/2	3 1/2	3.60
6	4 1/2	4.80
9	5 1/2	7.20
12	7	9.60
15	8 1/2	16.00
18	10 1/2	18.40
24	12 1/2	24.00

Price for larger sizes quoted on application.

Starrett's Tools

No. 105 Patent Key Seat Rule



The key seat rule is an improvement over the ordinary type in that the machinist's scale is used as part of the key seat rule. This is made possible by a device which holds two straight edges together in

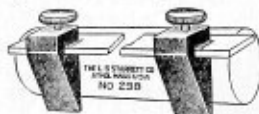
the form of a box square. One of these rules is a plain straight edge, the other rule with which machinist ordinarily works. Two edges forming box square when applied to surface of cylindrical piece keep graduated edge of rule in a line parallel with axis.

The steel auxiliary with straight edge is either plain or graduated in 32ds, and 64ths, as desired, and sent when ordered. Unless otherwise ordered the key seat rule is sent without auxiliary straight edges.

No. 105A. 6-inch, each	\$2.25
No. 105B. 6-inch, with auxiliary straight edge, plain, ea	2.75
No. 105C. 6-inch, with auxiliary straight edge, graduated, each	3.00
No. 105D. 9-inch, each	3.00
No. 105E. 9-inch, with auxiliary straight edge, plain, ea	3.75
No. 105F. 9-inch, with auxiliary straight edge, graduated, each	4.25

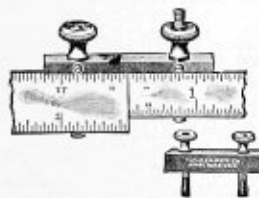
No. 298 Key Seat Clamp

Designed to transform any common steel scale into a Key Seat Rule. They are made from steel, case hardened and ground accurate. A pair weighs but one ounce. They can be put on or off almost instantly. May be used with combination square blades or with any straight rule. Price, per pair



Price, per pair \$0.60

Starrett's No. 299 Rule Clamps



Used for clamping two steel rules together, end to end, making one long rule. The rules to be clamped may be either the same or different widths, up to 1 1/4 inches. This clamp will be of special value to mechanics, whose tool chests will usually not hold rules longer than 12 inches.

Price, each \$0.50

No. 11 Patent Combination Square

With Hardened Blade

This tool facilitates work on the part of the mechanic, being the combination of a rule, square, mitre, depth gauge, height gauge, level and center head.

4-inch, without center head or level	\$0.75
4-inch, with center head	\$1.50 without, 1.00
9-inch, with center head	1.75 without, 1.25
12-inch, with center head	2.00 without, 1.50
18-inch, with center head	2.75 without, 2.25
24-inch, with center head	3.25 without, 2.75

The 6, 9, 12, 18 and 24-inch have levels (in their stocks) and center heads, and will be sent complete unless otherwise ordered. The 18 and 24-inch have same stock as 12-inch. The blades are graduated in No. 4, No. 1, No. 2 and No. 7 graduations. Those of No. 4 graduation being most used, will be sent unless otherwise ordered.

No. 23 Combination Square

For Carpenters and Machinists

The same in design as No. 11, but, while the blade is made from good, hard steel, it is not hardened. Made with No. 4 graduations only.

6-inch, with center head	\$1.50 without, \$1.00
9-inch, with center head	1.75 without, 1.25
12-inch, with center head	2.00 without, 1.50

No. 11-S Combination Square

This tool is the same as No. 11 Combination Square, except that it is furnished with blades graduated the same as shrink rules, and intended for the use of pattern makers. Made with No. 4 graduations only and in 1/8 and 1/16 inch shrinkage to the foot.

Price each, 12-inch blade with center head	\$2.50
Price each, 12-inch blade without center head	2.00
Price each, 12-inch blade only	1.75

Blades are made in No. 4 graduation, either 1/8 or 1/16 inch shrinkage, and will fit all Starrett's Combination Squares and sets; also all bevel protractors. Sent with centerhead and 1/8-inch shrinkage unless otherwise ordered.

No. 33 Combination Square

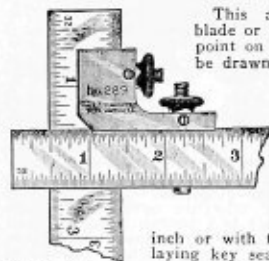
Drop Forged Steel

With Hardened Head and Blade

This square is the same as No. 11, except that it is made of drop forged steel and has hardened head as well as blade.

Size, inches	6	9	12	18	24
With center head	\$2.50	\$2.75	\$3.00	\$3.75	\$4.25
Without center head	2.00	2.25	2.50	3.25	3.75

Combination Square Attachment



This attachment, with a second blade or rule, can be clamped at any point on a square, so that lines may be drawn parallel to head, and when combined with center head is convenient in scribing parallel chords on the ends of cylindrical work.

Made to fit 12, 18 and 24-inch blades of Nos. 11, 23 and 33 squares. Can be used with any regular rule as wide as 1 1/4 inch or with flat steel square No. 21, in laying key seats, etc.

Price each \$0.80

No. 17 Large Combination Square

With Hardened Blade

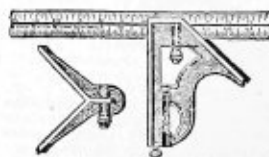
Same as No. 11, except that the parts are slightly larger thereby increasing its efficiency.

18-in. blade, 1 1/4 in. wide, 3/32 in. thick; 6-in. stock with 4-in. mitre. With center head	\$4.25
Without center head	3.25
24-in. blade, 1 1/4 in. wide, 3/32 in. thick; 6-in. stock with 4-in. mitre. With center head	4.25
Without center head	3.25

Furnished with center head unless otherwise ordered.

No. 8 Special Standard Square

With Hardened Blade

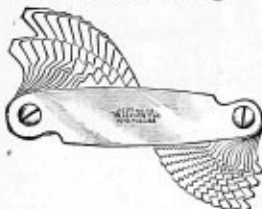


This square is similar to No. 11, but is larger and heavier. Designed for use of manufacturers who desire to keep a reliable standard.

18-in. blade, 1 1/2 in. wide, 1/10 in. thick; 8 1/4-in. stock with 5-in. mitre. Without center head	\$5.00
24-in. blade, 1 1/2 in. wide, 1/10 in. thick; 8 1/4-in. stock with 5-in. mitre. Without center head	6.00
Center head only, for either size	1.00

Starrett's Tools

Screw Pitch Gauges



No. 40 Improved

Free end of leaf is made narrow, permitting it to be inserted in a small nut, that either outside or inside threads may be compared.

This gauge has twenty-two pitches, viz: 9, 10, 11, 11½, 12, 13, 14, 15, 16, 18, 20, 22, 24, 26, 27, 28, 30, 32, 34, 36, 38 and 40.

Price each \$1.00

No. 4 Screw Pitch Gauge

24 Pitches, 4 to 30

Has the following pitches: 4, 4½, 5, 5½, 6, 7, 8, 9, 10, 11, 11½, 12, 13, 14, 15, 16, 18, 20, 22, 24, 26, 27, 28, 30. Like No. 40 it can be used inside of a nut as well as on outside of a screw or bolt. It is also a convenient and reliable tool to use as a 60-degree center gauge and gauge to test the grinding of either an inside or outside threading tool.

Price each \$1.25

No. 5 Screw Pitch Gauge

26 Pitches, 32 to 82

Of the same form as No. 40, for inside and outside work. Has the following pitches: 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58, 60, 62, 64, 66, 68, 70, 72, 74, 76, 78, 80, 82.

Price each \$1.25

No. 6 Screw Pitch Gauge

30 Pitches, 4 to 42

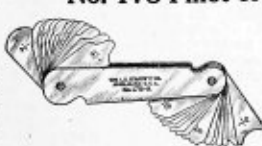
Of the same form as No. 4. Has the following pitches: 4, 4½, 5, 5½, 6, 7, 8, 9, 10, 11, 11½, 12, 13, 14, 15, 16, 18, 20, 22, 24, 26, 27, 28, 30, 32, 34, 36, 38, 40, 42. Price each \$1.50

No. 155 Screw Pitch Gauge

U. S. Standard

No. 155 has 25 pitches viz: 2½, 2¾, 3, 3½, 3¾, 4, 4½, 5, 5½, 6, 7, 8, 9, 10, 11, 12, 13, 14, 16, 18, 20. Also a center gauge with coarse and fine notch. Price each \$1.50

No. 178 Fillet or Radius Gauge



A concave and convex gauge, especially adapted for use in laying out special forming tools, dies, etc., as well as for measuring fillets. For use machinists and tool makers as well as pattern makers.

Size A has 30 leaves stamped to indicate radii by 64ths, from ¼ in. to ½ in. (one-half diametric size). Diameters are from ½ in. to 1 in., varying by 32ds.

Size B is made with 32 leaves stamped to indicate radii by 64ths, from ¼ in. to ½ in. Diameters are from ½ in. to 1 in., varying by 32ds.

No. 178A. Price each \$1.00

No. 178B. Price each 1.50

No. 72 Thickness Gauge or "Feeler"



This gauge has 22 leaves, varying in thickness by thousandths, running from .004 to .025. The thickness of each leaf is designated by the number upon it. Each leaf may be used singly or in combination with others, and any thickness in thousandths within their limits may be quickly obtained. The leaves fold within the case, which is 2¼ inches long.

Price each \$1.50

No. 172 Thickness Gauge

Size A has nine leaves, viz., .0015, .002, .003, .004, .006, .008, .010, .012 and .015. Sizes B and C have eight leaves the same as A with the omission of .0015. Leaves are tempered and have thickness marked upon them. Size A is made with either straight leaves as shown, or with tapering leaves. Sizes B and C are made with tapering leaves only.

No. 172A. Size 2¾ x 1½ inches \$1.00

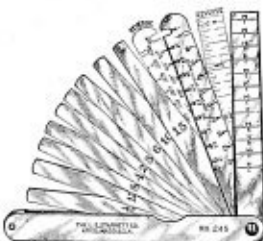
No. 172B. Size 4¾ x 1½ inches 1.50

No. 172C. Size 6¼ x 1½ inches 2.00

(Size A will be sent unless otherwise ordered.)



No. 245 Taper, Wire and Thickness Gauge



Taper gauge shows thickness in 64ths to 16ths of an inch on one side, and reverse side is graduated as a rule three inches of its length, reading in 8ths and 16ths of an inch.

Wire gauge, English standard, shows on one side sizes numbered from 19 to 36, with two extra slots, one ½, the other ¼ of an inch, and on reverse side the decimal equivalents expressed in thousandths.

This gauge has also 9 thickness or feeler gauge leaves, approximately 4 inches long, of the following thicknesses: .002, .003, .004, .006, .008, .010, .012, .015 and ¼th of an inch.

Price each \$4.00

Starrett's No. 45 Depth Gauge



The wire in this gauge is held to a groove by a friction spring inside the nut while adjusting, and may be used close to the end, as well as in the middle of the straight edge.

By loosening the nut, the gauge may be neatly folded.

Price each

No. 45A with 3½-in. stock \$0.75

No. 45B with 6-in. stock 1.15

No. 45C with 10-in. stock 1.35

Starrett's Tools

Depth Gauge

Has in place of the round wire to slide in the groove, as shown with No. 45, a 4-inch or 6-inch scale, $\frac{1}{16}$ -inch wide, graduated in either 32ds and 64ths, 50ths and 100ths, or 64ths and 100ths, indicating exact measurements, and may be used separately from the gauge.

	Price Each
45A with 3 1/2" stock and 4" scale.....	\$1.25
45B " 3 1/2" " " 6 "	1.50
45C " 6 " " 4 "	1.50
45D " 6 " " 6 "	1.75
45E " 10 " " 6 "	2.25

No. 237. Depth Gauge

The head of this gauge is case-hardened; 2 inches wide across base, $\frac{1}{4}$ -inch thick.

Blade which is conveniently held in groove of head by a knurled lock nut, is a 6 inch narrow spring-tempered rule. Blades graduated in 32ds and 64ths of an inch will be sent unless otherwise ordered, but can also supply them graduated in 50ths and 100ths, or 64ths and 100ths.

Price\$1.25



No. 446. Micrometer Depth Gauge

Designed for measuring depth of grooves, holes or irregular parts. Has $\frac{1}{2}$ -inch movement of screw, reading in thousandths; and with two $\frac{1}{2}$ -inch and one 1-inch standard collars to slip off or on spindle, 2 1/2 inches, reading in thousandths, can be obtained. Head is about $\frac{1}{16}$ -inch thick; this and the point of measuring rod are hardened.

Head carries with it a knurled set screw for locking spindle to prevent changing after being set.

No. 446A. 2 1/2-in. base, with case, \$6.00, without \$5.50
No. 446B. 4 -in. base, with case, 6.75, without 6.00

No. 447. Height Gauge Attachment

A steel base for holding inside micrometer No. 124, sets A and B, for use as a height gauge. Anvil end is even with bottom of base and micrometer is held perpendicularly, forming a reliable gauge. A slight turn of knurled screw instantly clamps it or releases it from base.

Price, attachment only..... \$1.75



Tool Makers' Parallel Clamps

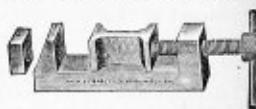


No.	161-AA.	Jaw opening	1/4"	lgth.	Jaw 1 1/2"	Per pair
"	161-A.	"	1 1/4"	"	2"	\$1.20
"	161-B.	"	1 3/4"	"	2 1/2"	1.40
"	161-C.	"	2 1/4"	"	3"	1.75
"	161-D.	"	2 3/4"	"	4"	2.05

No. 160. Tool-Makers' Steel Clamps

Made from drop forgings, case-hardened, have take-up blocks to slip on and off end of screw, and are held to same in a novel manner. Will hold work square and parallel for laying out on surface plates, fitting or drilling. A round piece may be rigidly held in two clamps and drilled on an upright, central and parallel. With small block in use, capacity of smaller clamps is a little over one inch, and that of larger clamp two inches.

Price per pair, 1 inch.....\$2.00
" " 2 ".....2.50



No. 268. Drill Blocks and Clamps



Clamp will hold a round piece up to 1 1/2 inch diameter firmly in groove of Blocks, for prick punching, drilling or laying out a series of holes before and while being drilled.

Drill blocks are furnished in pairs. Size of each is 2 inches x 1 1/2 inch.

No. 268A. Two Drill Blocks, \$1.00
No. 268B. Clamp50

No. 268C. Set, complete..... 1.50
No. 268D. one Clamp and two Drill Blocks, sent unless otherwise ordered.

"Little Giant" Jack Screws



Designed for tool-room use, leveling up work on a planer-bed or under an upright drill, setting up machinery, etc. All parts are case-hardened.

No. 190. Jack (A) is 1 1/2 inch diameter at base and has a range from 2 1/4 to 2 3/4 inches. Will raise 1,000 pounds or more. Two extension bases (B and C) are made to fit the base of main part (A) and are 2 and 1 inch high respectively. An auxiliary pointed screw (D) is supplied to be used in place of screw with swivel cap in certain places where it may be preferable. Base (E) is also provided, for use in cases where such a shape may be desirable.

No. 191. A smaller size, 1 inch diameter. Part A, 1 1/2 inch high; B, 1 inch; and C, 1/2 inch. Prices are for either No. 190 or 191.
Jack (A).....\$0.75
Extension Base (B)......30
Extension Base (C)......15
Extension Base (E)......15
Extra Screw (D).....\$0.15
Jack with all attachments..... 1.40
Sent complete (\$1.40) unless otherwise ordered.

Starrett's Tools

Tool-Makers' Buttons

With Screws and Washers for Jig Work

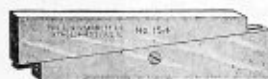


No. 494

Hardened and ground to standard size, and used to locate holes to be chucked and bushed for jigs, where positive accuracy is required. Buttons are furnished screwed to a small plate, which makes a convenient holder for them when not in use.

No. 494A	.300x $\frac{1}{2}$ inch	Price per set	\$2.00
No. 494B	.400x $\frac{1}{2}$ inch	" "	2.00
No. 494C	.500x $\frac{1}{2}$ inch	" "	2.00
Taps (.125-40)	to use with Tool-Makers' Buttons, each		.25

No. 154 Adjustable Parallels

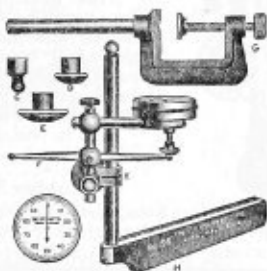


For use with milling, planer and shaping vises, also for leveling up work on planer, drill press, etc. Give any height from $\frac{1}{8}$ inch to $2\frac{1}{4}$ inches.

Number	Length	Thickness	Capacity	Price each
No. 154A	1 $\frac{1}{2}$ in.	$\frac{3}{8}$ in.	$\frac{1}{8}$ in. — $\frac{1}{4}$ in.	\$0.75
No. 154B	2 $\frac{1}{2}$ in.	$\frac{3}{8}$ in.	$\frac{1}{8}$ in. — $\frac{1}{4}$ in.	.90
No. 154C	3 $\frac{1}{2}$ in.	$\frac{3}{8}$ in.	$\frac{1}{8}$ in. — $\frac{1}{4}$ in.	1.00
No. 154D	4 $\frac{1}{2}$ in.	$\frac{3}{8}$ in.	$\frac{1}{8}$ in. — $\frac{1}{4}$ in.	1.25
No. 154E	5 $\frac{1}{2}$ in.	$\frac{3}{8}$ in.	$\frac{1}{8}$ in. — $\frac{1}{4}$ in.	1.50
No. 154F	6 $\frac{1}{2}$ in.	$\frac{3}{8}$ in.	$\frac{1}{8}$ in. — $\frac{1}{4}$ in.	1.75

No. 196 Universal Dial Test Indicator

Simple, reliable, easily read and very sensitive. Slightest pressure upon contact point produces a movement of hand on dial. Circumference of dial divided into 100 equal spaces, each representing a movement of contact point of one-thousandth of an inch. One revolution of hand therefore indicates 1-10 inch, capacity of instrument being two-tenths. By bringing contact point against work with just enough pressure to give hand one full turn, then setting it at 0, an opportunity is given for one full revolution of hand to both right and left of 0, showing a rise or drop in work and amount of variation. A most valuable feature is adjustable dial. By turning knurled rim dial may be instantly moved to bring 0 mark to any point desired in relation to hand. Each indicator is fitted with three hardened contact points for different classes of work. Special tool post and sleeve are useful in lathe work. For general work indicator with sleeve B is adapted for use with our 9 inch or 12 inch surface gauges.



Clamp G permits attaching indicator to large lathe and planer tools, milling arbors, etc.

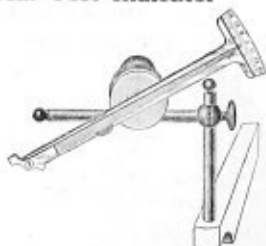
Attachment F more than doubles the value of indicator, adapting it for use inside of holes, to reach over blockings on face plates, etc.

No. 196A	Indicator with all attachments, as shown	\$10.75
No. 196B	Indicator only, with 3 contact points	7.00
No. 196F	Hole attachment	1.50
No. 196G	Clamp	.75
No. 196H	Tool post	.75
No. 196K	Sleeve	.75
	Extra contact points, each	.10

No. 196A, Indicator complete, will be sent unless otherwise ordered.

No. 64 Universal Test Indicator

May be used to test and show imperfections or truth of inside, outside or surface work. Can be instantly attached to spindle or needle of any surface gauge and used in connection with same to show the slightest variation in thousandths. May be clamped to flat or round support, varying in size from a surface gauge needle up to $\frac{3}{8}$ -inch, flat or round.

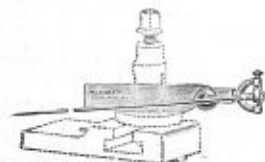


Indicator only	\$2.50
Tool-Post Holder, without arm	.75
Tool-Post Holder, with arm	1.00
Indicator, with Tool-Post Holder and arm, complete	3.50

Sent complete unless otherwise ordered. This indicator may be attached to No. 56, 57 or 257 Surface Gauge.

No. 65 Center Tester

This instrument was designed to use in adjusting and locating centrally any point or hole in a piece of work operated upon in a lathe chuck or on a face-plate; also to test the truth of lathe centers, or a shaft between the centers, the instrument being held in the tool post.



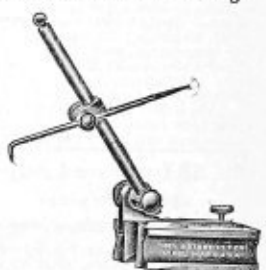
Price, each \$3.50

No. 56 Tool-Makers' Universal Surface Gauge

This gauge is adapted for light work. The base is steel, case hardened, with depressions milled in the sides for the thumb and finger to grasp. A V-shaped groove in the end and bottom adapts it for use on cylindrical work. An auxiliary guide piece is furnished to clamp to the base.

No. 56A, with 4-inch spindle and auxiliary guide, price	\$3.00
No. 56B, without auxiliary guide, price	2.50

Sent with guide unless otherwise ordered. A 7-inch spindle is furnished when ordered at an extra cost of 20 cents.



No. 57 New Universal Surface Gauge

Has heavy base, grooved thru the bottom and end, adapting it for use on or against circular work as well as flat surfaces.

In the rear end of the base are two gauge pins frictionally held which may be pushed down to bear against the edge of a surface plate or in the slot of a planer bed for linear work. For small work the spindle may be removed and the scriber inserted in hole provided where it can be sensitively adjusted and used to advantage on bench work.

An extra long spindle which may be quickly substituted for the regular will be sent with the gauge when ordered.

No. 57A	3 inch base with 9 inch spindle	\$2.50
No. 57B	3 " " " 9 and 12 inch spindles	2.55
No. 57C	3 $\frac{1}{2}$ " " " 12 inch spindle	3.00
No. 57D	3 $\frac{3}{4}$ " " " 12 and 18 inch spindles	3.50



Write for special circulars on waste.

Starrett's Tools

No. 257 Universal Surface Gauge

Spindle may be set upright or at any angle, or turned so as to work under base. Can be sensitively adjusted to any position. Snug and head carrying scriber are so made that when clamp nut is loosened all may be freely moved to any position, and by friction springs, retained in place until a slight turn of clamp nut holds them firmly.

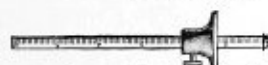
In base are four gauge pins, frictionally held, which may be pushed to bear against edge of a surface plate, or in slot of a planer bed for linear work.

Special attention is called to the four gauge pins in corners of base, which adapt it to be used as a locomotive guide liner and make it more convenient than other gauges for many uses.



No. 257A.	3-inch base, with 9-inch spindle.....	\$3.50
No. 257B.	3-inch base, with 9 and 12-inch spindles.....	\$3.85
No. 257C.	3½-inch base, with 12-inch spindle.....	4.00
No. 257D.	3½-inch base, with 12 and 18-inch spindles.....	4.50

No. 29 Scratch Gauge



For scribing lines parallel to a given surface, scratch gauge is used if distance is not too great and if line is to be scribed on a surface nearly at right angles with a given surface. Beam is graduated 50ths, or 64ths of an inch.

5-inch (beam ½-inch) graduated.....\$1.00 Not graduated.....\$0.65
6-inch (beam ¾-inch) graduated.....1.25 Not graduated......75

Unless otherwise ordered, we shall send those graduated in 64ths.

Two extra cutters will be sent with each gauge, fastened to the case.

No. 67 Improved Scriber

Length, with short bent point, 9 inches; with long point, 12 inches. All parts are interchangeable. The knurled sleeve is nickled.

Price complete.....	\$0.50
Price without long point.....	.35
Straight point, long or short bent point, each.....	.10
Long bent point, each.....	.15

The tool will be sent complete unless otherwise ordered.

No. 68 Improved Adjustable Sleeve Scriber

Made in two lengths, 8 inches and 12 inches. Tool makers will find the small size more desirable for general use, and the large one for heavier work. For pattern makers a knife scriber, made of a fine grade of steel, is supplied as an auxiliary.

Price each, either size, without knife point.....\$0.50
Knife point, extra......15
Extra scriber points, each......15

The 8-inch, being the more popular size, will be sent (without knife point) unless otherwise ordered.

No. 70 Pocket Scriber

This tool is made from steel tubing, knurled and nickel plated. The scriber is reversible, telescoping into the stock, and is held by a slight turn of the chuck so that it is always as safe to carry in the pocket as a penknife.

No. 70A.	Handle ¼-inch diameter.	Price each.....	\$0.25
No. 70B.	Handle ⅜-inch diameter.	Price each.....	.35

No. 162 Pin Vises



Have hardened jaws with chucks for holding scribers, small files, etc., nickel plated.

Number.....	162A	162B	162C	162D
Capacity, ins.	.0 to .04	.03 to .062	.05 to .125	.115 to .187
Price each.....	\$0.55	\$0.55	\$0.55	\$0.75
Price of set complete (one of each size).....	\$2.40			

Starrett's Speed Indicators

No. 104 High Speed

This indicator may run at highest speed required without heating, and this is on account of our frictionless bearing, against which the inner end of the spindle revolves. The working parts of this instrument are encased, and the dial plate has two rows of figures, reading right or left, as the shaft may run.

Price each.....\$1.00

Price each in leatherette case.... 1.50



We supply the indicators with a spindle 7½ inches long for use on dairy machines, etc., for 65 cents extra. The indicator in pasteboard box (price \$1.00) will be sent unless otherwise ordered.

No. 106 "Improved"

The graduations show every revolution, and with two rows of figures read both right and left, as the shaft may run. The instrument is nickel-plated and has a rosewood handle.

Price each, in pasteboard box.....\$1.50

Price each, in leatherette case..... 2.00

Sent in pasteboard box unless otherwise ordered.



No. 107 "Registering"

This instrument was devised to automatically register hundreds as well as units and tens, and thus relieve the mind from keeping tally. Will register 5,000 revolutions.

Price each, in pasteboard box....\$3.00

Price each, in leatherette case... 3.50

Sent in pasteboard box unless otherwise ordered.



Rubber Tips

Indicators listed above are supplied with two rubber tips for pointed and hollow centers, as shown in illustrations.

Surface Speed Attachment for Speed Indicators

Attachment

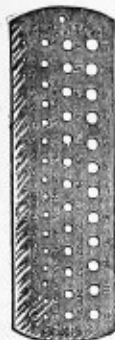
Showing Applied



This attachment can be applied to any of the speed indicators listed above, and when so applied will show the number of lineal feet per minute the periphery of a shaft is running, and thus enable a workman to know whether the speed is too slow or too fast to get the most work the tool will stand. A close approach to accuracy is not claimed for this attachment, but it is very convenient and adequate for the purpose intended.

Price each.....\$0.50

Starrett's Tools



No. 185 Time Saver Drill, Tap, and Steel Wire Gauge

By the use of this gauge one is enabled to select at once the right sized drill to suit machine screw tap most commonly used, leaving just stock enough for the tap to cut as near a full thread as is practicable for one tap without breaking it, thus saving much time and uncertainty of result attending the former crude ways of making a selection.

Price each.....\$2.00

No. 133 Engineers' and Plumbers' Levels



An adjustable, incline level, a fixed level, and a plumb. The hinged tube inside the working faces of the frame, carrying a level glass, is adjustable to the graduated scale, and shows any incline by 32ds (or less) to 2 inches to the foot without interfering in the least with the plumb or level.

10-inch, with plain glasses, \$2.75; with ground glasses.....\$5.75
15-inch, with plain glasses, 3.00; with ground glasses..... 6.00

No. 186 Drill and Steel Wire Gauge

This gauge gives the number of drill to fit each hole and size of hole in thousandths of an inch. No. 1 to 60 wire gauge. Price, each.....\$1.50

No. 187 Jobbers Drill Gauge

This gauge is for gauging twist drills and shows sizes from $\frac{1}{8}$ to $\frac{1}{2}$ -inch by 64ths. Price, each.....\$2.25

No. 130 Iron Level



Bench level, $3\frac{1}{2}$ -inch. Price each.....\$0.50

No. 132 Iron Bench Levels With Double Plumbs



4-inch, with square ends.....\$1.35
6-inch, with square ends..... 1.50
9-inch, with square ends..... 1.65
12-inch, with square ends..... 1.75
18-inch, with grooved ends..... 2.00
24-inch, with grooved ends..... 2.25

Nos. 97 and 98 Improved Levels for Testing Shafting, Etc.



In addition to the regular parallel vial, the bases have a cross level which enables one to place or hold the base on a shaft level in its cross section, not canted sidewise; for the shape of a level glass is such that, though true as adjusted on a flat surface, it will not be reliable when canted sidewise. Hence the value of the cross level, not only to test the truth of shafting, but other surfaces which tend to throw the level base into a canting position.

No. 97

6-inch, with plain vial.....\$1.75
8-inch, with plain vial..... 2.00
12-inch, with plain vial with plumb..... 2.50
18-inch, with plain vial with double plumb..... 3.50

No. 98

6-inch, with ground and graduated main vial.....\$4.00
8-inch, with ground and graduated main vial..... 4.50
12-inch, with ground and graduated main vial with plumb..... 6.00
18-inch, with ground and graduated main vial with double plumb..... 8.50

Nickel Plated Pocket Levels, No. 135



2 $\frac{1}{2}$ -inch, each.....\$0.40
3 $\frac{1}{2}$ -inch, each..... .50



No. 136 Cross Test Level

As the cut shows, two levels are united in one frame, extending at right angles $2\frac{1}{4}$ -inches each way. The level weighs but 4 ounces. When placed on work to be leveled in both directions, it will not be necessary to move the tool.

Price.....\$0.75

No. 900 Set of Tools



Specially suitable for Technical Students and Apprentices

In folding leather case. Size of case folded, 7 inches x $4\frac{1}{4}$ inches x $1\frac{1}{8}$ inches.

This set consists of the folding leather case and the following tools:

No. 11. 6-inch Combination Square, complete.
No. 117B. Center Punch.
No. 321. 6-inch Flexible Steel Rule in pocket case.
No. 390. Center Gauge.
No. 241. 4-inch Caliper.
No. 79. 4-inch Outside Caliper with solid nut.
No. 73. 4-inch Inside Caliper with solid nut.
No. 83. 4-inch Divider with solid nut.
Price, set complete.....\$6.00

Starrett's Tools

No. 1 Adjustable Jaw Cut Nipper



Jaws are detachable so they can be removed, ground and adjusted when worn. Each jaw can be ground away, $\frac{1}{4}$ inch remaining as good as new for all practical purposes. When used up new jaws can be obtained. Head and handles are of drop forged steel, finely finished, all parts are casehardened except jaws which are made from a high grade of steel, nicely tempered. The $5\frac{1}{2}$ -inch nippers open $\frac{1}{4}$ -inch, and the 7-inch open $\frac{1}{2}$ -inch.

$5\frac{1}{2}$ -inch, M (for music wire).	Price each.....	\$2.75
$5\frac{1}{2}$ " " C (for common use).	Price each.....	2.75
$5\frac{1}{2}$ " " B (for bicycle use).	Price each.....	2.75
7 " either M, C, or B.	Price each.....	3.25
Extra jaws either M, C, or B, which should be designated as above, per pair.....		.50
Unless otherwise ordered, Cut-Nippers with M jaws will be sent.		

No. 235 Tile Cut Nipper

These nippers are similar to No. 1, except that frames are cut out to allow jaws to be adjusted for wide opening, thus fitting them to be used for cutting tile.

Size $5\frac{1}{2}$ -inch.	Price each.....	\$2.30
Size 7 " "	Price each.....	2.60

No. 199 Cut Nipper

Wire can be cut at either extreme end of the jaws.

The cutting jaws conform to the inside of a bicycle rim, and will cut off the spokes just as close as required.

5-inch.	Price each.....	\$1.50
Jaws, per pair		1.00
Jaws, each .....		.50

In ordering extra jaws, specify which jaw is wanted.



No. 87 Mercury Plumb Bob

These plumb bobs are made from solid steel bored and filled with mercury and are of great weight in proportion to size. Low center of gravity, small diameter, hardened and ground points, knurling on body, and the simple and effective device at top for fastening end of line after winding up. Each is provided with a braided silk line.

Prices, Nickel Plated

	Each
4 in. long, $\frac{1}{2}$ in. diam., $3\frac{1}{2}$ oz.....	\$1.25
5 in. long, $\frac{5}{8}$ in. diam., 6 oz.....	1.75
$5\frac{1}{2}$ in. long, $\frac{3}{4}$ in. diam., 12 oz.....	2.25
6 in. long, 1 in. diam., 16 oz.....	2.75



No. 553 Pocket Screw Drivers

Made from steel tubing, knurled and nickel-plated. Butt of blade fits solid lock in tube, preventing turning.

To carry in pocket, reverse blade, inserting it in handle, giving a slight turn of the chuck to keep secure.

No. 553A. Handle $\frac{1}{4}$ in. diameter, blade 2 1/2 in. long, weight $\frac{1}{2}$ oz.	Price each.....	\$0.35
No. 553B. Handle $\frac{3}{8}$ in. diameter, blade 3 in. long, weight $1\frac{1}{2}$ oz.	Price each.....	.35
Extra blades.	Price each.....	.10



No. 557 Magazine Screw Driver



This tool has four blades of different widths, any of which may be quickly taken from telescope handle and inserted in end, where it is automatically locked and held for use.

The smaller blades may be used to make holes in wood for screws, as well as to drive them home. Widths of blades are $\frac{1}{8}$ -in., $\frac{3}{16}$ -in., $\frac{1}{4}$ and $\frac{3}{8}$ -in. Price, each.....\$1.00
Extra blades, each......10

No. 560 Electricians' Pocket Screw Driver

Same as No. 557 except that handle is covered with hard rubber for insulation from electrical currents.

Price each.....	\$1.50
Extra blades, each.....	.10

No. 150 Pocket Screw Driver

With Brad, Awl and Wrench



A compact combination of three tools. Consists of a finely finished steel handle with a knurled nut, which firmly holds a screw driver and brad awl made in one piece, this being telescoped when not in use. Shape of handle permits its use as an emergency wrench.

Price each, Plain.....	\$0.40
Nickel Plated .....	.50

No. 174 Tap Wrench



Made of steel, nicely finished, and will hold any tool that can be put into it.—taps, reamers, drills, etc. It holds tools of any shape, round, square or oval. Capacity $\frac{1}{4}$ -inch.
3 inches long. Price each.....\$0.50

No. 91 Tap Wrench



This wrench is of new design.—strong, neat and efficient. Will hold firmly a tap with square or round shank. Inside knurled adjusting screw a spring connected with plunger holds it back and causes instant movement with screw.

No. 91A $5\frac{1}{2}$ inches long, holding $5\frac{1}{4}$ -inch to $\frac{1}{4}$ -inch.	Price each.....	\$0.75
No. 91B 9 inches long, holding $\frac{1}{4}$ -inch to $\frac{1}{2}$ -inch.	Price each.....	1.00

No. 195 Double Lip Countersink



The only double-lip, self-centering wood countersink that has a keen cutting edge, and the only one made on the true principle for a wood-working tool. Will clear itself of its shavings in any kind of wood and will cut a smooth, round hole. Can be sharpened from inside with a file.

No. 195A $\frac{5}{8}$ inch.	Price each.....	\$0.40
No. 195B $\frac{3}{4}$ " "	Price each.....	.45

Starrett's Tools

Tool Makers Calipers and Dividers

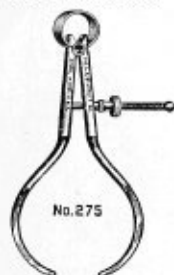
Calipers

No. 275 Outside

No. 274 Inside

No. 277

Dividers



No. 275



No. 274



No. 277

Made from round stock. Fulcrum stud hardened, bows extra strong. Screw and nut nicely fitted.

Price Each

Size, inches	2	3	4	5	6
Price each	\$1.00	\$1.25	\$1.50	\$1.50	\$1.75

The Fay Patent Spring Dividers

With Spring Nut

The Fay calipers and dividers, Nos. 74 to 77 all sizes, are sent with Spring Nut unless otherwise ordered.



No. 77

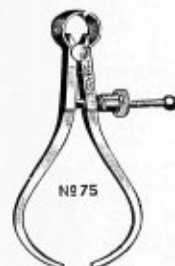
Size, in.	Price Each	
	With Spring Nut	With Solid Nut
2½	\$1.15	\$1.00
3	1.15	1.00
4	1.40	1.10
5	1.40	1.10
6	1.75	1.35
8	2.00	1.60

The Fay Patent Outside and Inside Calipers

With Spring Nut

Outside, No. 75

Spring Nut. Solid Nut.



No. 75

Size, in.	2½	3	4	5	6	8
Price Each	\$1.15	1.15	1.25	1.25	1.50	1.75
Solid Nut	\$1.00	1.00	1.10	1.10	1.35	1.60

Inside, No. 74

Spring Nut. Solid Nut.

Size, in.	2½	3	4	5	6	8
Price Each	\$1.15	1.15	1.25	1.25	1.50	1.75
Solid Nut	\$1.00	1.00	1.10	1.10	1.35	1.65



No. 74

The Fay Patent Thread Calipers

No. 76, Outside Caliper

Spring Nut. Solid Nut.

3 inch	\$1.15	\$1.00
4 "	1.25	1.10
5 "	1.25	1.10

No. 76 sent with Spring Nut unless otherwise ordered.

No. 78, Inside Caliper

Not made to receive Spring Nut.



No. 76



No. 78

Price with Solid Nut.

Size, inches	4	5
Price each	\$1.10	\$1.10

Yankee Inside and Outside Calipers

No. 79, Outside

No. 73, Inside



No. 79



No. 73

Made under the Fay patent, but are not quite so heavy as the Fay and cost less. Always furnished with solid nut, unless otherwise ordered.

Prices for No. 79 or 73.

Size, in.	2½	3	4	5	6	8	10	12
Spring Nut	\$0.80	\$0.85	\$0.90	\$0.95	\$1.00	\$1.15	\$1.50	\$1.65
Solid Nut	.65	.70	.75	.80	.85	1.00	1.35	1.50



No. 83



No. 82

Yankee Spring Dividers and Key Hole Calipers

No. 83 Spring Divider

Size, in.	2½	3	4	5	6	8	10	12
Spring Nut	\$0.80	\$0.85	\$0.90	\$0.95	\$1.00	\$1.25	\$1.50	\$1.65
Solid Nut	.44	.48	.52	.56	.61	.78	1.00	1.15

Furnished with solid nut unless otherwise ordered

No. 82 Key Hole Calipers

Size 3 in., with spring nut	85c	With solid nut	70c
Size 4 in., with spring nut	90c	With solid nut	75c

Starrett's Tools

No. 88 Ball Points

For Use with Starrett's No. 85 or No. 90 Dividers and No. 51, No. 58 and No. 59 Trammels

This attachment consists of four balls, of 1 1/2-inch, 1-inch, 3/4-inch, and 1/2-inch diameter respectively, and a holder which fits either divider leg or trammel head. It is used to form a seat for the divider leg in describing circles around a hole.

Prices

Complete, 4 Balls and Holder.....\$1.25
Either Ball or Holder..... .25
In ordering this set for use with trammels, please give tool number of the trammel so that the proper holder may be sent.

Improved Trammel Points No. 50 Nickel Plated

Made of bronze metal with forged steel points, hardened.

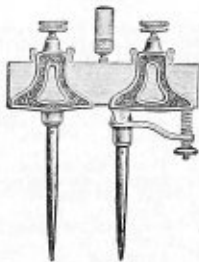
Either point can be removed, and pencil socket accompanying each pair put in its place.

Adjustable like spring dividers. Light and durable.

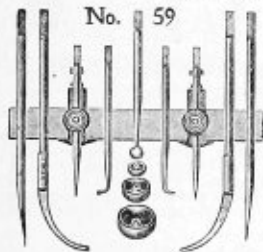
With 3-inch points, adjustable.....\$2.50

With 3-inch points, not adjustable.....1.50

Extra long points, 5-inch, per set......35



New Trammels



four ball points with holder, which enable one to scribe a circle from the center of any hole up to 1 1/2 inches and under.

No. 59A Trammel Heads (with one pair of points).....\$2.00

No. 59B Balls and Holder, per set.....1.25

No. 59C Small Caliper Legs, per pair......50

No. 59D Large......75

No. 59E Large Divider Points, " "......50

No. 59F Set Complete.....4.75

Trammel heads with one pair of points, No. 59A, will be sent unless otherwise ordered.

Extension Beam Trammels

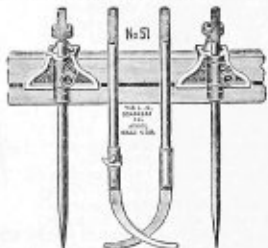
Nickel Plated

Have opening through the underside to accommodate the extension, giving width and stiffness in proportion to the length required for large work, while it is equally well adapted to receive a narrow beam for light work.

No. 51A Price complete.....\$3.25

No. 51B Without caliper legs.....2.50

Sent complete, No. 51A, unless otherwise ordered.



No. 18 Automatic Adjustable Stroke Center Punch



This center punch contains a mechanism which automatically strikes a blow of any required force when punched in exact position desired by operator. For work requiring a heavy blow, turn cap up; for a light mark, turn down.

No. 18AA 3 3/4 x 3 1/8 inch.....\$1.50

No. 18A 5 x 3 1/2 inch.....2.00

No. 18B 6 x 3 3/8 inch.....2.50

Extra points, each......10

Unless otherwise ordered, Size A will be furnished.

No. 117 Machinists' Center Punches



Length of each size 4 inches. Diameter, A 5/64 inch, B 3/32 inch, C 9/64 inch, D 5/32 inch.

A larger size, E, is made for heavy work; length 4 inches, diameter 1/4 inch, diameter of knurled part 3/4 inch.

Per dozen.....\$4.00

Each......30

Per dozen, assorted A, B and C, in round wooden box.....2.50

Sent in round box only when so ordered.

No. 118 Spacing Center Punch



A Combination Prick Punch and Spacing Tool, used for laying out work quickly and accurately—for drilling, cutting out dies, etc. The prick punch is solid—made from best tool steel, properly tempered.

No. 118 Price, each.....75



No. 116 Nail Sets

Made of fine grade steel both ends hardened.

Length of all sizes, 4 inches. Four sizes 1/8 to 3/4.

Per dozen.....\$1.00

Net each......30

Doz. in box.....1.35

No. 176 Extra Heavy Nail Sets

No. 176A 5 x 1 1/2 x 7/8 inch at point. Per doz.....\$1.40

No. 176B 5 x 1 1/2 x 3/4.....1.50

No. 194 Universal Scraper



use by means of handle with its ball joint connection.

To lock or release joint, or place blade at any angle, give handle a slight turn. Wing nut is used when blade is removed from handle.

Guard may be instantly slipped on or off either side of end of blade, and enables one to use tool with a firm grip, bearing on heavily or lightly as may be desired.

Price, each.....\$1.00

Extra blades, each.....15c; Guards for blades, each......35

Write for special catalog on tents and canvas goods.

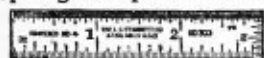
Starrett's Tools

Steel Rule Graduations English Measure

Rules are divided into parts of inches as follows:

No. 1 Graduation		No. 10 Graduation	
corner.....10, 20, 50, 100	1st corner.....32	corner.....32	
".....12, 24, 48	2d ".....64	".....64	
".....16, 32, 64			
".....14, 28			
No. 2 Graduation		No. 11 Graduation	
corner.....10, 20, 50, 100	1st corner.....64	corner.....64	
".....12, 24, 48	2d ".....100	".....100	
".....16, 32, 64			
".....8			
No. 4 Graduation		No. 12 Graduation	
corner.....64	1st corner.....50	corner.....50	
".....32	2d ".....100	".....100	
".....16			
".....8			
No. 6 Graduation		No. 13 Graduation	
corner.....32	1st corner.....8	corner.....8	
".....48	2d ".....16	".....16	
".....50			
".....64			
No. 7 Graduation		No. 14 Graduation	
corner.....64	1st corner.....8	corner.....8	
".....32	2d ".....32	".....32	
".....16			
".....100			
No. 8 Graduation		No. 15 Graduation	
corner.....32	1st corner.....10	corner.....10	
".....48	2d ".....20	".....20	
".....50	3d ".....50	".....50	
".....64	4th ".....100	".....100	
No. 9 Graduation		No. 16 Graduation	
corner.....64	1st corner.....32	corner.....32	
".....32	2d ".....64	".....64	
".....16	3d ".....50	".....50	
".....100	4th ".....100	".....100	

Spring Tempered Rules



With Graduated End



Without Graduated End

Number	300	301	302	306	307	308	309
Graduation No.	4	1	2	6	7	15	16

With Graduated End

No. 303 has No. 4 graduations and is graduated in 32nds on each side of one end. Made in 2 to 48 inch lengths.

Without Graduated Ends and with One Beveled Edge

No. 400 has No. 4 graduations with 64ths on beveled edge. No. 407 has No. 7 graduations with 100ths on beveled edge.

With Graduated Ends and with One Beveled Edge

No. 403 has No. 4 graduations with 64ths on beveled edge and 32nds on opposite sides of one end. Made in 2 to 48 inch lengths.

With and Without Graduated Ends

Designed to assist the user to quickly read in the 64ths. No. 600 has No. 4 graduations, which consist of 8ths and 16ths on one side and 32nds and 64ths on the other. Made in 1 to 24 inch lengths. No. 603 has No. 4 graduations and is graduated in 32nds on both ends of one side. Made in 2 to 24 inch lengths.

Heavy, Without End Graduations About 1-10 inch thick

Made in 6, 9, 12, 18, 24, 36, 48, 60 and 72 in. lengths. No. 410 with No. 4 graduations. No. 417 with No. 7 graduations. The 60 and 72 inch lengths made in No. 410 style only.

Flexible Rules

Made of very thin spring tempered steel, graduated on one side only. The 1 to 12 inch sizes are $\frac{1}{8}$ inch wide and will conform to a 2 inch circle 18 to 48 inch lengths are $\frac{1}{4}$ inch wide.

Number of rule	320	321	322	323	324
No. of graduations	10	11	12	13	14

Made in 1 to 48 inch lengths only.

Semi-Flexible Rules

These rules are about 1/40th inch thick, heavier than the flexible and lighter than the spring tempered rules; and are the same widths as the corresponding lengths of spring tempered rules.

No. 325 has No. 4 graduations, and graduated in 32nds on both sides of one end. Made in 2 to 12 inch lengths.

Prices of All Foregoing Rules

Length, inches	1	2	3	4	6	9	12
Width, inches	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$
Price, each	\$0.20	.30	.40	.50	.65	1.00	1.25
Length, inches	18	24	36	48	60	72	
Width, inches	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$
Price, each	\$2.00	2.50	5.00	7.00	16.00	20.00	

*Approximate.

Foregoing rules are about 3/64th inch thick, except Nos. 416 and 417, flexible and semi-flexible rules.

Narrow Rules



Made of spring tempered steel about $\frac{1}{16}$ inch wide. Graduated one corner each side whole length.

Length, inches	4	6	9	12
Price, each	\$0.50	.65	1.00	1.25
Number of rule	330	331	332	
No. of graduation	10	11	12	

Steel Shrink Rules

These rules are spring-tempered, except No. 372, and are of the same width and thickness as spring-tempered standard rules. 6 inch, each...\$0.75 12 inch, each...\$1.75 24 inch, each...\$3.50

- No. 370. Shrink, $\frac{1}{8}$ to foot, No. 4 graduation.
- No. 371. Shrink, $\frac{1}{8}$ to foot, No. 2 graduation.
- No. 372. Shrink, $\frac{1}{8}$ to foot, Flexible, graduated in 32nds and 64ths.
- No. 373. Shrink and Standard, $\frac{1}{8}$ to foot, No. 4 graduation.
- No. 375. Brass Shrink, $\frac{1}{8}$ to foot, No. 4 graduation.
- No. 376. Brass Shrink, $\frac{1}{8}$ to foot, No. 2 graduation.
- No. 377. Double Shrink, $\frac{1}{8}$ to foot, No. 4 graduation.
- No. 378. Double Shrink, $\frac{1}{8}$ to foot, No. 2 graduation.

No. 465. Hook and Handle Rule



Used by blacksmiths for measuring hot pieces of material, and are convenient in measuring through holes or from the inside when held against a corner, etc.

Made from hard rolled sheet brass $\frac{1}{16}$ inch thick, $\frac{1}{8}$ inch wide, with heavy graduations and figures, graduated from end in $\frac{1}{16}$ inch on one side and from inside of hook in 16ths of an inch on the other, which enables taking measurements either hook or from outside edge. Graduated 12 inches and measures over all 16 $\frac{1}{4}$ inches. Price each...\$1.15

Improved Hook Rules

Very convenient in taking measurements from round corners, through hubs of pulleys, setting inside calipers, etc. The 6 inch may be carried in pocket. Hook can be quickly removed by turning eccentric stud one half round.

No. 419. Is a No. 303 rule, No. 4 graduation, with hook and with end graduation.							
No. 420. Is a No. 300 rule, No. 4 graduation, with hook.							
No. 421. Is a No. 410 rule, No. 4 graduation, with hook.							
The hooks can be applied to rules of other graduations when ordered. Prices same as below.							
Length, inches	6	9	12	18	24	36	
Price, each	\$1.00	1.40	1.75	2.50	3.00	5.75	

Starrett's Tools

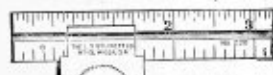
Narrow Hook Rules



For taking measurements through small holes where regular hook rules cannot be used. Can also be used for setting inside calipers, etc. Measurements through holes as small as $\frac{1}{8}$ inch can be obtained. Graduated one side in 32nds and the other in 64ths of an inch.

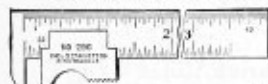
No. 442, No. 330 rule, with hook.
Length, inches 4 6 9 12
Price, each \$0.75 \$0.90 \$1.25 \$1.50
These hooks can be applied to other narrow rules of different graduations.

Rules with Thumb Slide



Useful in measuring against a shoulder, width of flanges, collars, etc. Slide may be used on either edge of rule, or removed and rule used alone.
6 inches long, about $\frac{1}{8}$ inch wide and $\frac{1}{16}$ inch thick.
No. of Rule 290 291 292 297
No. of Graduation 4 1 2 7
Price each \$1.25

No. 296 Slide Caliper Rule



Consists of a hook rule having an adjustable slide so that work may be placed between the two contact edges and reading made. 4 inches long, about $\frac{1}{8}$ inch wide and $\frac{1}{16}$ of an inch thick. Graduations are No. 4, with 32nds and 64ths on front as shown, and 8ths and 16ths on back. Thumb piece slides in a groove on reverse side as shown in No. 290 above. Jaws are $\frac{1}{2}$ inch deep.
Price each \$1.50

No. 460 Blacksmiths' Rule



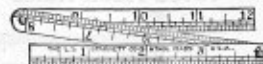
Made of spring tempered steel, 2 feet long, $\frac{1}{4}$ inches wide, with 12 inch joints. Graduated in 8ths on one side and 16ths on the other. Price each \$0.50
No. 461 same as No. 460 except that it has stop joint.
Price each \$0.75

No. 462 Folding Brass Rule

Made of hard brass with stop joints, otherwise the same as No. 460. Price each \$0.75

No. 450 Folding Steel Pocket Rule

Made of Spring Tempered Steel



1 foot long, $\frac{3}{8}$ inch wide 4 inch joints 3 fold.
Price each \$0.25
In metal bound leather case.
Price each30
Nickel plated.
Price each35
2 foot long, $\frac{3}{8}$ inch wide, 6 inch joints, 4 fold.
Price each40
In metal bound leather case.
Price each50
Nickel plated.
Price each55

No. 451 Folding Pocket Steel Rule

Made of the best spring tempered steel, $\frac{3}{8}$ inch wide, in 6 inch sections with double lock joints, accurately graduated in 8ths on one side and 16ths on the other, with large figures for easy reading.
Length, feet 2 3 4 6
No. of folds 4 6 8 12
Price each \$1.50 \$2.00 \$2.50 \$3.00

Steel Straight Edges

No. 380—Plain—Not Graduated

Used where lines are to be scribed absolutely straight or where surfaces must be tested for their precision.

Length, inches 12 18 24 36 48 60
Width, inches 1 1 1/4 1 1/2 2 2 1/2 3
Thickness, ins. 3/16 1/8 3/16 1/4 3/8 1/2
Price each \$1.20 \$1.80 2.40 5.00 8.00 12.00

Made in pairs when two are wanted of exactly same width. Above prices are for single straight edges.

No. 385 Beveled Edge Not Graduated

otherwise the same as No. 380

Length, inches 12 18 24 36 48 60
Width, inches 1 1 1/4 1 1/2 2 2 1/2 3
Thickness, ins. 3/16 1/8 3/16 1/4 3/8 1/2
Price each \$1.50 2.50 3.50 6.00 10.00 15.00

No. 383 Graduated Steel

Straight Edge

Not beveled. Graduated on one side only, one in 16ths, the other in 8ths of an inch. Same width and thickness as No. 380.

Length, inches 12 18 24 36
Price each \$1.80 \$2.50 \$3.25 \$6.25

No. 387 Beveled Edge—Graduated

Graduated on beveled edge only, in 32nds of inch. Same width and thickness as No. 380.

Length, inches 12 18 24 36
Price each \$2.00 \$3.00 \$4.25 \$7.25

Center Gauge

For use in grinding and setting, screw cutting tools. The angles are 60°, except in Nos. 395 and 396, in which they are 55°.

No. 390. Not tempered, graduated one corner each in 32nds, 24ths, 20ths and 14ths. Price each

No. 391. Spring-tempered. Price each

No. 395. Whitworth, not tempered. Price each



Center Gauge Attachment

This attachment is a V block with a slot above the V, containing a flat spring to frictionally hold center gauge parallel with block. Placing V block against a lathe spindle or face plate, a threading tool can be adjusted to line perfectly to cut both sides of a thread proper angle, for both external and internal work.
Price each



Builders' and Architects' Levels

Builders' Dumpy Level



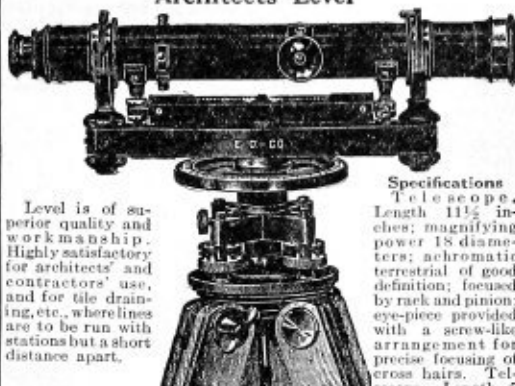
Is a low priced but reliable and well-made instrument, and will meet all the requirements of the builder, contractor and millwright.

Specifications

Telescope. Length 11½ inches; magnifying power, 18 diameters; achromatic terrestrial of good definition; focused by rack and pinion; eye-piece provided with a screw-like arrangement for precise focusing of cross hairs. Cross Bar. Length, 8 inches; ribbed to increase stability and decrease weight. Level to Cross Bar. Length 5 inches; graduated on the glass. Horizontal Circle. Diameter, 3 inches; graduated to degrees, numbered 0 to 90 each way, with vernier reading to minutes. ish. Telescope, level vial casing and cross bar, cloth finished; other parts bronzed and lacquered. Weight. Instrument, 6 pounds; tripod 6 pounds.

No. 1600. Dumpy Level with tripod, complete.....\$65.00

Architects' Level



Level is of superior quality and workmanship. Highly satisfactory for architects' and contractors' use, and for tile draining, etc., where lines are to be run with stations but a short distance apart.

Specifications

Telescope. Length 11½ inches; magnifying power 18 diameters; achromatic terrestrial of good definition; focused by rack and pinion; eye-piece provided with a screw-like arrangement for precise focusing of cross hairs. Telescope. Length, 5 inches; graduated on glass. Bar. Length, 8 inches; best composition metal. Level to Cross Weys. Provided with a new locking device which securely fastens the clips. Horizontal Circle. Diameter, 3 inches; graduated to degrees, numbered 0 to 90 each way, with vernier reading to 5 minutes. Parallel Plates. Of large diameter, the upper consisting of four well-braced arms; four leveling screws; provided with clamp to spindle. Weight, 5 pounds; tripod, 6 pounds.

No. 6005. Architects' Level with tripod, complete.....\$80.00
No. 6006. Same as No. 6005, but with tangent screw.....\$5.00

Transits

No. 6166

Reconnaissance Transit

Specifications

Telescope. Length, 9 inches; magnifying power, 21 diameters; balanced, and reverses at both ends; line of collimation true for all distances; object slide and eye-piece with dust protectors; fixed stadia hairs. Object Glass. Diameter, 1 inch. Eye-piece. Improved, giving a flat field. Horizontal Axis. Length, 4 inches; cast hollow to reduce weight. Level to Telescope. Length, 4½ inches; graduated on the glass, indicating a variation of 30 seconds of arc to 1/10-inch motion of the bubble. Standards. Phosphor bronze.

Horizontal Circle. Diameter, 5 inches to edge of graduation; graduated on solid silver to half-degrees, with one double vernier reading to single minutes, placed at an angle of 30 degrees to line of sight; marked from 0 to 180 each way.

Compass. Graduated to half-degrees, figured from 0 to 90 on each side of North and South; magnetic needle, 3½ inches, variation plate with vernier and rack and pinion.

Plate Levels. Length, 2 inches; indicating a variation of 1 minute of arc to 1/10-inch motion of the bubble.

Tangent Screws. Phosphor bronze; improved form, with opposing spiral spring.

Parallel Plates. Of large diameter, the upper consisting of four well-braced arms; four leveling screws. Shifting Center. Range of shift, ½-inch.

Finish. Standards, cloth-finished; all other parts bronzed and lacquered.

Weight. Instrument, 10 pounds; tripod, 9 pounds.

Price.....\$212.50

No. 6017

Builders' Transit

Specifications

Telescope. Length, 8 inches; magnifying power, 16 diameters; achromatic terrestrial, of good definition; focused by rack and pinion; eye-piece provided with a screw-like arrangement for precise focusing of cross hairs. Level to Telescope. Length, 4½ inches; graduated on the glass.

Horizontal Circle. Diameter, 5 inches; reads to degrees; graduated on brass, silvered.

Vernier. One, reading to 2 minutes; vernier plate fitted with two spirit levels placed at right angles to each other.

Tangent Screws. Phosphor bronze; improved form, with opposing spiral spring.

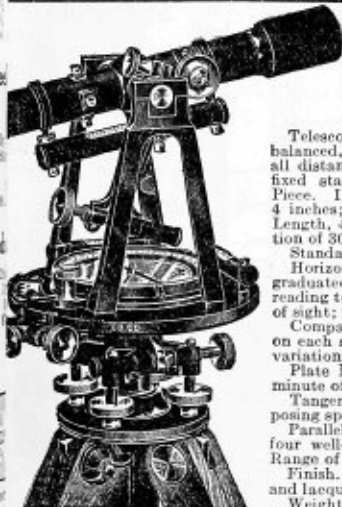
Finish. Standards, cloth-finished; all other parts bronzed and lacquered.

Weight. Instrument, 6 pounds; tripod, 6 pounds.

No. 6015. Builders' Transit, with tripod No. 6202, box, etc. Each.....\$155.00

No. 6017. Builders' Transit, like No. 6015, but having compass with raised ring, silvered, graduated to degrees, with variation

ate, needle about 3 inches; tripod No. 6202, box, etc. Each.....\$180.00



No. 6017



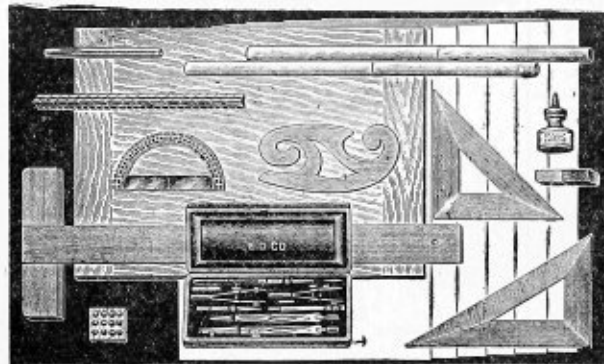
No. 6166

It is especially serviceable in the determination of points in a vertical plane above or below the level line, or for the repetition angles.

Students, Drawing Outfit

This outfit consists of everything necessary for the student in high school or manual training courses. In buying a complete outfit of this kind the student is relieved of the trouble of buying each article separately, and at the same time he may rest assured that nothing is omitted. We have arranged two outfits, both of which are the same with the exception of the set of instruments.

The No. 1 Outfit contains a set of German silver instruments as follows: Pocket case, containing compasses, 5 1/4-inch, with pencil point and lengthening bar; dividers, 5 1/4-inch; spring bow pencil, 3 1/4-inch; spring bow pen, 3 1/4-inch; ruling pen, 5-inch, metal handle; key and box.



No. 1

The No. 2 Outfit contains a set of No. 1169 instruments with steel points as follows:

Ruling pen, 4-inch spring blade; ruling pen, 3 1/2-inch spring blade; steel spring bow dividers, 5 1/4-inch metal handle; steel spring bow pencil, 3 1/4-inch metal handle; hair spring dividers, 6-inch; compasses, 6-inch, with fixed needle point, pen, pencil point and lengthening bar; box with leads.

The outfits are as follows, furnished with the set of drawing instruments preferred:

One set German silver drawing instruments; one drawing board, 16x22 inches; one T-square, 24-inch pearwood; one protractor, 4 1/2-inch, brass; one set 12-inch, triangular, boxwood; one triangle, 30x30 8-inch pearwood; one triangle, 45°, 6-inch pearwood; one irregular curve, pearwood; one dozen steel tape 3/8-inch, on card; one drawing pencil, Hyperion, 40; one bottle ink, Dietzgen's Waterproof black; one pencil eraser, Dietzgen's; two sheets tracing cloth, 15x20 inches, Imperial; six sheets drawing paper, 15x20 inches, cream.

Outfit No. 1 complete. Price each \$12.00
Outfit No. 2 complete. Price each \$14.00



The Phillips Slide Rule

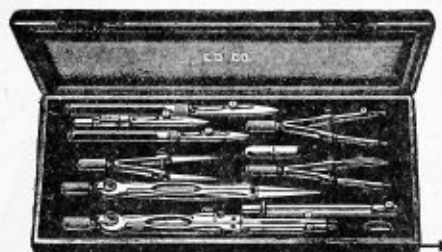
No. 1776B. Phillips slide rule, with cube and reciprocal scales, 10-inch, divisions on white ivory, glass frameless indicator, proved automatic adjustment, in case, with book of instructions.

Is of wide range and precision. By an ingenious arrangement of a reciprocal scale, formulas in civil, mechanical and electrical engineering, taking the form $a \times b \div c \times d$ can be solved with one slide movement.

Price each \$12.00

"Reliance" Instruments

German Silver with Steel Points



No. 1169

The "Reliance" instruments are of high quality German silver and English tool steel. They are warranted to give satisfactory service and we recommend them to engineers and professional draftsmen. Cases of Morocco leather, silk velvet lined.

Ruling pen, 4-inch spring blade; ruling pen, 5 1/2-inch spring blade; steel spring bow dividers, 3 1/4-inch metal handle; steel spring bow pencil, 3 1/4-inch metal handle; steel spring bow pen, 3 1/4-inch metal handle; hair spring dividers, 6-inch; compasses, 6-inch, with fixed needle point, pen, pencil point and lengthening bar. Box with leads.

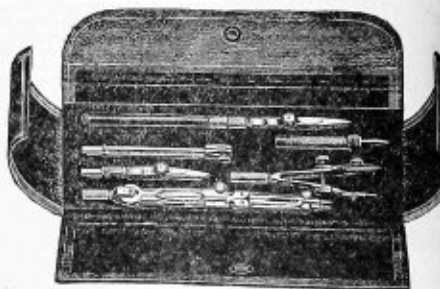
Price per set \$9.50

No. 1169P containing same assortment as No. 1169, but in pocket book case.

Price per set \$11.00

Highest Grade

German Silver and Steel. Silk Velvet Lined Case



No. 1070

This set represents the highest grade and embodies all the latest improvements. Materials used are carefully selected to afford the greatest efficiency in combining strength, durability, elasticity and lightness. Workmanship and finish are perfect.

Cases are of Morocco leather, silk velvet lined, pocket-book style. In pocket book case, velvet lined, containing: Ruling pen, 4 1/4 inches, with spring and ebony handle. Ruling pen, 5 1/2 inches, with spring and ebony handle. Steel spring bow dividers, 3 1/4-inch metal handle. Steel spring bow pencil, 3 1/4-inch metal handle. Steel spring bow pen, 3 1/4-inch metal handle. Hair spring dividers, 6 inches. Compasses, 6 inches, with fixed needle point, pen, pencil point and lengthening bar. Box with leads.

Price per set \$14.00

Technical School Instruments

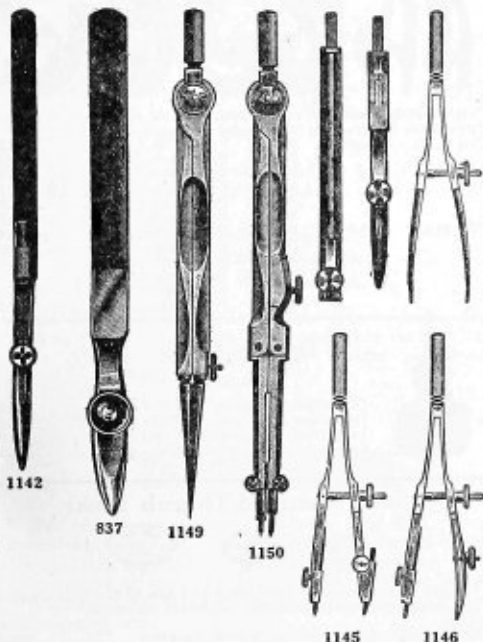


No. 1223

This brand of German silver instruments, due to their price are well adapted for school use. They are very superior to the usual brass or nickel plated tools being improved in quality and appearance, and will render good service for a reasonable time.

Pocket case, containing compasses, 5 1/4-inch, with pen, pencil point and lengthening bar; dividers, 5 1/4-inch; spring bow pen, 3 1/4-inch; ruling pen, 5-inch, metal handle; key and lead box. Price per set.....\$5.00

"Reliance" Instruments



The following are a few of the most commonly used instruments and are often bought separately. For that reason we price them separately. They are especially adapted for manual training school use and possess remarkable satisfactory qualities.

No. 1142. Steel spring bow dividers, 3 1/4-inch metal handle. Price each.....\$1.30
No. 837. Detail ruling pen, 6-inch ebony handle. For long lines. Price each.....\$2.20
No. 1149. Hairspring dividers, 6-inch. Price each.....\$2.20
No. 1150. Compasses, 6-inch, with fixed needle point, pen, pencil point and lengthening bar. Price each.....\$4.40
No. 1144. Steel spring bow dividers, 3 1/4-inch. Price each.....\$1.70
No. 1145. Steel spring bow pencil, 3 1/4-inch. Price each.....\$2.40
No. 1146. Steel spring bow pen. Price each.....\$2.40

No. 11B Fulton Drawing Paper

Light Green

Light green color, smooth, hard surface. Takes ink and pen. Does not become brittle and stands erasing to the greatest extent. Color more agreeable to work on than either white or cream.

Royal	19x24 inches.	Price per quire.....	\$2.20
Imperial	22x30 inches.	Price per quire.....	2.85
Special	24x36 inches.	Price per quire.....	4.60

No. 12 Cream Drawing Paper

Exceptionally fine for preliminary and general drawings and sketches. Takes ink, pencil and color well.

Royal	19x24 inches.	Price per quire.....	\$2.70
Imperial	22x30 inches.	Price per quire.....	3.90
Special	24x36 inches.	Price per quire.....	5.80

No. 60 Cream Drawing Paper

Same as No. 12 only in rolls.
36-in. wide in 25-yd. rolls. Price per roll.....\$ 8.40
42-in. wide in 25-yd. rolls. Price per roll.....10.80

No. 56 Teuton Drawing Paper

A white sketching paper. Will not break in folding. Has best erasing qualities and takes pencil, ink and color well.

36-in. wide in 50-yd. rolls.	Price per roll.....	\$8.50
42-in. wide in 50-yd. rolls.	Price per roll.....	9.85
36-in. wide in 25-yd. rolls.	Price per roll.....	4.70
42-in. wide in 25-yd. rolls.	Price per roll.....	5.70

No. 59 Saxon Drawing Paper

Light cream color with smooth, hard surface. Takes ink, pencil and watercolor. Does not become brittle and takes erasing to the greatest extent.

36-in. wide in 25-yd. rolls.	Price per roll.....	\$6.50
42-in. wide in 25-yd. rolls.	Price per roll.....	8.05

No. 65 Standard Drawing Paper

A pure white paper of excellent quality. Uniform in thickness and surface. Suitable for pencil, ink and color work.

36-in. wide in 25-yd. rolls.	Price per roll.....	\$ 9.50
42-in. wide in 25-yd. rolls.	Price per roll.....	12.00

No. 3351B Art Gum



For cleaning engravings, drawings, paintings, books and papers. Soft and entirely free from grit.

Size 1 1/4 x 1 1/8 inches, each.....	\$0.10
Size 2 1/4 x 1 1/8 inches, each.....	.20

Pencil Erasers

No. 3332. Green, oblong, beveled.	Price each.....	\$0.10
No. 3335. Gray flexible rubber.	Price each.....	0.20

Ink Erasers

No. 3360. Oblong. Erases clean.	Price each.....	\$0.10
---------------------------------	-----------------	--------

Combination

No. 3365. For both pencil and ink.	Price each.....	\$0.10
------------------------------------	-----------------	--------

Hardtmuth's Koh-I-Noor Pencils

No. 3250

Owing to the highly compressed graphite center, the point remains sharp for a long time.

Koh-i-noor pencils, hexagon, yellow polish, in degrees as follows:

3B, 2B, B, HB, F, H, 2H, 3H, 4H, 5H, 6H, 7H, 8H, 9H	Price each.....	\$0.20
4B.....		.25
6B, 5B.....		.30

Hyperion Drawing Pencils

No. 3200

Of superior quality, correctly and uniformly graded, contain no grit and will hold their points well. Hexagon shape, yellow polish. In degrees as follows:

2B, B, HB, F, H, 2H, 3H, 4H, 5H, 6H.	Price each.....	\$0.10
--------------------------------------	-----------------	--------

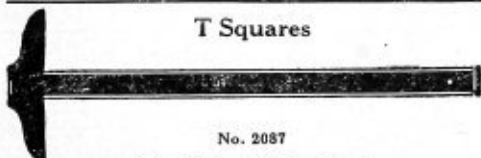
Drawing Materials

Drawing Boards



Strongly and carefully made of selected narrow and thoroughly seasoned strips with side edges clamped. Two drawing surfaces.

No. 2265			
Size, inches.....	20x24 1/2	20x26	23x31
Price each.....	\$1.35	\$1.50	\$2.10



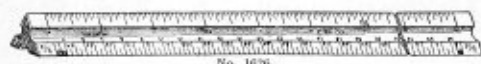
T Squares

Plain Blade with Fixed Head

No. 2070						
Size, inches.....	15	18	24	30	36	42
Price each.....	\$0.30	\$0.40	\$0.50	\$0.60	\$0.70	\$0.90
Mahogany, Ebony Lined Blade and Fixed Head						
No. 2079						
Size, inches.....	24	30	36	42	48	
Price each.....	\$0.90	\$1.20	\$1.50	\$1.80	\$2.10	
Transparent Ambro Lined, Maple Blade, Black Walnut Head						
No. 2087						
Size, inches.....	18	24	30	36	42	48
Price each.....	\$1.50	\$2.50	\$3.00	\$3.50	\$4.00	\$5.00

Triangular Boxwood Scales

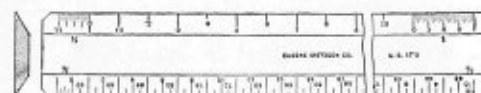
U. S. Standard. Machine Divided



Divided 1/2, 1/4, 1/8, 3/16, 1/2, 3/4, 1, 1 1/2, 3 inches to the foot, 1/2-inch.	
Price each, 12 inches long.....	\$0.80
No. 1535	
Triangular boxwood plain scale. Divided: 10, 20, 30, 40, 50, 60 parts to the inch.	
Price each, 12 inches long.....	\$1.00

Flat Boxwood Scales

U. S. Standard. Machine Divided



Divided 1/2, 1/4, 1/8, 1-inch to the foot.	
No. 1351. Flat boxwood scale, 6 inches long.	Price each \$0.75
No. 1356. Flat boxwood scale, 12 inches long.	Price each 1.20

Triangles

Mahogany Ebonized Line Triangles

No. 2013-30x60°	No. 2013-45°
8-in. Price ca. \$0.55	6-in. Price ca. \$0.65
10-in. Price ca. .75	8-in. Price ca. .75
12-in. Price ca. 1.00	10-in. Price ca. 1.00
14-in. Price ca. 1.35	12-in. Price ca. 1.35

Transparent Ambro Triangles

No. 2021x-30x60°	No. 2022x-45°
6-in. Price ca. \$0.50	6-in. Price ca. \$0.70
8-in. Price ca. .70	8-in. Price ca. 1.00
10-in. Price ca. .95	10-in. Price ca. 1.50
12-in. Price ca. 1.30	12-in. Price ca. 2.10
14-in. Price ca. 1.65	14-in. Price ca. 2.60



No. 2021

Brass Protractors

For dividing circles into degrees and finding angles. Divided into one degree, except Nos. 1937 and 1938 which are divided into 1/2 degrees.



No. 1935 1/2. Semi-circular, brass plated, 3 1/2-inch diameter.	
Price each.....	\$0.80
No. 1936. Semi-circular brass plated, 4 1/4-inch diameter.	
Price each.....	\$0.80
No. 1937. Semi-circular brass plated, 5 1/2-inch diameter.	
Price each.....	\$1.30
No. 1938. Semi-circular, brass plated, 6 3/4-inch diameter.	
Price each.....	\$1.70

Irregular Curves



Accurately made of either pearwood or transparent ambro. Invaluable for drawing in irregular curves.

No. 2150. Pearwood.	No. 6. Price each.....	\$0.80
	No. 8. Price each.....	.50
	No. 13. Price each.....	.50
	No. 15. Price each.....	.50
	No. 16. Price each.....	.50
	No. 18. Price each.....	.50
No. 2152. Amber.	No. 6. Price each.....	.50
	No. 8. Price each.....	.50
	No. 13. Price each.....	.50
	No. 15. Price each.....	1.10
	No. 16. Price each.....	1.10
	No. 18. Price each.....	1.10



Drawing Inks

No. 2681

In bottles of 3 1/2-oz.	Price each.....	\$0.50
In bottles of 4 -oz.	Price each.....	2.50
In bottles of 1/2-pint.	Price each.....	4.50
In bottles of 1 -pint.	Price each.....	7.50

Steel Stamped Thumb Tacks



Made of one piece of hard steel and are of the best quality. The points are needle finished. Mounted on cards.

No. 2443-1. Round heads, 5/8-inch diameter.	Price per dozen.....	\$0.10
No. 2443-2. Round heads, 3/4-inch diameter.	Price per dozen.....	.10
No. 2443-3. Round heads, 1/2-inch diameter.	Price per dozen.....	.10

Simplex Brass Thumb Tacks

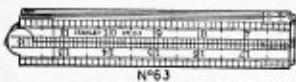


Very thin and have strong steel flat head.

No. 2434. Brass round heads, 3/8-inch diameter.	Price per dozen.....	\$0.40
No. 2435. Brass round heads, 1/2-inch diameter.	Price per dozen.....	.50
No. 2836. Brass round heads, 3/4-inch diameter.	Price per dozen.....	.60

Stanley Boxwood Rules

Selected boxwood; polished brass trimmings; lines and figures marked black. Graduations marked on both sides.



No. 63. Two-foot; four fold; round joint; middle plates; graduated in 8ths and 16ths. Width folded, 1 inch. Weight per dozen, 1½ pounds.

Price per dozen.....\$3.40

Price each......34

No. 61. Two-foot; four fold; square joint; middle plates; graduated in 8ths and 16ths. Width folded, 1 inch. Weight per dozen, 1½ pounds.

Price per dozen.....\$4.20

Price each......42

No. 53. Two-foot; four fold; arch joint; edge plates; graduated in 8ths, 12ths and 16ths. Width folded, 1 inch. Weight per dozen, 1½ pounds.

Price per dozen.....\$6.30

Price each......63



Two-foot, four fold. Graduated in 8ths, 10ths, 12ths and 16ths with drafting scale. Width folded, 1 inch. Weight per dozen, 2¼ pounds.

No. 84. Square joint, half bound.....\$ 9.10

No. 62. Square joint, full bound.....11.10

Per Doz. Each



No. 72½. Two-foot; four fold. Square joint. Full bound; graduated in 8ths, 10ths and 16ths and drafting scale. Width folded 1½ inch. Weight per dozen, about 2½ pounds.

Price per dozen.....\$12.75

Price each......128



No. 53½. Architects' two-foot, four fold. Brass mountings, arch joint; edge plates. Graduated in 8ths, 10ths, 12ths and 16ths. Inside edges beveled. Architects' drafting scale. Width folded, 1 inch. Weight per dozen, about 1½ pounds.

Price per dozen.....\$11.10

Price each......110



No. 36. Six-inch, two fold caliper. Square joint, graduated in 8ths, 10ths, 12ths and 16ths. Width folded, ½ inch. Weight per dozen about 1 pound.

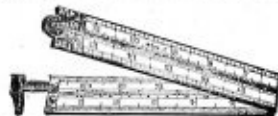
Price per dozen.....\$6.30

Price each......63

No. 32. One-foot, four fold. Arch joint edge plates. Graduated in 8ths, 10ths, 12ths and 16ths. Width folded, 1 inch. Approximate weight per dozen, 1¼ pounds.

Price per dozen.....\$9.75

Price each......98



No. 36½. One-foot, two fold. Square joint. Graduated in 8ths, 10ths, 12ths and 16ths. Width folded, 1½ inch. Approximate weight per dozen, 1¼ pounds.

Price per dozen.....\$9.30

Price each......93

No. 62C. Two-foot, four fold. Square joint. Full bound. Graduated in 8ths, 10ths, 12ths and 16ths. Width folded, 1 inch. Approximate weight per dozen, 3 pounds.

Price per dozen.....\$18.75

Price each......188

Pattern Makers' Shrinkable Rules



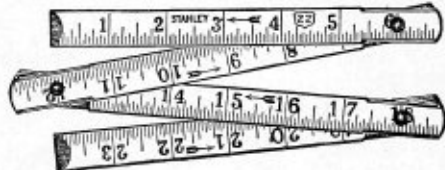
No. 30½. No folds. Selected boxwood brass tips. Figures and lines marked black. Width, 1½ inches. Graduated in 8ths and 16ths. Furnished in lengths from 24½ to 24½ inches in 7 sizes, showing ¼, 1/12, 1/10, ⅓, ⅕, ⅙ and ⅛-inch shrinkage per foot. Weight per dozen, 2 pounds.

Price per dozen.....\$19.20

Price each......192

Note.—When ordering shrinkage rules, be sure to state what shrinkage to the foot is wanted. Steel shrinkage rules are listed elsewhere.

Folding Pocket or Zig Zag Rules



Stanley's make, strictly high grade, not to be compared with the many cheap, inferior kinds on the market.

Made of flexible hardwood, plated steel joints and tips, with stiff spring which holds rule rigid when open; also has patented shield plates. Graduated in 8ths and 16ths. Length of joints, 6 inches. Width, ⅝ inch.

Enameled White

Length, feet.....	3	4	5	6	8
Per dozen.....	\$5.50	\$7.35	\$9.15	\$10.95	\$13.65
Price each.....	.55	.74	.92	1.10	1.36

Enameled Yellow

Length, feet.....	3	4	5	6	8
Per dozen.....	\$5.10	\$6.75	\$8.40	\$10.05	\$13.35
Price each.....	.50	.68	.84	1.00	1.34

H.Channon Company Chicago

Lufkin Measuring Tapes



The Improved Method of marking overcomes errors and annoyances in reading. In taking a measurement, the total length usually falls somewhere between the exact feet, and the reading before the eye is for the fraction of a foot only. It is necessary to refer back to the foot figure before the total reading can be had. In nine cases out of ten the fractional reading is lost or forgotten and it is necessary to take a second measure to avoid error. This Improved Method consists of the repetition of a Foot Reading at every inch in figures, easily distinguished from the subdivision figures bringing the Total Reading instantaneously before the eye. Suppose the total length measured should fall at 46 ft. 7 1/4 in. the reading on the tape would appear as in the cut shown above. All Lufkin steel tapes 1/4 and 3/8 inches wide and up to 100 feet are furnished with "Instantaneous Readings" as described above.

Reliable Steel Tape

The "Reliable" is the finest steel tape made regardless of price. Fine Russet Leather Case with heavy nickel plated brass mountings. Double Folding flush nickel plated brass winding handle, opened by pressing pin on opposite side. Measurements guaranteed perfectly accurate. Width of tape 3/8 inch. Marked feet, inches and eighths on one side.



Number	Price Each	Length Feet	Diameter of Case
200	\$ 4.50	25	2 1/4 in.
203	7.25	50	3 1/4 in.
205	10.50	75	4 1/4 in.
206	12.80	100	4 1/2 in.

Packed one in a paste-board box.

Tapes marked feet, 10ths and hundredths of feet for surveyors' use same price as regularly marked tapes.

Reliable Jr. Steel Tape

An exact counterpart of the "Reliable" tape listed above and not much over half its size and weight. Although small and light it is constructed in such a durable manner that with proper care it will last indefinitely. Extreme accuracy and the finest construction throughout is guaranteed. Each tape is packed in an individual box. Width of tape 1/4 inch.



Number	Price Each	Length Feet	Diameter of Case
100	\$4.30	25	2 1/4
103	5.25	50	2 3/4
105	6.60	75	3 1/4
106	8.00	100	3 3/4

Challenge Steel Tape

Fine Russet Leather Steel Lined Case with extra heavy Nickel Plated Brass Mountings. Fine Steel Tape 3/8 inch wide.

Winding handle is Brass Extra Heavily Nickel Plated and is opened by pressing button on opposite side. This is a strictly first quality tape and is excelled only by the "Reliable" Tape.



Number	Price Each	Length Feet	Diameter of Case
260	\$3.75	25	2 1/4
263	4.75	50	3 1/4
265	6.00	75	4 1/4
266	7.75	100	4 1/2

Challenge Jr. Steel Tape

Exactly the same quality as the Challenge Tape described above, and is designed for those who desire a tape that is light and durable.

Number	Price Each	Length Feet	Diameter of Case
1260	\$3.50	25	2 1/4
1263	4.00	50	2 3/4
1265	5.25	75	3 3/8
1266	6.75	100	3 3/4

Rival Steel Tape

Nickel Plated, highly polished steel case. Nickel Plated Brass Winding Handle which folds flush and is opened by push button on opposite side.

Fine steel tape, marked on one side only in either 10th or 12th inches. Please specify which is wanted, when ordering. A very good tape at a moderate price.



Number	Price Each	Length Feet	Diameter of Case
240	\$3.25	25	2 3/4
243	4.00	50	3 1/4
245	5.25	75	3 3/4
246	6.60	100	4 1/4

Rival Jr. Steel Tape

A light, compact, serviceable tape in which durability has not been sacrificed. Junior tapes are 1/4 inch wide and guaranteed accurate.

Number	Price Each	Length Feet	Diameter of Case
1240	\$3.00	25	2 1/4
1243	3.50	50	2 3/4
1245	4.75	75	3 1/4
1246	5.75	100	3 3/8

Channon steel barrels are great gasoline and oil savers. Get our prices.

Pocket Steel Tapes

Nickel Plated Brass Case. Fine Steel Tape $\frac{1}{4}$ inch wide. Spring Wind and Center Stop. Tape is marked on one side only in inches and 16ths. Weight per Dozen about $1\frac{1}{4}$ pounds.



Lumber	143	145	146	148
Length of Tape, ft.	3	5	6	8
Price Each	\$0.60	\$0.70	\$0.90	\$1.20

Metallic Tape

Fine Russet Leather Case, with extra heavy brass mountings. Extra heavy, double folding Brass Winding Handle opened by pushing button on opposite side of case. Fine quality Linen Tape $\frac{3}{4}$ inch wide, with 8 strands of fine Brass Wire interwoven through the entire length. Figures and lines marked black. Marked on one side only and graduated in feet and 12ths.



Lumber	600	603	605	606
Length, feet	25	50	75	100
Weight each, lbs.	$\frac{1}{2}$	1	$1\frac{1}{2}$	$1\frac{1}{2}$
Price, each	\$2.60	\$3.70	\$4.40	\$5.50

Sterling Linen Tape

Hard leather case, with polished nickel plated trimmings. Flush handle. Highest quality pure linen tape, $\frac{1}{4}$ -inch wide, reinforced with leather the first 4 inches and heavily coated.

Marked on one side only and graduated in feet and inches.



Lumber	400	403	405	406
Length, feet	25	50	75	100
Price, each	\$1.70	\$2.20	\$2.80	\$3.30

Universal Ass Skin Tape

Brass bound case with imitation rawhide sides. Cream enameled. Brass folding handle. Brass trimmings and trimmings. One-half inch waterproof coated cotton tape. Graduated in inches and 4ths on one side only.



Lumber	710	713	715	716
Length, feet	25	50	75	100
Price, each	\$0.40	\$0.50	\$0.70	\$0.90

Board Rules

Finest Selected Hickory



Figures clearly burned in. Tempered and polished steel head brazed to heavy brass shoulder attached to rule with heavy rivets. Diamond or square head, as desired; 3 ft.; 3 tier measures, lengths 8 to 18 feet.

No. 2. Width, $1\frac{1}{2}$ inches. Price, each.....\$2.90

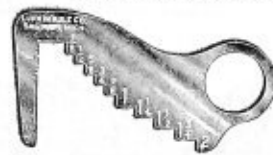
No. 3. Width, $1\frac{1}{4}$ inches. Price, each.....2.60

No. 2N. Width, 1 inch. Price, each.....2.90

*Same as No. 2, except brass shoulder is $\frac{1}{2}$ inch shorter.

Weight per dozen, about 6 pounds.

Nickel Plated Lumber Gauges



For measuring the thickness of lumber. Very light and convenient. Made of nicely finished aluminum and heavily nickel plated.

No. 00. $\frac{3}{8}$, $\frac{1}{2}$, $\frac{5}{8}$, $\frac{3}{4}$, $\frac{7}{8}$, 1, $1\frac{1}{4}$, $1\frac{1}{2}$, $1\frac{3}{4}$, 2.

Price, each\$1.00

Johnson's Patent Combination Rule



Made of spring German silver, accurately and distinctly graduated. Can be used as a hook rule, caliper gauge, protractor, triangle or try square. Upper edge is graduated in 32nds; lower edge in 16ths. Protractor is divided to five degrees, and vernier reads to $\frac{1}{2}$ degree. Rule remains firm wherever set.

Price each, 6-inch, 2-fold.....\$2.75

Price each, 12-inch, 2-fold.....4.50

The "Rustless" Rule

Luminoy, of which this rule is made, is a special alloy of aluminum, which always remains bright without polishing. It will not rust when exposed to water or moisture. Figures are large and clear. Graduations (16ths) are stamped on the metal and cannot be worn or rubbed off. Joints are spring steel and will not work loose. Very light weighing but 1 ounce per lineal foot.

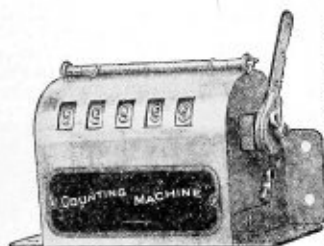


Length, feet 4 5 6

Price, each\$2.00 \$2.50 \$3.00

Counting Machines

The Redington

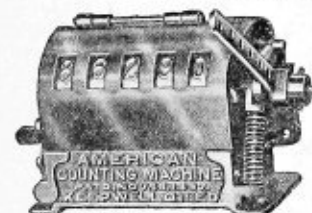


A reliable, efficient little machine for rapid and accurate counting. Durable, neat in appearance and low in price. Absolutely accurate at high or low speed. Will not jump or repeat. Easily and quickly set back to zero without the use of a key or other device. All working parts are enclosed and protected, yet easily accessible for inspection. Dimensions

$3\frac{1}{4} \times 2\frac{1}{4} \times 2\frac{1}{4}$ inches. Weight boxed, 23 ounces.

Price each \$10.00

The American



This machine is larger, heavier and stronger than the Redington and is not intended for high speed work. It is simple, reliable, and any number wheel can be set forward or backward without disturbing the others. The operating lever can be adjusted so that it may be operated from four different directions. Dimensions

$6 \times 3 \times 3\frac{1}{4}$ inches. Weight boxed, 4 pounds, 1 ounce.

Price each \$15.00

The American

With Locked Case



Where there is any likelihood that machine operator or other employee may tamper with the counter, this type should be used. Exactly the same as the American with a cover which can be locked and numbers show through a glass. Weight $4\frac{1}{4}$ pounds.

Price each \$16.00

No. 748 B. & S. Speed Indicator



For determining velocity of shafts and spindles running in either direction. Registers on either side, front side used to determine velocity of shafts and spindles running in one direction; reverse side speed of those running in opposite direction, avoiding all confusion and errors.

Dials register units and tens by means of a revolving pointer and, in addition, front dial registers hundreds up to 5000 by means of a rotating dial in the center. This dial will register when either side is used.

Quick use is greatly facilitated by means of a small knurled wheel on side of case which, when turned, reverts the rotating disk on the front dial to starting point.

Price each \$5.50 In Morocco case \$6.00

The Benton Tally Register



These little registers are positive in their action and can be set to zero at will. They are simple in construction, can be carried in the pocket, are about the size of an ordinary watch and weigh about 6 ounces. They are used by railroad telegraph and steamboat men for checking or tallying telegraph poles, and passengers, and all kinds of freight, by cattlemen for counting cattle and sheep, by lumbermen, loggers, and timber estimators, and by detectives and spotters, and in places of amusement for counting people going in and out. In fact they can be used for any purpose where a correct count is desired to be kept.

No. 00. Records to 100. Price each \$3.00

No. 0. Records to 1,000. Price each 2.75

No. 1. Records to 10,000. Price each 6.25

The Job Counter



An extremely simple and compact counting machine. Parts are stamped from steel and brass with case hardened ratchet and dog. Provided with stationary adjusting keys for setting and two bolt holes for attaching. Case heavily nickel plated. Approximate weight each 1 pound.

4 Dial, counts to 9,999. Dimensions of case $4\frac{1}{4} \times 2\frac{1}{4} \times 1\frac{1}{4}$ inches. Price each \$5.50

5 Dial, counts to 99,999. Dimensions of case $4\frac{1}{4} \times 2\frac{1}{4} \times 1\frac{1}{4}$ inches. Price each \$6.00

Veeder Special Counter



A small, compact instrument; positive count and very easily read. Reading is always in sight and cannot be accidentally disturbed. Operator does not have to watch counter, but can give all his attention to watch. Length $3\frac{1}{4}$ inches. Weight 4 ounces.

Price each \$4.75

The Lightning Speed Indicator

Recording to 1,000 Revolutions



This little instrument weighs but $1\frac{1}{2}$ ounces, is very easily read and is suitable for testing all speeds of machinery from the most delicate to the heaviest. Supplied with two rubber tips for pointed, flat or hollow centers and an extension spindle which gives it a reach of $2\frac{1}{2}$ inches. Packed out in a cloth covered case.

Price each \$3.75

In leatherette case 4.50

General Description of Files and Rasps

Shops striving for efficiency have learned the wisdom of careful file selection.

They have ascertained the saving of time by fast cutting files and the lessening of errors by the use of files that cut accurately.

They have determined the positive economy in using high quality, long wearing files though the initial cost may be slightly more than that for inferior products.

The saving of time, the improvement of work, the appreciation of better files by the workmen, and the longer service from our files are important points in increasing the efficiency of your shop.

We offer two reputable grades:

Imperial Brand

Our Imperial Brand Files are made of the very best quality crucible file steel, which takes a uniform hardness without becoming brittle. They are perfectly tempered to insure fast, even cutting and possess unusual long wearing qualities. Imperial Brand Files are cut on the newest, improved file cutting machinery, and great care is exercised in every stage of manufacture.

Before packing, Imperial Brand Files are thoroughly examined and selected for shape, cutting qualities, soundness and temper, thus avoiding the possibility of soft or imperfect files being shipped.

Great Western Brand

Our Great Western Brand Files are of first quality, forged from high quality file steel, carefully tempered, hardened, inspected before packing and entirely free from seconds.

Great Western Brand Files are guaranteed to give satisfactory service and will cut better, faster and longer than many similarly priced files.

Files and Rasps Have Three Distinguishing Features.

First—Their Length—Which is always measured exclusive of their Tang.

Second—Their Kind or Name—Which has reference to the shape or style.

Third—Their Cut—Which has reference not only to character, but also to relative degrees of coarseness of Teeth.

The Length—Of a file is the distance between its Heel or part of the File where the Tang begins and the point or end opposite. The Tang or portion of the File prepared for the reception of the handle is never included in the Length. In general, the Lengths of Files bear no fixed proportion to either their Width or Thickness, even though they be of the same kind.

The Kind—By Kind we mean the varied shapes or styles of Files which are distinguished by certain technical names, as, for instance, Flat, Mill, Half-round, etc. The Kinds are divided, from the form of their Cross Sections into Three Geometrical Classes, namely, Quadrangular Sections, Circular Sections and Triangular Sections; Odd and Irregular Forms are collected under Miscellaneous Sections. These Sections are in turn sub-divided according to their general contour or outline, into Taper and Blunt.

Taper—Designates a File, the Point of which is more or less reduced in size, both in Width and thickness by a gradually narrowing Section extending from One-half to Two-thirds the Length of the File, from the Point; Custom has also established it as a short name for the Three Square Hand saw File.

Blunt—Designates a File that preserves its Sectional Shape throughout, from Point to Tang.

The Cut of Files is divided, with reference to the character of the Teeth, into Single Cut, Double Cut and Rasp Cut, and with reference to the Coarseness of the Teeth into Rough, Coarse, Bastard, Second Cut, Smooth and Dead Smooth. Regarding the latter we may say very briefly that the Bastard Cut is used upon the coarser, heavier classes of work while the Second Cut and Smooth are used for the finer grades and for finishing the work started by the Bastard. The Rough and Dead Smooth are seldom called for, but correspond to the above use.

The Single Cut File—Is one in which a Single, Unbroken Course of Chisel Cuts is made across its surface, arranged parallel to each other, but with a horizontal obliquity to the Central Line.

The Double Cut File—Has Two Courses of Chisel Cuts crossing each other, the Second Course, with rare exceptions, being finer than the first.

Rasp Cut—Differs from Single or Double Cut in the respect that the Teeth are disconnected from each other, each Tooth being made by a single pointed punch.

Superfine, or Super, Cut—A term applied by the Lancashire File-makers to designate a grade of Cut designated by us as Dead Smooth.

Safe Edge, or Side—Terms used to denote that a File has one or more of its Edges or Sides smooth or Uncut, that it may be presented to the work without injury to that portion which does not require to be Filed.

All orders filled with Imperial Brand unless otherwise specified.

Imperial

Flat Files

Great Western



Double Cut—Tapering Sides

One of the most common files used; not confined to any specific kind of work, but used by mechanics generally for a great variety of purposes, in machine shops and foundries.

Length, inches	3	4	5	6	8	10	12	14	16	18	20
Bastard cut, per dozen		\$3.70	\$3.90	\$4.30	\$5.30	\$7.00	\$9.70	\$13.30	\$17.80	\$23.90	\$31.10
Bastard cut, price each		.37	.39	.43	.53	.70	.97	1.33	1.78	2.39	3.11
Second cut, per dozen		4.30	4.60	4.80	6.10	8.10	11.00	15.30	20.10	26.80	35.30
Second cut, price each		.43	.46	.48	.61	.81	1.10	1.53	2.01	2.68	3.53
Smooth cut, per dozen		4.70	4.90	5.30	6.60	8.70	12.10	16.70	22.30	29.20	38.30
Smooth cut, price each		.47	.49	.53	.66	.87	1.21	1.67	2.23	2.92	3.83
Extreme width, inches	$\frac{11}{16}$	$\frac{7}{8}$	$\frac{33}{64}$	$\frac{65}{64}$	$\frac{85}{64}$	1	1 $\frac{1}{8}$	1 $\frac{13}{16}$	1 $\frac{11}{8}$	1 $\frac{3}{4}$	1 $\frac{7}{8}$
Approximate thickness, inches	$\frac{3}{16}$	$\frac{3}{16}$	$\frac{3}{16}$	$\frac{3}{16}$	$\frac{3}{16}$	$\frac{3}{16}$	$\frac{3}{16}$	$\frac{3}{16}$	$\frac{3}{16}$	$\frac{3}{16}$	$\frac{3}{16}$
Approximate weight per dozen, lbs		3 $\frac{3}{4}$	4 $\frac{1}{8}$	4 $\frac{1}{2}$	5 $\frac{3}{4}$	7 $\frac{1}{2}$	10	13 $\frac{1}{2}$	18 $\frac{1}{2}$	24	31 $\frac{1}{2}$

For dead smooth files (not carried in stock) double the price of bastard cut.

Half Round Files



Double Cut—Tapering Sides

This file is used largely in the machine shop. Double cut on flat side, single cut on convex side.

Length, inches	3	4	5	6	8	10	12	14	16	18	20
Bastard cut, per dozen		\$4.80	\$5.40	\$6.10	\$7.50	\$9.10	\$11.80	\$15.50	\$20.60	\$27.50	\$36.20
Bastard cut, price each		.48	.54	.61	.75	.91	1.18	1.55	2.06	2.75	3.62
Second cut, per dozen		5.60	6.10	6.70	8.30	10.10	13.00	17.00	22.50	29.90	39.40
Second cut, price each		.56	.61	.67	.83	1.01	1.30	1.70	2.25	2.99	3.94
Smooth cut, per dozen		6.10	6.40	7.10	8.90	10.70	13.90	18.30	24.20	32.00	42.30
Smooth cut, price each		.61	.64	.71	.89	1.07	1.39	1.83	2.42	3.20	4.23

For dead smooth half round files (not carried in stock) double the price of bastard cut.

Hand Files



Double Cut—Parallel Sides—One Safe Edge

This file is preferred among machinists and engineers for finishing flat surfaces. Owing to its shape, and having one safe edge it is particularly useful where a flat taper file is unsuitable.

Length, inches	4	5	6	8	10	12	14	16
Bastard cut, per dozen	\$3.70	\$3.90	\$4.30	\$5.40	\$7.50	\$10.70	\$15.00	\$20.10
Bastard cut, price each	.37	.39	.43	.54	.75	1.07	1.50	2.01
Second cut, per dozen	4.30	4.70	5.10	6.30	8.70	12.30	17.00	22.80
Second cut, price each	.43	.47	.51	.63	.87	1.23	1.70	2.28
Smooth cut, per dozen	4.80	5.30	5.60	6.70	9.40	13.50	18.00	24.20
Smooth cut, price each	.48	.53	.56	.67	.94	1.35	1.80	2.42
Width, inches	$\frac{11}{16}$	$\frac{5}{8}$	$\frac{33}{64}$	$\frac{33}{64}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$
Thickness, inches	$\frac{3}{16}$	$\frac{3}{16}$	$\frac{3}{16}$	$\frac{3}{16}$	$\frac{3}{16}$	$\frac{3}{16}$	$\frac{3}{16}$	$\frac{3}{16}$
Weight, per dozen, pounds	3 $\frac{3}{4}$	4 $\frac{1}{8}$	4 $\frac{1}{2}$	5 $\frac{3}{4}$	7 $\frac{1}{2}$	10	13 $\frac{1}{2}$	18 $\frac{1}{2}$

For dead smooth hand files (not carried in stock) double the price of bastard cut. All weights and dimensions given are approximate only and are not guaranteed. Packed, 10-inch and under, 1 dozen in a box; 12-inch and longer, 5 dozen in a box. All orders filled with Imperial Brand files unless otherwise specified.

Imperial

Round Files

Great Western

Double Cut—Tapering Sides
Used for enlarging holes and shaping internal angles which are filled in.

Length, inches.....	3	4	5	6	8	10	12	14	16	18	20
Bastard cut, per dozen.....	\$3.00	\$3.00	\$3.20	\$3.50	\$4.30	\$5.60	\$7.50	\$10.70	\$14.70	\$20.20	\$27.40
Bastard cut, price each.....	.30	.30	.32	.35	.43	.56	.75	1.07	1.47	2.02	2.74
Second cut, per dozen.....	3.50	3.50	3.80	4.00	4.90	6.40	8.60	12.20	16.80	22.70	30.70
Second cut, price each.....	.35	.35	.38	.40	.49	.64	.86	1.22	1.68	2.27	3.07
Smooth cut, per dozen.....	3.90	3.90	4.10	4.50	5.40	7.00	9.40	13.10	17.90	24.30	32.90
Smooth cut, price each.....	.39	.39	.41	.45	.54	.70	.94	1.31	1.79	2.43	3.29
Approximate diameter, inches.....	$\frac{1}{2}$	$\frac{3}{4}$	$1\frac{1}{2}$	$1\frac{3}{4}$	$2\frac{1}{2}$	$3\frac{1}{2}$	$4\frac{1}{2}$	$5\frac{1}{2}$	$6\frac{1}{2}$	$7\frac{1}{2}$	1
Approximate weight per dozen, lbs.....	$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$	$2\frac{1}{2}$	$3\frac{1}{2}$	$4\frac{1}{2}$	$5\frac{1}{2}$	$6\frac{1}{2}$	1

Square Files

Double Cut—Tapering Sides
Used in almost all branches of mechanical industries, principally for enlarging rectangular apertures.

Length, inches.....	3	4	5	6	8	10	12	14	16	18	20
Bastard cut, per dozen.....	\$3.80	\$3.80	\$4.10	\$4.60	\$5.50	\$7.40	\$10.20	\$13.90	\$18.70	\$25.10	\$32.80
Bastard cut, price each.....	.38	.38	.41	.46	.55	.74	1.02	1.39	1.87	2.51	3.28
Second cut, per dozen.....	4.00	4.60	4.80	5.10	6.30	8.50	11.50	16.10	21.20	28.20	36.70
Second cut, price each.....	.40	.46	.48	.51	.63	.85	1.15	1.61	2.12	2.82	3.67
Smooth cut, per dozen.....	4.90	4.90	5.30	5.50	7.00	9.10	12.80	17.50	23.30	30.40	39.30
Smooth cut, price each.....	.49	.49	.53	.55	.70	.91	1.28	1.75	2.33	3.04	3.93
Extreme width, inches.....	$\frac{1}{2}$	$\frac{5}{8}$	$1\frac{1}{2}$	$1\frac{3}{4}$	$2\frac{1}{2}$	$3\frac{1}{2}$	$4\frac{1}{2}$	$5\frac{1}{2}$	$6\frac{1}{2}$	$7\frac{1}{2}$	1
Approximate weight per dozen, lbs.....	$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$	$2\frac{1}{2}$	$3\frac{1}{2}$	$4\frac{1}{2}$	$5\frac{1}{2}$	$6\frac{1}{2}$	1

Square Blunt Double Cut Files

Same as square files listed above, except that they have parallel or straight edges instead of tapering and are carried in stock in the bastard cut only. Has one safe edge.

Length, inches.....	6	8	10	12	14	16
Bastard cut, per dozen.....	\$4.60	\$5.50	\$7.40	\$10.20	\$13.90	\$18.70
Bastard cut, price each.....	.46	.55	.74	1.02	1.39	1.87

Warding Files

Double Cut—Tapering Sides
Used considerably by machinists and jewelers, but more especially by locksmiths for making keys.

Length, inches.....	3	4	5	6	8	10
Bastard cut, per dozen.....	\$4.00	\$4.00	\$4.50	\$4.90	\$6.40	\$8.70
Bastard cut, price each.....	.40	.40	.45	.49	.64	.87
Second cut, per dozen.....	4.80	4.80	5.30	5.90	7.50	10.10
Second cut, price each.....	.48	.48	.53	.59	.75	1.01
Smooth cut, per dozen.....	5.40	5.40	5.80	6.40	8.20	11.00
Smooth cut, price each.....	.54	.54	.58	.64	.82	1.10
Extreme width, inches.....	$\frac{1}{2}$	$\frac{15}{16}$	$\frac{15}{16}$	$\frac{15}{16}$	$\frac{15}{16}$	$\frac{15}{16}$
Approximate thickness, inches.....	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$
Approximate weight per dozen, pounds.....	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$

All weights and dimensions given are approximate only and are not guaranteed. Packed, 10-inch and under, 1 dozen in a box; 12-inch and larger, $\frac{1}{2}$ dozen in a box. All orders filled with Imperial Brand unless otherwise specified.

Imperial

Knife Files

Great Western



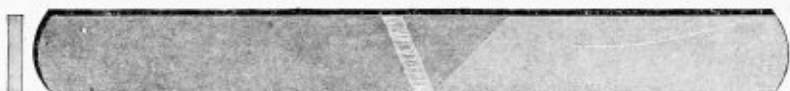
Double Cut—Tapering Sides

Length, inches	4	5	6	8	10
Bastard cut, per dozen	\$5.40	\$6.10	\$6.90	\$8.50	\$10.10
Bastard cut, price each	.54	.61	.69	.85	1.01
Second cut, per dozen	6.10	6.70	7.50	9.10	11.50
Second cut, price each	.61	.67	.75	.91	1.15
Smooth cut, per dozen	6.40	7.10	7.90	9.50	12.30
Smooth cut, price each	.64	.71	.79	.95	1.23
Extreme width, inches	$\frac{11}{16}$	$\frac{11}{16}$	$\frac{13}{16}$	$\frac{7}{8}$	1 $\frac{1}{4}$
Approximate thickness, inches	$\frac{3}{16}$	$\frac{3}{16}$	$\frac{11}{32}$	$\frac{11}{32}$	$\frac{5}{16}$
Approximate weight per dozen, pounds	$\frac{3}{8}$	$\frac{5}{8}$	1	2 $\frac{3}{4}$	4 $\frac{1}{2}$

Great American Cross Cut Saw

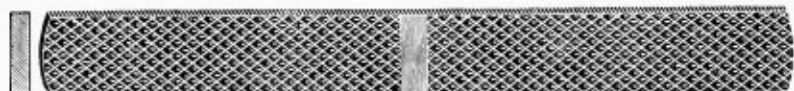
Single Cut—Knife Shape
Used for filing two-man cross cut saws, principally the Great American style of tooth

Planer Knife

Single Cut—Parallel Sides—Round Ends
The most suitable file for sharpening planer knives, paper cutting knives, etc.

Pattern	Great American Cross Cut Saw				Planer Knife		
Length, inches	6	8	10	12	8	10	12
Price per dozen	\$6.10	\$7.50	\$9.10	\$11.80	\$6.40	\$8.60	\$12.10
Price each	.61	.75	.91	1.18	.64	.86	1.21
Width, inches	$\frac{13}{32}$	$\frac{21}{32}$	$\frac{9}{16}$	1	$\frac{23}{32}$	$\frac{21}{16}$	1 $\frac{5}{16}$
Thickness, inches	$\frac{3}{32}$	$\frac{11}{32}$	$\frac{11}{32}$	$\frac{11}{32}$	$\frac{21}{32}$	$\frac{11}{16}$	$\frac{11}{16}$

Plain Horse Rasp



Rasp Cut—Parallel Sides—Used Mostly by Blacksmiths for Horseshoeing

Flat Wood Rasp



Rasp Cut, Tapering Sides. For Wheelwrights, Carriage Makers, etc., and for Woodworking in General

Horse Rasps					Flat Wood Rasps						
Length, inches	12	14	16	18	Length, inches	8	10	12	14	16	18
Plain half file, dozen	\$12.80	\$17.80	\$24.40	\$32.90	Price per dozen	\$9.40	\$12.80	\$17.50	\$23.20	\$30.30	\$40.50
Plain half file, each	1.28	1.78	2.44	3.29	Price each . . . . .	.94	1.28	1.75	2.32	3.08	4.15
Width, inches	1 $\frac{1}{32}$	1 $\frac{1}{8}$	1 $\frac{1}{4}$	1 $\frac{1}{2}$	Width, inches	$\frac{3}{8}$	1	1 $\frac{1}{8}$	1 $\frac{1}{4}$	1 $\frac{1}{2}$	1 $\frac{3}{4}$
Thickness, inches	$\frac{1}{16}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{1}{2}$	Thickness, "n.	$\frac{3}{8}$	$\frac{7}{16}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{3}{4}$
Weight, dozen, pounds	15 $\frac{1}{4}$	20	28 $\frac{3}{4}$	38	Wt. doz., lbs.	3 $\frac{1}{2}$	6 $\frac{3}{4}$	11 $\frac{1}{4}$	18 $\frac{1}{2}$	27	41

All weights and dimensions given are approximate only and are not guaranteed. Packed, 10-inch and under, 1 dozen in a box; 12-inch and longer, $\frac{1}{2}$ dozen in a box. All orders filled with Imperial Brand files unless otherwise specified.

Imperial

Mill Files

Great Western



Single Cut—Tapering Sides

Used mostly for sharpening mill saws, mowing machine knives and plows; in machine shops for lathe work, draw filing and to some extent finishing the several compositions of brass and bronze.

Length, inches	3	4	5	6	8	10	12	14	16	18
Bastard cut, per doz.	\$3.00	\$3.20	\$3.50	\$4.00	\$4.50	\$5.00	\$5.50	\$6.00	\$6.50	\$7.00
Bastard cut, price each	.30	.32	.35	.40	.45	.50	.55	.60	.65	.70
Second cut, per doz.	3.50	3.80	4.00	4.50	5.00	5.50	6.00	6.50	7.00	7.50
Second cut, price each	.35	.38	.40	.45	.50	.55	.60	.65	.70	.75
Smooth cut, per doz.	3.90	4.10	4.50	5.00	5.50	6.00	6.50	7.00	7.50	8.00
Smooth cut, price each	.39	.41	.45	.50	.55	.60	.65	.70	.75	.80
Extreme width, inches	$\frac{1}{2}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	1	1 $\frac{1}{4}$	1 $\frac{1}{2}$	1 $\frac{3}{4}$	2
Approximate thickness, inches	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$
Approximate weight per dozen, pounds	$\frac{3}{4}$	$\frac{1}{2}$	1	1 $\frac{1}{4}$	2	3	4	5	6	7

Mill—One Round Edge

Mill—Two Round Edges

Single Cut—Tapering Sides

Used for Filing the Gullet or Space Between Saw Teeth

Length, inches	6	8	10	12	14
Bastard cut, per doz.	\$3.90	\$4.80	\$5.30	\$5.40	\$12.00
Bastard cut, price ea.	.40	.48	.53	.45	1.20
Extreme width, in.	$\frac{5}{8}$	$\frac{3}{4}$	1	1 $\frac{1}{2}$	1 $\frac{3}{4}$
Approx. thickn's, in.	$\frac{1}{2}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{8}$	$\frac{1}{2}$
Weight per doz., lbs.	1 $\frac{1}{4}$	2 $\frac{1}{2}$	3	4	5

Regular Taper Files



Single Cut—Tapering Sides

Used principally for sharpening coarse tooth hand saws, small circular saws, etc.

Length, inches	3	4	5	6	7	8	9	10	12	14
Single cut, per doz.	\$2.10	\$2.20	\$2.50	\$2.60	\$2.90	\$3.10	\$3.40	\$3.60	\$3.80	\$4.00
Single cut, price each	.21	.22	.25	.26	.29	.31	.34	.36	.38	.40
Approximate thickness, inches	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
Approximate weight per dozen, pounds	$\frac{1}{2}$	$\frac{1}{2}$	1 $\frac{1}{4}$	2	3	4	5	6	7	8

Slim Taper Files



Single Cut—Tapering Sides

The popular saw file. These files are considerably lighter and largely used for sharpening regular hand saws.

Length, inches	3	3 $\frac{1}{2}$	4	4 $\frac{1}{2}$	5	5 $\frac{1}{2}$	6	7	8	9	10	12
Single cut, per doz.	\$2.10	\$2.10	\$2.20	\$2.30	\$2.50	\$2.90	\$3.10	\$3.40	\$3.60	\$3.80	\$4.00	\$4.20
Single cut, price each	.21	.21	.22	.23	.25	.29	.31	.34	.36	.38	.40	.42
Thickness, inches	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$
Weight, dozen, pounds	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$

Extra Slim Taper Files

Similar to the slim taper files but made of lighter stock. Especially intended for filing panel, back, butchers' scroll and other thin edge, fine tooth saws.

Length, inches	3	3 $\frac{1}{2}$	4	4 $\frac{1}{2}$	5	5 $\frac{1}{2}$	6	7	8
Thickness, inches	$\frac{1}{16}$	$\frac{1}{16}$	$\frac{1}{16}$	$\frac{1}{16}$	$\frac{1}{16}$	$\frac{1}{16}$	$\frac{1}{16}$	$\frac{1}{16}$	$\frac{1}{16}$

All weights and dimensions given are approximate only and are not guaranteed. Packed, 10-inch and under, 1 dozen in a box; 12-inch and longer, $\frac{1}{2}$ dozen in a box. All orders filled with Imperial Brand files unless otherwise specified.

Imperial

Double End Taper Files, Reversible Great Western



Single Cut—Tapering Sides—With Handle

Same as slim taper, with the added advantage of having two files in one at a lower price and a handle which can be easily attached. Intended for hand and buck saw filing.

Length of File, Inches	6	7	8	9	10
Price, per dozen.....	\$3.50	\$3.50	\$3.90	\$4.40	\$4.90
Price each.....	.35	.35	.39	.44	.49
Approx. thickness, inches.....	$\frac{1}{12}$	$\frac{1}{4}$	$\frac{9}{12}$	$\frac{3}{8}$	$\frac{3}{8}$

Band Saw Files



Made in Two Styles—Parallel or Blunt and Tapering Sides—Cut Shows Blunt

For filing band saws, the slenderness of which does not permit the teeth being filed to a sharper bottom. This file has rounded edges, is mill cut, and has shorter angles than the taper patterns. Blunt files not priced, advance 1 inch. In ordering state whether blunt or taper files are wanted.

Length, inches.....	4	5	6	8	10
Regular, per dozen.....	\$2.90	\$3.50	\$4.70	\$6.70	\$9.70
Regular, price each.....	.29	.35	.47	.67	.97
Slim, per dozen.....	2.60	3.20	3.90	5.30	7.50
Slim, price each.....	.26	.32	.39	.53	.75
Thickness, inches.....	$\frac{1}{12}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$

Cant Saw (Lightning)



Single Cut—Parallel Sides

Used generally for filing cross cut saws having M shaped teeth.

Length, inches.....	6	8	10	12
Price, per dozen.....	\$5.40	\$6.40	\$8.70	\$11.40
Price each.....	.54	.64	.87	1.14
Width, inches.....	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{7}{8}$	1
Thickness, inches.....	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{1}{2}$

Auger Bit Files



Made Especially for Sharpening Auger Bits

No. 1—7 inch. One end cut on edges reverse end cut on sides only. Cutting ends $1\frac{1}{8}$ inches long, $\frac{1}{4}$ inch wide, tapered to point. Weight per dozen about 12 ozs.

Per dozen.....\$6.00 Price each.....\$0.60

All weights and dimensions given are approximate only and are not guaranteed. Packed, 10-inch and under, 1 dozen in a box; 12-inch and longer, $\frac{1}{2}$ dozen in a box. All orders filled with Imperial Brand Files unless otherwise specified.

Imperial

Half Round Wood Rasp

Great Western



Rasp Cut—Tapering Sides

Half Round Cabinet Rasp



Rasp Cut—Tapering Sides

Half Round Wood Rasp

Length, ins.	8	10	12	14	16	18
Price per doz.	\$10.10	\$13.70	\$18.70	\$24.80	\$32.90	\$43.60
Price each...	1.01	1.37	1.87	2.48	3.29	4.36
Width, ins.	$\frac{3}{4}$	$\frac{7}{8}$	$1\frac{1}{8}$	$1\frac{3}{8}$	$1\frac{1}{2}$	$1\frac{3}{4}$
Thickness, ins.	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$
Wt. doz. Lbs.	3 $\frac{1}{4}$	6 $\frac{1}{4}$	10 $\frac{5}{8}$	16 $\frac{3}{8}$	23	33

Half Round Cabinet Rasp

Length, ins.	8	10	12	14	16	18
Price per doz.	\$12.80	\$17.50	\$22.80	\$29.60	\$36.90	\$46.90
Price each...	1.28	1.75	2.28	2.96	3.69	4.69
Width, ins.	$\frac{3}{4}$	$1\frac{1}{8}$	$1\frac{1}{4}$	$1\frac{1}{2}$	$1\frac{3}{4}$	$1\frac{7}{8}$
Thickness, ins.	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$
Wt. doz. Lbs.	3	5 $\frac{5}{8}$	9 $\frac{1}{2}$	13 $\frac{5}{8}$	20 $\frac{5}{8}$	30

Babbitt Float File



Single Cut, Tapering Sides, for Filing Babbitt, Lead and Other Soft Metals.

Length, inches	6	8	10	12	14	16
Half Round, price per dozen	\$7.50	\$9.10	\$11.80	\$15.50	\$20.60	\$27.50
Half Round, price each	.75	.90	1.18	1.50	2.00	2.75
Extreme Width, inches	$\frac{3}{8}$	$\frac{25}{32}$	$\frac{15}{16}$	$\frac{15}{16}$	$1\frac{11}{16}$	$1\frac{9}{8}$
Extreme Thickness, inches	$\frac{3}{16}$	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{3}{4}$	$\frac{7}{16}$
Approx. Weight, dozen Lbs.	2 $\frac{1}{2}$	3 $\frac{1}{2}$	6	11	17	24

Vixen Files or Hand Milling Tools



Vixen Files, because of their circular teeth, will not chatter or chase, produce a very even surface, and will work well on greased surfaces. They are adapted to soft and tool steel, cast and wrought iron, bronze, copper and other hard metals. They will cut brass, aluminum and other soft metals without clogging.

Description	Flat						Half Round					
Size, inches	8	10	12	14	16	18	8	10	12	14	16	18
Regular (Bastard) per doz.	\$5.25	\$6.55	\$7.90	\$9.45	\$11.30	\$13.65	\$ 4.25	\$5.25	\$6.45	\$7.80	\$9.40	\$11.50
Regular (Bastard) each	.53	.65	.80	.95	1.13	1.36	.43	.53	.65	.78	.95	1.15
Fine (Second Cut) per doz.	6.30	7.60	8.95	10.50	12.35	14.70	5.00	6.00	7.20	8.55	10.15	12.25
Fine (Second Cut) each	.63	.76	.90	1.05	1.24	1.47	.50	.60	.72	.85	1.00	1.23
Smooth, per doz.	6.85	8.15	9.45	11.00	12.85	15.20	6.40	6.40	7.60	8.95	10.55	12.65
Smooth, each	.69	.82	.95	1.10	1.29	1.52	.64	.64	.76	.90	1.05	1.27
Dead Smooth, per doz.	7.35	9.20	11.00	13.10	14.95	17.30	5.90	7.40	9.10	10.95	12.55	14.65
Dead Smooth, each	.74	.92	1.10	1.31	1.50	1.73	.59	.74	.91	1.10	1.25	1.47
Horse Rasps, per doz.				21.00	23.10							
Horse Rasps, each				2.10	2.30							

Extra (X-F) Fine

Swiss Pattern Files

The Nicholson X. F. files are an American made Swiss pattern and are recognized as the best files for die and tool making and fine precision work.

They are made by the most modern file machinery and are of the best material and workmanship.

The cut is designated by number, ranging from No. 00 (the coarsest) to No. 6 (the finest). Packed one dozen in a box.

Hand Files



Size, inches.....	4	5	6	8	10	12
Dozen, Nos. 00 to 2..	\$2.70	\$3.45	\$4.10	\$6.30	\$9.55	12.30
Each, Nos. 00 to 2..	.27	.35	.41	.63	.95	1.23
Dozen, Nos. 3 and 4..	2.85	3.65	4.40	6.60	9.90	12.60
Each, Nos. 3 and 4..	.29	.37	.44	.66	.99	1.26
Dozen, Nos. 6.....	3.25	4.40	5.00	7.75	11.10	17.00
Each, No. 6.....	.33	.44	.50	.76	1.10	1.70
Extreme width, in... Thickness, inches...	$\frac{11}{32}$ $\frac{3}{32}$	$\frac{5}{16}$ $\frac{1}{16}$	$\frac{3}{8}$ $\frac{1}{8}$	$\frac{7}{8}$ $\frac{3}{16}$	$\frac{15}{16}$ $\frac{1}{2}$	$1\frac{1}{2}$ $\frac{5}{8}$

Pillar Files



Size, inches.....	3	4	5	6	8	10
Dozen, Nos. 00 to 2..	\$1.85	\$2.35	\$3.05	\$3.30	\$5.50	\$8.55
Each, Nos. 00 to 2..	.19	.24	.31	.33	.55	.86
Dozen, Nos. 3 and 4..	1.95	2.50	3.20	3.50	5.80	8.80
Each, Nos. 3 and 4..	.20	.25	.32	.35	.58	.88
Dozen, Nos. 6.....	2.05	2.60	3.40	3.65	6.05	9.30
Each, No. 6.....	.21	.26	.34	.37	.61	.93
Extreme width, in... Thickness, inches...	$\frac{11}{32}$ $\frac{1}{16}$	$\frac{11}{32}$ $\frac{1}{16}$	$\frac{5}{16}$ $\frac{1}{8}$	$\frac{11}{16}$ $\frac{3}{16}$	$\frac{3}{4}$ $\frac{1}{2}$	$1\frac{1}{2}$ $\frac{3}{4}$

Narrow Pillar Files



Size, inches.....	3	4	5	6	8	10
Dozen, Nos. 00 to 2..	\$1.85	\$2.35	\$3.05	\$3.30	\$5.50	\$8.55
Each, Nos. 00 to 2..	.19	.24	.31	.33	.55	.86
Dozen, Nos. 3 and 4..	1.95	2.50	3.20	3.50	5.80	8.80
Each, Nos. 3 and 4..	.20	.25	.32	.35	.58	.88
Dozen, Nos. 6.....	2.05	2.60	3.40	3.65	6.05	9.30
Each, No. 6.....	.21	.26	.34	.37	.61	.93
Extreme width, in... Thickness, inches...	$\frac{7}{32}$ $\frac{1}{32}$	$\frac{11}{32}$ $\frac{1}{16}$	$\frac{11}{32}$ $\frac{1}{16}$	$\frac{11}{32}$ $\frac{1}{16}$	$\frac{11}{32}$ $\frac{1}{16}$	$\frac{11}{32}$ $\frac{1}{16}$

Extra Narrow Pillar Files



Size, inches.....	3	4	5	6	8	10
Dozen, Nos. 00 to 2..	\$1.85	\$2.35	\$3.05	\$3.30	\$5.50	\$8.55
Each, Nos. 00 to 2..	.19	.24	.31	.33	.55	.86
Dozen, Nos. 3 and 4..	1.95	2.50	3.20	3.50	5.80	8.80
Each, Nos. 3 and 4..	.20	.25	.32	.35	.58	.88
Dozen, Nos. 6.....	2.05	2.60	3.40	3.65	6.05	9.30
Each, No. 6.....	.21	.26	.34	.37	.61	.93
Extreme width, in... Thickness, inches...	$\frac{5}{32}$ $\frac{1}{32}$	$\frac{11}{32}$ $\frac{1}{16}$	$\frac{11}{32}$ $\frac{1}{16}$	$\frac{11}{32}$ $\frac{1}{16}$	$\frac{11}{32}$ $\frac{1}{16}$	$\frac{11}{32}$ $\frac{1}{16}$

Half Round Files



Size, inches.....	3	4	5	6	8	10	12
Dozen, Nos. 00 to 2..	\$2.30	\$2.75	\$3.45	\$4.40	7.45	10.70	12.90
Each, Nos. 00 to 2..	.23	.28	.35	.44	.75	1.07	1.29
Dozen, Nos. 3 and 4..	2.40	3.40	4.30	5.25	8.75	13.80	16.90
Each, Nos. 3 and 4..	.24	.34	.43	.53	.88	1.38	1.69
Dozen, No. 6.....	2.60	3.70	4.65	5.90	9.55	16.20	19.30
Each, No. 6.....	.26	.37	.47	.59	.96	1.62	1.93
Extreme width, in... Thickness, inches...	$\frac{11}{32}$ $\frac{1}{16}$	$\frac{11}{32}$ $\frac{1}{16}$	$\frac{11}{32}$ $\frac{1}{16}$	$\frac{11}{32}$ $\frac{1}{16}$	$\frac{11}{32}$ $\frac{1}{16}$	$\frac{11}{32}$ $\frac{1}{16}$	$1\frac{1}{2}$ $\frac{1}{16}$

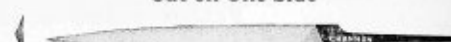
Crossing or Oval Files



Size, inches.....	3	4	5	6	8	10
Dozen, Nos. 00 to 2..	\$2.25	\$3.40	\$4.40	\$5.25	\$8.50	11.50
Each, Nos. 00 to 2..	.23	.34	.44	.53	.85	1.15
Dozen, Nos. 3 and 4..	2.30	3.60	4.95	5.90	9.25	14.30
Each, Nos. 3 and 4..	.23	.36	.50	.59	.93	1.43
Dozen, No. 6.....	2.40	3.85	5.50	6.60	10.10	16.90
Each, No. 6.....	.24	.39	.55	.66	1.01	1.69
Extreme width, in... Thickness, inches...	$\frac{11}{32}$ $\frac{1}{16}$	$\frac{11}{32}$ $\frac{1}{16}$	$\frac{11}{32}$ $\frac{1}{16}$	$\frac{11}{32}$ $\frac{1}{16}$	$\frac{11}{32}$ $\frac{1}{16}$	$\frac{11}{32}$ $\frac{1}{16}$

Barrett Files

Cut on One Side



Size, inches.....	3	4	5	6	8	10
Dozen, Nos. 00 to 2..	\$2.10	\$3.40	\$4.70	\$6.05	\$9.15	12.30
Each, Nos. 00 to 2..	.21	.34	.47	.61	.92	1.23
Dozen, Nos. 3 and 4..	2.15	3.50	4.95	6.30	9.35	12.60
Each, Nos. 3 and 4..	.22	.35	.50	.63	.94	1.26
Dozen, No. 6.....	2.25	3.60	5.25	6.60	9.55	12.80
Each, No. 6.....	.23	.36	.53	.66	.96	1.28
Extreme width, in... Thickness, inches...	$\frac{5}{32}$ $\frac{1}{32}$	$\frac{11}{32}$ $\frac{1}{16}$	$\frac{11}{32}$ $\frac{1}{16}$	$\frac{11}{32}$ $\frac{1}{16}$	$\frac{11}{32}$ $\frac{1}{16}$	$\frac{11}{32}$ $\frac{1}{16}$

Round Files




Size, inches.....	3	4	5	6	8	10
Dozen, Nos. 00 to 2..	\$1.05	\$1.75	\$2.05	\$2.55	\$4.40	\$7.15
Each, Nos. 00 to 2..	.11	.18	.21	.26	.44	.75
Dozen, Nos. 3 and 4..	1.05	1.85	2.30	2.85	4.95	8.25
Each, Nos. 3 and 4..	.11	.19	.23	.29	.50	.83
Dozen, No. 6.....	1.05	1.95	2.50	3.15	5.50	9.55
Each, No. 6.....	.11	.20	.25	.32	.55	.95
Diameter, inches...	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{7}{16}$	$\frac{1}{2}$	$\frac{11}{16}$	$\frac{3}{4}$

Our line of files is most complete and the prices are right.

Extra [X-F] Fine Swiss Pattern Files


The Nicholson X. F. files are an American made Swiss pattern and are recognized as the best files for die and tool making and fine precision work.
They are made by the most modern file machinery and are of the best material and workmanship.
The cut is designated by number, ranging from No. 00 (the coarsest) to No. 6 (the finest). Packed one dozen in a box

Square Files




Size, inches.....	3	4	5	6	8	10
Dozen, Nos. 00 to 2.....	\$1.35	\$2.20	\$2.75	\$3.55	\$5.50	\$7.15
Each, Nos. 00 to 2.....	.14	.22	.28	.36	.56	.72
Dozen, Nos. 3 and 4.....	1.35	2.35	2.90	3.75	6.05	8.00
Each, Nos. 3 and 4.....	.14	.24	.29	.38	.61	.80
Dozen, No. 6.....	1.35	2.50	3.05	3.95	6.60	8.80
Each, No. 6.....	.14	.25	.31	.40	.65	.85
Thickness, inches.....	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{7}{8}$

Taper Three Square Files




Size, inches.....	3	4	5	6	8
Dozen, Nos. 00 to 2.....	\$2.20	\$2.85	\$3.45	\$4.40	\$7.40
Each, Nos. 00 to 2.....	.22	.29	.35	.44	.74
Dozen, Nos. 3 and 4.....	2.35	3.00	3.60	4.55	7.95
Each, Nos. 3 and 4.....	.24	.30	.36	.45	.80
Dozen, No. 6.....	2.50	3.20	3.85	4.75	8.50
Each, No. 6.....	.25	.32	.39	.48	.85
Thickness, inches.....	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$

Warding Files




Size, inches.....	3	4	5	6	8
Dozen, Nos. 00 to 2.....	\$1.85	\$2.60	\$3.30	\$4.10	\$6.10
Each, Nos. 00 to 2.....	.19	.26	.33	.41	.61
Dozen, Nos. 3 and 4.....	1.95	2.85	3.55	4.40	6.60
Each, Nos. 3 and 4.....	.20	.29	.35	.44	.66
Dozen, No. 6.....	2.10	3.10	3.85	4.65	7.20
Each, No. 6.....	.21	.31	.39	.47	.72
Extreme width, in.....	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$
Thickness, inches.....	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$

Knife Files



Size, inches.....	3	4	5	6	8
Dozen, Nos. 00 to 2.....	\$2.30	\$3.30	\$4.30	\$4.95	\$8.80
Each, Nos. 00 to 2.....	.23	.33	.43	.50	.88
Dozen, Nos. 3 and 4.....	2.45	3.40	4.55	5.50	9.20
Each, Nos. 3 and 4.....	.25	.34	.46	.55	.92
Dozen, No. 6.....	2.55	3.55	4.85	6.05	9.60
Each, No. 6.....	.26	.36	.49	.61	.96
Extreme width, in.....	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$
Thickness, inches.....	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$

Crochet Files




Size, inches.....	4	5	6	8
Dozen, Nos. 00 to 2.....	\$3.15	\$3.85	\$4.95	\$8.25
Each, Nos. 00 to 2.....	.32	.39	.50	.83
Dozen, Nos. 3 and 4.....	3.45	4.30	5.40	8.75
Each, Nos. 3 and 4.....	.35	.43	.54	.88
Dozen, No. 6.....	3.70	4.70	5.75	9.15
Each, No. 6.....	.37	.47	.58	.92
Extreme width, inches.....	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$
Thickness, inches.....	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$

Pippin Files


Size, inches.....	4	5	6	8
Dozen, Nos. 00 to 2.....	\$3.15	\$3.85	\$4.95	\$8.25
Each, Nos. 00 to 2.....	.32	.39	.50	.83
Dozen, Nos. 3 and 4.....	3.45	4.30	5.40	8.75
Each, Nos. 3 and 4.....	.35	.43	.54	.88
Dozen, No. 6.....	3.70	4.70	5.75	9.15
Each, No. 6.....	.37	.47	.58	.92
Extreme width, inches.....	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$
Thickness, inches.....	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$

Equaling Files



Size, inches.....	4	5	6	8
Dozen, all cuts.....	\$2.75	\$3.70	\$4.25	\$6.90
Each, all cuts.....	.28	.37	.43	.69
Extreme width, inches.....	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$
Thickness, inches.....	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$

Slitting Files



Size, inches.....	4	5	6	8
Dozen, all cuts.....	\$3.50	\$5.25	\$6.70	\$9.40
Each, all cuts.....	.35	.53	.67	.94
Extreme width, inches.....	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$
Thickness, inches.....	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$

Round Edge Joint or Drill Files

Cut only on edges.

Parallel all sides. Same shape as Equalizing File.

Length, inches.....	4	5	6	8
Dozen, all cuts.....	\$2.25	\$3.05	\$3.70	\$4.95
Each, all cuts.....	.24	.31	.37	.60
Thickness, / thin.....	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$
in inches / thick.....	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$

Extra [X-F] Fine

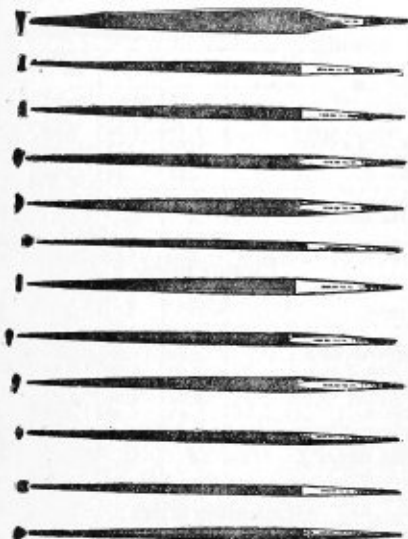
Swiss Pattern Files

The Nicholson X. F. Brand of files is an American made Swiss Pattern and is equal in every respect to the genuine Swiss File. Made by modern file machinery and of the best material and workmanship procurable.

Used by jewelers, watch and tool makers and for similar fine work. The cut is designated by numbers, ranging from No. 00, the coarsest, to No. 6, the finest.

Die Sinkers' Files

3 1-2 Inches Long



Price, Set of 12. No. 0 and 2 Cuts.....\$2.50

Bent Riffles, Handled

THREE SQUARE BASTARD



HAND BASTARD



FLAT FLOUT SAFE SIZES



HALF ROUND BASTARD



THREE SQUARE RASP



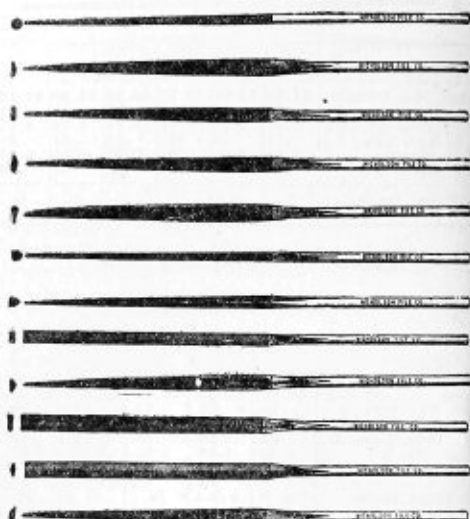
ROUND RASP



Price per set.....\$0.50

5 1-2 Inch Needle Files

With Round Handles



Price Per Set of 12.....\$1.60

"Spark" Brand Coil Files



Indispensable for filing spark gaps, plugs, magnetos and contact points. Owing to their special shape and size, they may readily be inserted between the points for cleaning purposes. Price, dozen.....\$8.00 Each.....\$0.40

Stub Files and Holder

Files Are Detachable



Indispensable for filing small surfaces in cramped places.

Price per set.....\$9.00
Extra files, price each......45



Surface File Holder

This tool is used for filing large surfaces where considerable stock is to be removed. Will hold any shape file.

No.	Will Hold Files, Length, inches	Price Each
4	12, 14	\$1.60
5	14, 16	1.90

For files of other styles, see previous pages.

Taperhole File Handles



With Short Ferrule—Style A.



With Long Ferrule—Style B.

The holes in these file handles are made to fit the ends of the files. With tang touching full length hole, very little driving is necessary to secure a perfect fit, and splitting of file handles is reduced to minimum. Users of Taperhole File Handles lose time in reboring or burning out handles and always have handle straight on the file. Taperhole handles do not become loose.

The Style B is preferable because of its long steel ferrule which obviates breakage and is finely finished throughout.

	Style A.				
Number	1	2	3	4	5
Length, Inches	3 3/4	4	4 1/4	4 1/2	4 3/4
Largest Diameter	1	1 1/8	1 1/4	1 1/2	1 3/4
Price Per Gross	\$1.80	\$2.00	\$2.25	\$2.50	\$3.00
Price Per Dozen	.18	.20	.23	.25	.30

Assortments

Numbers.	Per Gross.	Per Dozen.
2, 3	\$2.00	\$0.20
2, 3, 4	2.15	.22
2, 3, 4, 5	2.30	.25

	Style B.				
Number	11	12	13	14	15
Length, Inches	4	4 1/4	4 1/2	4 3/4	5
Largest Diameter	1	1 1/8	1 1/4	1 1/2	1 3/4
Price Per Gross	\$6.00	\$6.35	\$6.75	\$7.00	\$7.75
Price Per Dozen	.60	.65	.70	.75	.80

Kaalot Fibre File Handles



These handles are made of a continuous length of paper which is cemented while being wound. They are actually indestructible and will give long service. Nos. 4, 5 and 6 have a brass ferrule imbedded in end. They stickily will not split. They are perfectly smooth and have a nice red finish.

No.	Size, inches	Size of File, inches	Per Gross	Per Dozen
1	3 x 3/4	3 to 5	\$ 9.10	\$0.90
2	2 1/2 x 3/4	6 to 8	11.50	1.15
3	4 x 1	9 to 10	13.65	1.35
4	4 1/2 x 1 1/4	11 to 12	15.75	1.50
5	5 x 1 1/4	13 to 14	18.00	1.80
6	5 1/2 x 1 1/4	15 and up	20.10	2.00

Spun Brass Ferrule File Handles



Made of selected birchwood, carefully smoothed and shellacked. Fitted with heavy spun brass ferrule swaged on handle. Ferrule cannot come off.

No.	Per Dozen	Length, inches	Diameter, Ferrule	Diameter at Widest Part
00	\$1.80	6	1 1/2	1 3/4
0	1.60	5 1/2	1 1/2	1 3/4
1	1.40	5 1/4	1 1/2	1 3/4
2	1.20	4 3/4	1	1 1/4
3	1.00	4 1/2	7/8	1 1/4
4	.80	4	3/4	1

Jewelers' File Handles



Suitable for small Swiss Files, etc. Brass ferrule. All polished.

No.	Price, Per Dozen	Length, inches	Diameter, inches
1	\$0.60	4 1/4	5/8
2	.70	4 1/4	3/4
3	.75	4 1/4	1/2
4	.80	4 1/4	3/8

File Cards for Cleaning Files



Nicholson's File Card, mounted on leather and secured to hardwood holder. Size of wire cleaner 2x4 1/2 inches. Length over all 9 inches. Weight 2 lbs. per dozen.

Price Per Dozen.....\$4.60 Price Each.....\$0.45



Nicholson's Combination File Card and Brush. Mounted on leather. Size 2x4 1/2 inches. Length over all 9 inches. Weight 2 1/2 lbs. per dozen.

Price Per Dozen.....\$0.75 Price Each.....\$0.65



Colton's Steel Back File Card. Mounted on canvas and secured to steel back. Size 2x4 inches. Length 8 inches. Weight 2 1/2 lbs. per dozen.

Price Per Dozen....\$4.00 Price Each.....\$0.40



Common Pattern. Mounted on canvas and secured to wood back. Size 2x4 inches. Length over all 8 inches. Weight 2 lbs. per dozen.

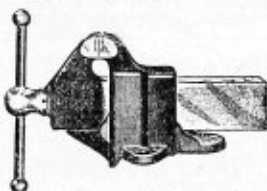
Price Per Dozen.....\$3.00 Price Each.....\$0.30

Gripwell Mechanics Vises

Our "Gripwell" brand of vises are made of a special mixture of iron and steel, making a tough, strong casting. They are heavy and the material is well distributed, all parts subject to strain are re-inforced. Screw, knob, handle and jaws are cold rolled steel. Jaws are a high grade crucible cast tool steel, not vise jaw steel or open hearth steel. The nut which is subject to the most wear is malleable and is extra heavy. "Gripwell" Vises are finished with dull black paint. Their design, material and workmanship is strictly first class throughout and they are fully warranted.

Machinists' Stationary Base

This pattern is one of the most popular types of vises for general use. It is strong, heavy, well made and all finished parts are handsomely polished and lacquered.

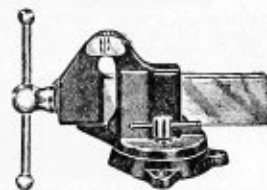


Special attention is called to Nos. 108 and 108½. These vises are extra heavy and are suitable for the hardest service.

No.	Price Each	Width Jaw, inches	Opens, inches	Weight, lbs.
102½	\$5.25	2½	2½	17
103	6.00	3	4	22
103½	7.00	3½	5	28
104	8.50	4	6	42
104½	10.00	4½	6½	54
105	13.00	5	7½	75
105½	18.50	5½	8½	101
106	25.00	6	10	135
107	37.50	7	12	210
108	50.00	8	12½	276
108½	60.00	8½	12½	286

Machinists' Swivel Base

This vise can be turned in any position on an axis parallel with the floor and is locked by a clamping bolt which works in a channel. The grip is positive and permits no slipping.



For some classes of work this vise will be found most convenient, and the difference in price between it and the stationary base vise is so small, that the additional investment is justified.

No.	Price Each	Width Jaw, inches	Opens, inches	Weight, lbs.
202½	\$6.50	2½	2½	20
203	7.50	3	4	28
203½	8.75	3½	5	38
204	10.50	4	6	54
204½	12.50	4½	6½	65
205	16.00	5	7½	90
205½	22.00	5½	8½	120
206	30.00	6	10	156
207	40.00	7	12	240

Self Adjusting Jaw

Back jaw of this vise is self-adjusting, and conforms automatically to any angle. This self-adjusting jaw is so constructed that it is absolutely as strong and durable as a solid jaw.



No.	Price Each	Width Jaw, inches	Opens, inches	Weight, lbs.
303½	\$ 7.00	3½	5	30
304	9.00	4	6½	48
304½	10.50	4½	7½	58
305	14.00	5	8½	78
305½	17.00	5½	9	110
306	24.00	6	10	146
307	30.00	7	12	195

Self Adjusting Jaw-Swivel Base

Same as the vise described above, but possessing the additional advantage of having a swivel base. It is designed low and may be used on same height bench as standard stationary base vise.



No.	Price Each	Width Jaw, inches	Opens, inches	Weight, lbs.
403½	\$ 8.75	3½	5	37
404	10.50	4	6½	53
404½	12.50	4½	7	70
405	16.00	5	7½	85
405½	22.00	5½	8½	125
406	27.00	6	11	158
407	35.00	7	12	220

Gripwell Automatic Swivel Vises

This vise is automatically locked when jaws are tightened but will swivel to any position when they are open. There are no screws, levers, or pins to break, stick or wear.

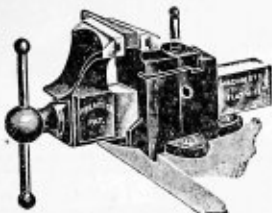


Number	Price	Width Jaw	Opens	Weight
1	\$ 6.00	1½ in.	2 in.	3 lbs.
2	7.50	2½ in.	2½ in.	11 lbs.
3	9.50	3 in.	4 in.	20 lbs.
4	11.00	3½ in.	5 in.	33 lbs.
5	13.50	4 in.	6 in.	57 lbs.
6	16.50	5½ in.	8 in.	75 lbs.
7	24.00	5¾ in.	9 in.	122 lbs.
8	36.00	6 in.	11 in.	140 lbs.
9	45.00	7 in.	12 in.	224 lbs.

Prentiss Patent Self-Adjusting Jaw Vises

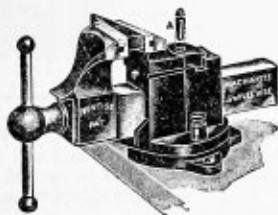
The back jaws of these vises are self-adjusting, and in use conform by automatic action to any angle making firm the object held, whether straight bevelled or wedge shaped. By inserting pin, marked A in illustration, jaw becomes fixed thus making a parallel solid jaw vise. The faces on Prentiss Vises are secured to the jaws by screws and are therefore replaceable.

Machinists' Stationary Base Vise



No.	Price Net Each	Width Jaws Inches	Opens Inches	Weight Pounds
1	\$ 5.50	2 5/8	3 1/2	13 1/2
2	7.00	3 1/2	4 3/4	28
2 1/2	9.00	4	5 1/4	41
3	10.50	4 1/2	6	54
4	17.00	5 1/4	8	96
5	24.00	6	9	146
6	30.00	7	11	184

Machinists' Swivel Base Vise



By raising ratchet pin B, this vise may be adjusted to right or left at the will of the operator. When pin is released it is forced home by a spring rendering vise solid and firm at any desired position.

No.	Price Net Each	Width Jaws inches	Opens Inches	Weight Pounds
18	\$ 6.75	2 5/8	3 1/2	17
19	8.50	3 1/2	4 3/4	32
19 1/2	10.50	4	5 1/4	46
20	12.50	4 1/2	6	65
21	19.00	5 1/4	8	109
22	27.00	6	9	168
23	35.00	7	11	207

Parker's Patent Re-Inforced Sliding Jaw Vises

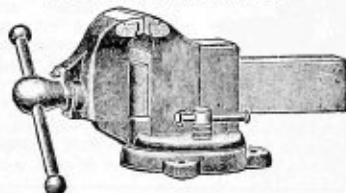
Made with a reinforced sliding jaw, consisting of a solid steel bar inserted the entire length of the slide, thoroughly welded into the casting, thus rendering the slide or moveable jaw practically unbreakable. No other vises have this feature.

Solid Jaw Stationary Base



No.	Price Each	Width of Jaws Inches	Opens Inches	Weight Pounds
29	\$ 6.25	3 1/4	4	31
39	7.00	3 3/4	6 1/4	47
49	9.00	4 1/4	7	66
59	11.75	4 3/4	8	81
69	16.25	5 1/4	9	123
79	24.00	6 1/4	9 1/2	150

Solid Jaw Swivel Base

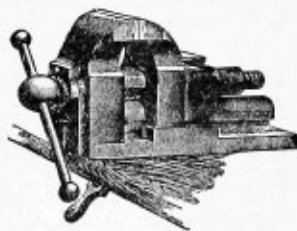


No.	Price Each	Width of Jaws Inches	Opens Inches	Weight Pounds
229	\$ 7.00	3 1/4	4	36
239	8.75	3 3/4	6 1/4	54
249	11.00	4 1/4	7	75
259	14.50	4 3/4	8	95
269	20.50	5 1/4	9	143
279	30.00	6 1/4	9 1/2	185

Parker's Heavy Filing or Chipping Vises

Exceptionally strong to allow chipping without danger of breaking.

Steel jaws are milled closely fitted and held by screws, and after years of service may be easily renewed.

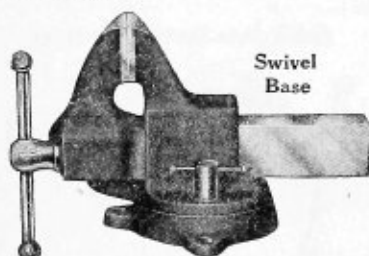


No.	Price Each	Width of Jaws Inches	Open Inches	Weight Pounds
65	\$16.00	5	6	80
66	24.00	6	7	100

The above line of vises are but a few of our immense stock.

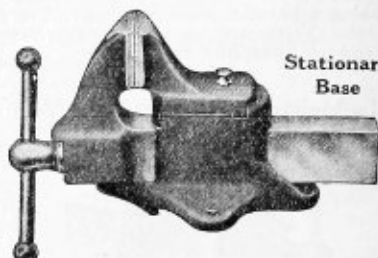
"Bullock" Woodworkers' Vises

Made with the same careful workmanship as our Bullock machinists' vises, but especially designed for woodworkers with the idea of giving workmen vises with which they can work to the best advantage. The self-adjusting jaw vises are exceptionally well designed, being much lower than most vises of this type, which permits them being placed on same height benches as standard swivel and stationary base vises. Castings made from special alloy of iron and steel, screw and handle of cold rolled steel, jaws crucible cast tool steel carefully hardened, and of malleable iron.



Swivel
Base

Nos. 155 and 156, with Stationary Jaws
Nos. 157 and 158, with Swivel Jaws

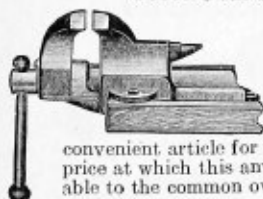


Stationary
Base

Nos. 153 and 154, with Swivel Jaws
Nos. 151 and 152, with Stationary Jaws

Number	151	152	153	154	155	156	157	158
Price each	\$8.50	\$10.50	\$9.00	\$11.00	\$10.50	\$12.50	\$10.50	\$12.50
Width of jaws, inches	4	4½	4	4½	4	4½	4	4½
Jaws open, inches	7	11	7	11	7	11	7	11
Weight, pounds	48	60	52	66	53	66	62	76

Steel Oval Slide Vise



Made entirely of steel. A very serviceable vise for use in garages and homes. The anvil arrangement makes this vise a very convenient article for many purposes. The low price at which this anvil is sold makes it preferable to the common oval slide cast iron vise.

Number	25	30	35	40
Price each	\$5.00	\$6.00	\$8.00	\$10.00
Width jaws, inches	2½	3	3½	4
Opens, inches	3½	4	4½	5
Weight, pounds	8	10	15	20

Standard Pipe Grips



These pipe grips can be attached to any machinists' vise and converts it into a pipe vise. Will fit any make.

No.	Price per Set	For Pipe	Suitable for Vises
A	\$2.50	¼ to 2½	With 3 to 4½-inch jaws
B	2.75	¼ to 5	With 5 to 6½-inch jaws
C	3.00	¼ to 6	With 7 to 8½-inch jaws

Victor "Jersey" Vises

High grade, material and workmanship the best.

Body, head and collar are in one piece, turned from cold rolled steel. Screw has a square lathe cut thread.

Jaws are ground so they meet squarely when tightened. Both back and front jaws are filed to a fit.



With Plain Iron Jaws

Number	741	742	743
Size jaws, inches	1½	1¾	2
Weight, pounds	3	3½	3½
Price each	\$1.25	\$2.25	\$3.50

With Hardened Tool Steel Jaws

Number	763	764	765	766
Size jaws, inches	2	2½	2½	3
Weight, pounds	3½	4	5	5½
Price each	\$3.10	\$3.50	\$4.25	\$6.25

Brass and Copper Vise Jaws

Made to cover rough jaw faces and will not mar or injure finished work which would be spoiled if clamped in an ordinary vise. In ordering state make of vise and size of jaws.

Prices on Application.

Machinists' Vises

Consult us on your machinists' vise requirements when installing new equipment or adding to your present.

Our stock is exceedingly large, representing the most reputable manufacturers.

Pipe Vises

We have pipe vises suitable for every purpose.

On account of the severe strain a pipe vise is subjected to, we always recommend purchasing the size of a little larger capacity than is actually needed.

Woodworkers' Vises

Albernathy Roller Nut Rapid Acting Woodworkers' Vise

Rapid acting, continuous screw vises which overcome the disadvantages of the old style vise. Screw engages in a roller nut which makes a half turn, a slight turn to the left disengages screw from nut which allows for rapid movement of jaws. Either style vise can be furnished with adjustable dog shown in right hand illustration.

No. 70. Jaws 7 inches long, 4 inches deep, opening 9 inches, weight 26 pounds. Price.....\$6.50

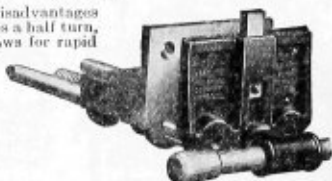
No. 70D. Same size, with adjustable dog. Price.....\$6.00

No. 80. Jaws 10 inches long, 4 inches deep, opening 12 inches, weight 35 pounds. Price.....\$6.50

No. 80D. Same size, with adjustable dog. Price.....\$7.00



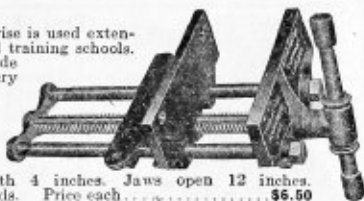
No. 80 Std. Cabinet and Pattern Makers' Size



No. 70D for Manual Training Schools, Home, Shop Use, Etc.

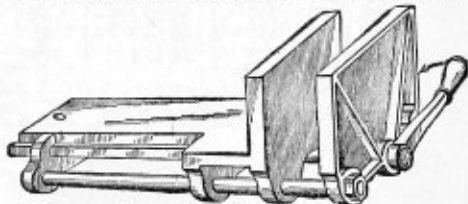
Toles Pat. Rapid Acting Vise

This type of vise is used extensively in manual training schools. Made of high grade material and very durable. Slot in screw disengages nut for rapid movement of jaws. Width of jaws 10 inches, depth 4 inches. Jaws open 12 inches. Weight 36 pounds. Price each.....\$6.50

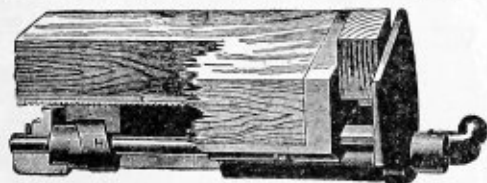


Massey Lightning Grip Parallel Bar Vise

The construction keeps jaws parallel and prevents lost motion.



No.	Width of Jaw, Inches	Jaw Opens, Inches	Weight, Pounds	Price Each
23	8	8	31	\$5.00
24	10	12	39	6.00

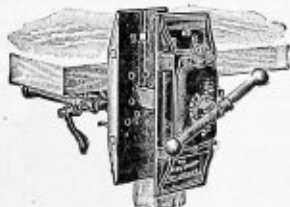


The Lightning Grip Woodworkers' Vise

This is a heavy, well made vise intended for hard and continuous service. It is extremely quick acting and a quarter turn of handle gives a positive grip. Furnished with stop in front jaw for 75c extra.

No.	Price Each	Width of Jaw, Inches	Opens, Inches	Weight, Pounds
17	\$6.00	9	12	47
19	4.00	7	7	29

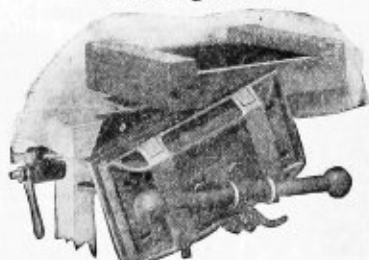
Universal Pattern Makers' Vise



This vise has six pairs of jaws, so that it is adapted to grasp any kind of work without regard to irregularity of form. Can be used in any conceivable position. Supplied with one set of grooved jaws to hold round work, one set for taper work, one set to hold copper work, one set to hold any size ring. Also one rough jaw for cast iron work and one smooth jaw for finished work.

No.	Price Each	Size of Jaw, Inches	Opens, Inches	Weight, Pounds
1	\$15.00	7x18 1/2	14	86
2	12.50	5x14	12	56

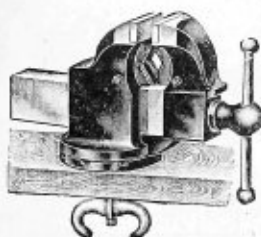
Quick Acting Universal Manual Training Vises



A standard vise made with a small jaw face. With the vise swung at any angle work can be conveniently held flat on the bench.

No.	Jaw, Inches	Opens, Inches	Weight, Pounds	Price
6B	6x12	12	42	\$10.50
7B	6x12	16	45	11.50
8B	6x12	20	49	12.50

Prentiss' Monarch Combination Pipe Vises



A good, strong, serviceable combination pipe vise, with swivel bottom controlled by large winged nut. Pipe jaws cut and milled from best quality of steel and are reversible, thus giving double wear. Handsomely finished and polished.

No.	Price Each	Width of Jaws, in.	Holds Pipe Inches	Weight Pounds
401	\$16.00	3½	½ to 2½	44
402	22.00	4½	½ to 3	65
403	32.00	5	½ to 4	110

Parker's Pat. Pipe Vise

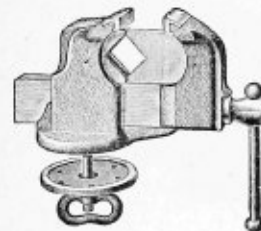
A combination vise that is strong and compact. The steel faces are milled and fitted to the jaws and are renewable.

Nos. 88½ and 89½ are stationary base. Nos. 87, 88, 288½ and 289½ have swivel base.



No.	Price Each	Width of Jaws, in.	Opens Inches	Takes Pipe Inches	Weight Pounds
87	\$16.00	3½	4¾	½ to 2	41
88	22.00	4½	6	½ to 3	59
288½	32.00	4¾	6½	½ to 4	105
289½	45.00	5¾	9½	½ to 6	155
88½	32.00	4¾	6½	½ to 4	94
89½	45.00	5¾	9½	½ to 6	141

Smith's Pat. Pipe Vise



This combination pipe vise has been on the market for many years and is very favorably known. It is heavy, strong and serviceable and sold at a lower price than either the Prentiss or Parker Pattern.

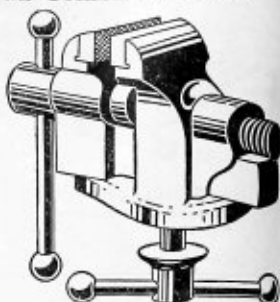
Number	1	2	3
Price each	\$16.00	\$22.00	\$32.00
Width, Jaws, inches	3¾	4	4½
Opens, inches	4	5	6
Takes Pipe, inches	½ to 2	½ to 3	½ to 4
Weight, pounds	47	70	100

Walworth Pat. Combination Vise

A very strong, heavy, and substantial bench vise much preferred by many mechanics. Has 5-inch solid steel jaws cut extra coarse to grip pipe securely. Holds as well as pipe vises with angular jaws and is handy and quick to operate.

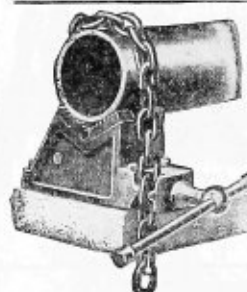
Has a large capacity, holding all sizes of pipe from ½ to 6-inch. Clamps to bench. All parts interchangeable. Weight, 78 pounds.

Price each \$18.00



The Ellis Chain Pipe Vise

This pipe vise is very similar to the Vulcan, but is intended for use with the large sizes of pipe. Grips pipe perfectly without crushing it. Very strong and well made, with a capacity for large range of sizes.



Number	0	1
Holds pipe, in.	½ to 6	½ to 10
Weight, lbs.	28	55
Price, comp.	\$12.00	\$20.00

Vulcan Chain Pipe Vise

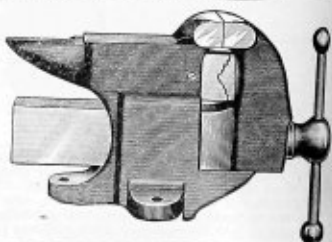
This vise is unbreakable, compact, rapid and positive in action. Adjustment is effected by slightly turning the screw. Made entirely of wrought steel; drop forged jaws of saw tempered steel for file sharpening. Jaws of the No. 1 size are designed to prevent bending of the smallest sizes of pipe should too much pressure be applied.

Number	1	2	4
Pipe size, inches	½ to 2	½ to 4	½ to 8
Price complete	\$3.50	\$7.50	\$18.00
Weight, pounds	4	10	30



New Auto Vise

This tool combines a solid anvil, a strong machinist's vise and a powerful pipe vise. A most handy tool for garage or machine shop. Screw and handle are cold rolled steel. Jaws hardened tool steel.



Number	Price Each	Width, Jaws, in.	Capacity Pipe Jaws, Inches	Weight, Lbs.
231—Stationary base	\$10.00	3	½ to 1½	32
232—Stationary base	14.00	3½	½ to 2	65
240—Swivel base	13.00	3	½ to 1½	42
241—Swivel base	16.00	3½	½ to 2½	80

Malleable Hinged Pipe Vice

Self Locking



The bolt which forms the hinge on this vise is removable, and entire head of vise can be taken off and reversed, which is a very convenient feature where vise is used for working in close quarters.

Body and base of vise are malleable iron. Handle and screw are cold rolled steel.

Size No.	Price Each	For Pipe Sizes	Weight, Pounds
0	\$3.00	$\frac{1}{8}$ to 2	5
1	3.75	$\frac{3}{8}$ to 2 $\frac{1}{2}$	8
2	5.75	$\frac{3}{4}$ to 3 $\frac{1}{2}$	14
3	8.40	$\frac{1}{2}$ to 4 $\frac{1}{2}$	18
4	19.50	$\frac{1}{2}$ to 6	45

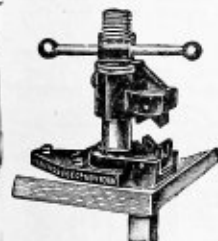
Malleable Kit Pipe Vice

A strong and convenient pipe vise intended especially for plumbers and steamfitters for carrying in tool kit. It is exactly the same as the vise shown above and in addition has a bracket enabling the user to attach it to table, bench, or any available projection without using screws or bolts.



No.	Price Each	Capacity
0K	\$10.00	$\frac{1}{4}$ to 2
1K	14.00	$\frac{1}{2}$ to 2 $\frac{1}{2}$
2K	20.00	$\frac{1}{4}$ to 3 $\frac{1}{2}$

Prentiss 20th Century Pipe Vice



A very strong, convenient and durable pipe vise which can be used on bench or post in any position. Material and workmanship is guaranteed strictly first class throughout.

The smallest size is particularly adapted for the mechanics' tool kit, being very compact and light in weight.

Number	Price Each	Capacity, Pipe Sizes	Weight Each, Pounds
285	\$5.00	$\frac{1}{4}$ to 2	8
286	7.50	$\frac{3}{8}$ to 3	18
288	14.00	$\frac{3}{8}$ to 4	40

Toledo Pipe Vice

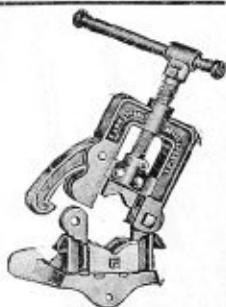


One of the best vises made for the steamfitter and plumber. It is much more than a pipe vise. It will hold tight anything that will go inside the jaws. Illustrations show a valve and an ell as well as a piece of $\frac{1}{8}$ and 2 $\frac{1}{2}$ -inch pipe, all held equally well. May even be used for holding polished pipe. Grips with half the pressure of most vises. Will not crush or bend pipe and is fully guaranteed to give satisfactory service.

No. 1. $\frac{1}{8}$ to 2 $\frac{1}{2}$ -inch pipe. Weight, 15 pounds. Price, \$10.00
No. 2. $\frac{1}{8}$ to 4 $\frac{1}{2}$ -inch pipe. Weight, 45 pounds. Price, \$20.00

Genuine Armstrong Hinged Pipe Vice

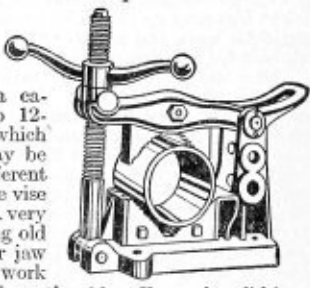
The Armstrong hinged pipe vise is well known and so simple in construction that a detailed description is hardly necessary. Made of the best malleable iron with steel jaws and are interchangeable so that any parts which become worn in use can be replaced.



Number	Price Each	Capacity	Weight, Pounds
00	\$6.00	$\frac{1}{8}$ to 1 $\frac{1}{4}$	3
0	8.50	$\frac{1}{8}$ to 2 $\frac{1}{2}$	11
1	10.00	$\frac{1}{8}$ to 2 $\frac{1}{2}$	16
2	20.50	$\frac{1}{2}$ to 4 $\frac{1}{2}$	30
3	30.00	1 to 6	35

Jarecki Patent Pipe Vice

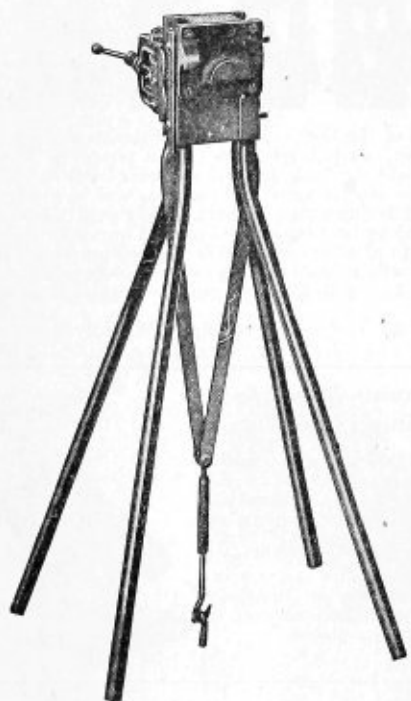
This strong and powerful pipe vise is especially intended for shop use—two sizes having a capacity from 1 $\frac{1}{2}$ to 12-inch pipe. The pin which forms the hinge may be inserted in three different holes, thus giving the vise its great capacity. A very handy vise for taking old work apart as upper jaw is hinged allowing work to be placed in vise from the side. Frame is solid iron and jaws are hardened tool steel.



Number	Price Each	Capacity of Pipe	Weight, Pounds
1	\$24.00	1 $\frac{1}{2}$ to 6	67
2	60.00	6 to 12	168

Henderson Portable Conduit Bench

A Complete Conduit Shop



A compact vise and bending stand, in great demand among electricians and other mechanics who cut thread and bend pipe.

A light, portable tool which can be readily placed in any position on a floor or easily moved from floor to floor as work demands. Especially efficient for working 3/4-inch and smaller pipes and conduits.

The legs may be placed in the best position for the particular work and may be reversed, making it very compact for carrying or shipping.

Every outfit includes a conduit bender, rigidly mounted opposite the vise. The pipe is bent mainly by weight of the workman and is fed into the bender waist high. There is no muscle strain due to awkward positions. The pipe is not flattened or kinked and is easily bent to exact measurements. The side outlet permits quick removal of pipe, and, together with carefully designed bending bosses will make the most complicated and difficult bends.

To set up, turn legs into the position best suited for the work and fasten turnbuckle to the floor with screw hook as shown. This turnbuckle is heavy and strong and holds the tool rigidly.

An expansion shield is also furnished for securing to concrete floor.

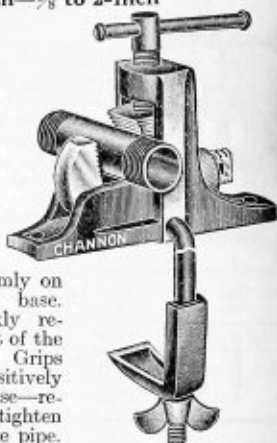
Weight, 40 pounds. Price.....\$30.00

Stillson-Vise

Spin Up Nut, Turn Down Screw—Quick as a Flash—1/8 to 2-Inch

A compact little kit vise which combines strength, lightness, speed of adjustment and range. Although weighing approximately 6 pounds, the Stillson Vise has a range of from 1/8 to 2-inch pipe. Can be easily screwed, nailed or clamped to bench or post, and will hold firmly on account of its long base. Clamp can be quickly removed or swung up out of the way when not in use. Grips pipe much more positively than the ordinary vise—requires less pressure to tighten—is not as hard on the pipe.

The movable jaws used in this vise are guaranteed. Stillson and Trimo wrench jaws are known and used the world over.



*Maximum capacity, 2 inches with Trimo jaw; with Stillson jaw, 1 1/2-inch.

No. 1 Stillson-Vise, complete, with clamp.....\$3.00

No. 1 Stillson-Vise, complete, without clamp... 2.50

No. 1 Stillson-Vise, complete, without wrench jaw and nut..... 2.25

No. 1 Stillson-Vise, complete, without clamp, wrench jaw and nut..... 1.80

Blacksmiths' Solid Box Vise

The front and back jaws are each forged from one solid piece of special ingot steel. The jaw facings, of crucible tool steel, are welded far enough down to relieve any possible strain.

The box is deeper and the jaws open wider than is usual with a vise of this type. They open the full width.

It admits of a wider range of work in proportion to its size than any other vise on the market.

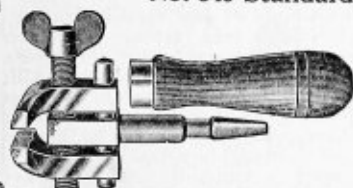
The jaw faces are accurately ground and polished. They come together flat and in perfect alignment.



No.	Weight, Pounds	Length of Jaw, Inches	Depth from Top of Jaw to Top of Box, Inches	Vise Opens, Ins.	Price Each
40	40	4	3 1/2	4	\$10.50
50	50	4 1/2	4 1/2	4 1/2	11.50
65	65	5	4 1/2	5	14.00
80	80	5 1/2	5	5 1/2	17.50
100	100	6	5 1/2	6	22.00
130	130	6 1/2	6	6 1/2	29.00
150	150	7	6 1/2	7	36.00
180	180	7 1/2	7 1/2	8	47.00
200	200	8	7 1/2	8	56.00

Hand Vises

No. 549 Standard



Drop forged tempered steel jaws finished black or bright. Handles are bright finish cocobolo or black cherry.

Width of Jaws Inches	Jaws Open Inches	Weight Ounces	Prices Each	
			Black	Bright
1 1/4	1 1/4	14	\$1.25	\$1.50
1 1/2	1 1/2	18	1.50	1.75

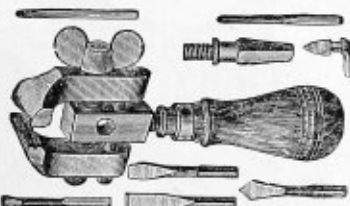
No. 540 "Boss" Vise



All steel (except handle), hardened throughout, finely finished with polished jaws.

Width of Jaws, Inches	Jaws Open, Inches	Weight, Pounds	Price Each
1 1/4	3/4	1 1/2	\$0.75
1 1/2	1	2 1/2	1.00

No. 1 Alford



Drop forged, tempered jaws, hollow cocobolo handle or holding tools. Handle or bit brace shank can be screwed into vise as illustrated or at right angles. Price includes tools.

Width Jaws, Inches	Jaws Open, Inches	Price Complete
1 1/4	1 1/4	\$3.50

Spring Hand Vises With Bright Steel Jaws



Length, inches	3	4	5	6
Width of jaws, inches	1	1 1/4	1 1/4	2
Price each	\$0.60	\$0.60	\$0.85	\$1.20

Improved Hand Vise Nickel Plated

For holding wire there is a hole through the handle and screw. Weight, 8 ounces; width of jaws, 1/2-inch.



Price each \$3.00

Jeweler's Pin Vise Nickel Plated

The screw is large, cleanly cut and covered from dirt. Jaws are 3/8-inch wide.

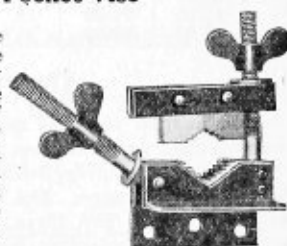


Prices

Regular size, price each \$2.50
Small size, price each 2.25

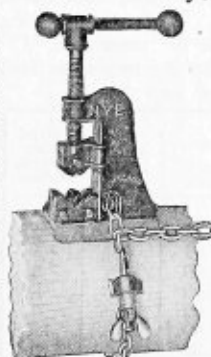
Nye Pocket Vise

Lower part of frame may be inserted in the jaws of an ordinary bench vise or can be fastened to edge of bench with ten-penny nails. Jaws are tool steel, angle iron frame. Cold rolled steel screws. Can be carried in coat pocket.



No. 1. Holds pipe from 1/8 to 1 1/4 inches. Weight 1 1/2 pounds. Price each \$2.50
No. 2. Holds pipe from 1/8 to 2 inches. Weight 2 1/2 pounds. Price each \$3.50

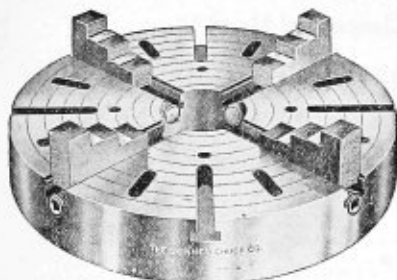
Nye Chain Vise



Different from other vises in the construction of the jaws, the upper jaw being V-shape, and acting like a swivel. The strength of one finger is sufficient to tighten the vise so that it will resist any turn or pull. The jaws are made of the finest tool steel, hardened and tempered. The long screw is of cold rolled steel. Takes pipes from 1/8 to 2 inches, including 2-inch coupling. The chain attachment is guaranteed to stand 1000 pounds strain. No separate parts to attachment.

Price complete \$7.50
Price without chain attachment 4.00

Four Jaw Independent Lathe Chucks



An independent chuck is one in which the jaws are operated independently of each other.

Made with cast iron body or cast steel body.

The cast iron body is very strong, the faces are ground true to straight edge, and accurately graduated in inches. The 8-inch and smaller sizes have solid faces. The 9 and 10-inch have openings in the face between the jaws. The 12 to 16-inch have T slots in the face; 18-inch and larger have openings and T slots, as shown in the accompanying illustration.

The cast steel body is suitable for the heaviest class of work in railroad shops and government service. Jaws are extra wide and adjusting screws are of large diameter with heavy square thread, nicely fitted and threaded their entire length.

Order by these Numbers	Price Each		Rated Size of Chuck Inches	Will Hold About Inches	Approx. Shipping Weight Pounds	Order by these Numbers	Price Each		Rated Size of Chuck Inches	Will Hold About Inches	Approx. Shipping Weight Pounds
	Iron Body	Steel Body					Iron Body	Steel Body			
904	\$20.00	.....	4½	6	10	918	\$54.00	\$87.00	18	21	175
906	22.00	\$36.00	6	7½	17	920	62.00	100.00	20	23	195
908	26.00	42.00	8	9½	34	921	66.00	107.00	21	24	215
909	28.00	46.00	9	11½	42	922	70.00	114.00	22	25	226
910	30.00	50.00	10	12½	49	924	80.00	130.00	24	27	270
912	35.00	58.00	12	14½	80	926	93.00	150.00	26	29	315
914	40.00	67.00	14	16½	105	928	110.00	175.00	28	31	340
915	43.00	71.00	15	18	122	930	130.00	200.00	30	35	485
916	46.00	76.00	16	19	133	936	210.00	345.00	36	41	715

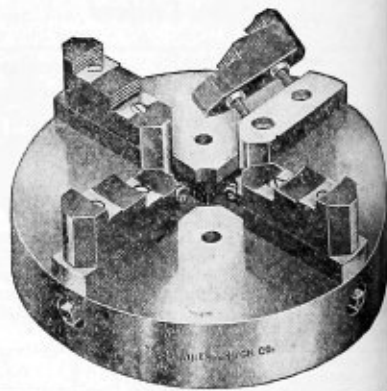
Three and Four Jaw Combination Lathe Chucks

A combination chuck is one in which the jaws may be operated either universally or independently, as desired.

The body is a highly finished casting, with face ground true to a straight edge. The 3-jaw chucks under 12 inches have solid faces. The three jaw chucks, 15 and 24-inch, have two slots between the jaws; 26 and 36-inch have three slots between the jaws; the 4-jaw chucks, 15 to 36-inch, have two slots between the jaws.

The chucks are provided with recess in back to which a face plate is fitted, this plate also being fitted to the lathe or machine spindle.

The jaws are drop forged, thoroughly case hardened and have raised and ground steps. There is no considerable strain on the binding screws in the reversible "J" jaws, as hardened steel bushings (fitted in the upper section) engage in both sections and receive the end thrust.

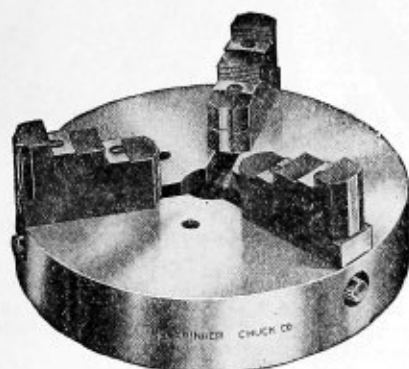


Three Jaw		Four Jaw		Will Hold, Inches	Rated Size Chuck, Inches	Three Jaw		Four Jaw		Will Hold, Inches	Rated Size Chuck, Inches
No.	Price Each	No.	Price Each			No.	Price Each	No.	Price Each		
603 J	\$26.00	.....	.....	3¾	3	618 J	\$ 87.00	818 J	\$102.00	18¾	18
604 J	29.00	804 J	\$36.00	4½	4	621 J	110.00	821 J	130.00	21¼	21
605 J	32.00	805 J	39.00	5¾	5	624 J	136.00	824 J	160.00	25	24
606 J	35.00	806 J	42.00	7¼	6	627 J	160.00	827 J	192.00	28½	26
608 J	42.00	808 J	50.00	8¾	8	630 J	200.00	830 J	240.00	31¾	30
609 J	45.00	809 J	54.00	9½	9	636 J	264.00	836 J	325.00	37	36
612 J	56.00	812 J	66.00	12½	12	642 J	360.00	842 J	450.00	42¼	42
615 J	70.00	815 J	82.00	16¾	15						

Bolts for attaching and key wrench for operating, furnished with each chuck.

We can furnish blank face plates for any size chuck, see next page.

Universal Chucks—Geared Screw



A Universal Lathe Chuck is one in which the jaws are all operated at once, moving to and from the center together and having a common center at all times.

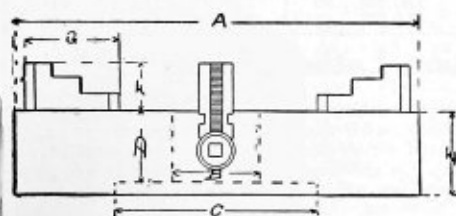
These Jaws have the same features as on the Combination Chucks.

With Style "J" Patent Reversible Jaws

Three-Jaw				Four-Jaw	
Rated Size, Inches	Will Hold Approximately, Inches	Order by These Numbers	Price Each	Order by These Numbers	Price Each
3	3 3/4	303J	\$ 24.00		
4	4 1/2	304J	27.00	404J	\$ 34.00
5	5 3/4	305J	30.00	405J	37.00
6	7 1/4	306J	32.00	406J	39.00
8	8 3/4	308J	38.00	408J	46.00
9	9 1/2	309J	41.00	409J	50.00
12	12 3/4	312J	49.00	412J	59.00
15	16 3/8	315J	60.00	415J	72.00
18	18 3/8	318J	75.00	418J	90.00
21	21 1/4	321J	96.00	421J	116.00
24	25	324J	120.00	424J	144.00

Face Plates. We can furnish from stock rough face plate castings to fit any lathe chuck. We recommend that they be fitted in your own shop or by a local machinist, as having the lathe handy, an accurate fit can be made. We can, however, have these fitted upon request. Price for blank casting **\$0.10 lb.** In ordering give diameter of recess in chuck.

Independent Chucks



Approximate Dimensions in Inches

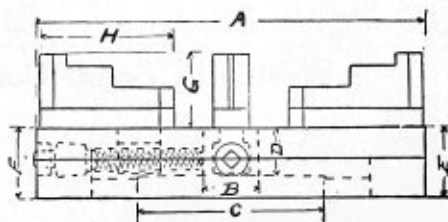
Size	A	B	C	D	E	F	G
4	4 1/2	1	4	1 1/2	2	1 1/2	1 1/2
6	6	1 1/2	5	1 1/2	2 1/2	1 1/2	2 1/2
8	8	1 1/2	5	2 1/2	2 3/4	1 1/2	3 1/2
9	9	1 1/2	5	2 1/2	2 3/4	1 1/2	3 1/2
10	10	2	6	2 3/4	3	1 1/2	3 1/2
12	12	2 3/4	6 3/4	2 3/4	3 1/2	1 1/2	3 3/4
14	14	3	7 3/4	2 3/4	3 1/2	1 1/2	3 3/4
15	15	3	8	3	3 3/4	2 1/2	4 1/4
16	16	3	8 3/4	3	3 3/4	2 1/2	4 1/4
18	18	4	10	2 1/2	4	2 1/2	5 1/2
20	20	4	11	2 1/2	4	2 1/2	5 1/2
21	21	4 1/4	11	2 1/2	4	2 1/2	5 1/2
22	22	5	12	2 1/2	4	2 1/2	5 1/2
24	24	5	13	3 1/4	4 3/4	2 3/4	5 3/4
26	26	5	14	3 1/4	4 3/4	2 3/4	5 3/4
28	28	5	15	3 1/4	4 3/4	2 3/4	5 3/4
30	30	5	15	3 1/4	5 1/8	3 1/4	7 1/2
36	36	6	18	3 3/4	5 1/8	3 3/4	7 1/2

E. Dimensions of Combination Chuck only.

F. Dimensions of Universal Chuck only.

All other dimensions the same.

Universal and Combination Chucks

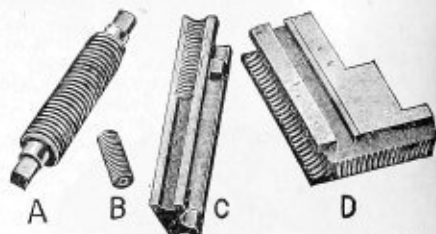
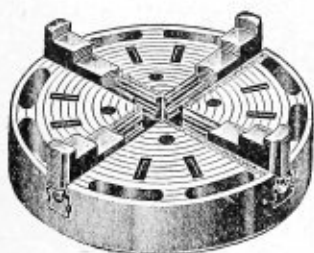


Approximate Dimensions in Inches

Size	A	B	C	D	E	F	G	H
3	4 1/2	3/4	1 1/2	1	1 1/2	1 1/2	1 1/2	1 1/2
4	5 1/2	1	2 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2
5	7	1 1/4	3 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2
6	8	1 1/2	3 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2
8	9 1/4	1 1/2	4 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2
9	10 1/2	1 1/2	5	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2
12	13 1/2	1 1/2	6 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2
15	16 1/4	2 1/2	7	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2
18	18	2 1/2	8	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2
21	21	3	10	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2
24	24	3	12	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2
27	27 1/2	3	13	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2
30	31 1/2	3	15	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2
36	37 1/2	3	18	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2
42	47 1/2	3	21	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2

Dimension A gives diameter of "flush screw" pattern Chuck. The diameter of the body of the "projecting screw" pattern Chuck is less but the space required to swing Chuck is the same as the "flush screw."

Wescott's "IXL" Independent Lathe Chuck



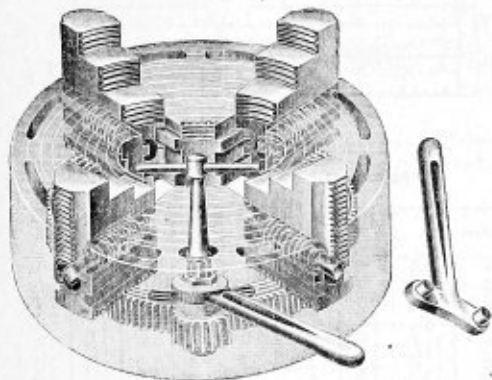
A, screw under jaw. B, set screw by which C is fastened. C, steel screw carrier. D, steel jaw.

In the IXL Independent Chuck, the end thrust and strain come upon the Chuck Body at its strongest point. This has been accomplished by providing each jaw screw with a steel carrier, which is threaded on one side and fastened by two set screws, one set screw following the other, and each acting as a lock to the other. One half of each set screw engages with the screw carrier, the other half with body of chuck, the set screws being long enough to secure great resistance.

Three or Four Jawed "IXL" Independent Lathe Chucks

Diam., Inches	Price Each	Capacity, Inches	Diam. of Center Hole, Inches	Approx. Diam. of Recess, Inches	Approx. Weight, Pounds	Diam., Inches	Price Each	Capacity, Inches	Diam. of Center Hole, Inches	Approx. Diam. of Recess, Inches	Approx. Weight, Pounds
4 $\frac{1}{8}$	\$21.00	6	1 $\frac{1}{4}$	3 $\frac{3}{8}$	14	16	\$46.00	20	3 $\frac{1}{4}$	7 $\frac{5}{8}$	155
6	22.00	7 $\frac{1}{2}$	1 $\frac{5}{8}$	5 $\frac{1}{8}$	22	18 $\frac{1}{2}$	56.00	23	4	9 $\frac{3}{8}$	190
8	26.00	9 $\frac{1}{2}$	2 $\frac{1}{8}$	5	39	21 $\frac{1}{4}$	68.00	26	4 $\frac{1}{8}$	9 $\frac{3}{8}$	280
10 $\frac{1}{8}$	30.00	12 $\frac{1}{2}$	2 $\frac{3}{8}$	6	51	24	80.00	30	4 $\frac{1}{2}$	10	320
12	35.00	15	3	6 $\frac{1}{2}$	72	27	105.00	33	5	12 $\frac{1}{8}$	400
13 $\frac{1}{4}$	38.00	17	3	6 $\frac{1}{2}$	88	30	130.00	36	5	12 $\frac{1}{8}$	447
14	40.00	18	3	7 $\frac{5}{8}$	92	36	210.00	43	7 $\frac{1}{4}$	15	650

Westcott's Scroll Combination Lathe Chucks



A scroll combination (Universal or Independent Jaw) Chuck, with spur, not bevel, gears. Jaws can be operated either independent or universal at any position. No shifting of rack or gears is necessary to operate for either movement. Jaws are reversible.

Screw heads are flush and do not project to catch on operator's clothing.

The spur pinion is operated by either a socket or open end wrench as shown in cut.

The Jaw screws are held in a steel box giving them a steel bearing on each end. Boxes are easily removed for cleaning purposes, etc.

The scroll may be rapidly manipulated by a lever engaging directly with it at the back, and increased gripping power gained by applying the open end wrench to the spur pinion.

This Chuck can also be furnished as a strictly Universal Chuck at same price.

Diam., Inches	Price Three Jawed	Price Four Jawed	Will Hold, Inches	Lathe Swing, Inches	Diam. of Recess	Approx. Weight, Pounds	Diam., Inches	Price Three Jawed	Price Four Jawed	Will Hold, Inches	Lathe Swing, Inches	Diam. of Recess	Approx. Weight, Pounds
6	\$33.00	\$39.00	7 $\frac{3}{8}$	8	3 $\frac{1}{2}$	24	21 $\frac{1}{4}$	\$136.00	\$155.00	26	20	9 $\frac{3}{8}$	250
8	44.00	52.00	10 $\frac{1}{4}$	10	5	43	24	170.00	190.00	30	30	10	266
10 $\frac{1}{8}$	52.00	60.00	12 $\frac{1}{2}$	12	6	56	27	220.00	240.00	33	32	12 $\frac{1}{8}$	440
13 $\frac{1}{4}$	70.00	80.00	16	16	7 $\frac{1}{8}$	97	30	240.00	300.00	36	36	12 $\frac{1}{8}$	495
16	90.00	105.00	19	20	9 $\frac{3}{8}$	152	36	350.00	400.00	43	42	15	715
18 $\frac{1}{2}$	108.00	130.00	22	22		198							

No. 1 Style Jaws



Geared Scroll Chucks

Strictly a universal chuck, jaws working together by means of a scroll threaded plate; commonly used for holding round pieces. Small size jaws are made of special crucible steel; larger sizes of open hearth steel, carefully hardened. Designed for hard service generally and, being perfectly balanced, is also well adapted for use on high speed machines.

The three-jaw chuck is mostly used, answering all ordinary requirements in general service. Four-jaw chucks can be furnished when desired.

Chucks furnished with two sets of jaws unless otherwise ordered. No. 1 style is for gripping outside of work; No. 2 for gripping inside of work. If chuck with one set of jaws only is required, specify style of jaw.

Diameter, Inches	Price Each With Two Sets of Jaws	Price Each With One Set of Jaws	Extra Jaws Price per Set of 3	Diameter of Hole, Inches	Diameter of Recess for Flange, Inches	Approximate Weight in Pounds
2 1/2	\$17.00	\$14.00	\$ 5.25	1 1/2	1 1/2	1 1/8
3	20.00	17.00	5.25	5/8	1 7/8	1 3/8
4	22.00	19.00	6.00	5/8	2 1/8	2 1/2
5	24.00	21.00	6.75	1	3 1/8	6 1/2
6	28.00	24.00	7.50	1 1/4	3 3/4	9 3/4
7 1/2	32.00	27.00	9.00	1 3/8	4 1/2	15
9	38.00	33.00	10.50	2	4 3/4	26
10 1/2	44.00	38.00	13.50	2 1/2	5 5/8	36
12	52.00	45.00	13.50	3	5 5/8	48
15	70.00	60.00	21.00	3	7	71

Screws for attaching to face plate and wrench for operating furnished with each chuck.

Round and Box Body Two Jaw Chucks

Round Body Chucks



These chucks are used by all brass manufacturers. Can be furnished with either independent or universal jaws. Jaws are dove tailed for slips. Box body chucks can be furnished as shown or with hub which can be threaded to fit spindle of machine.

In ordering always state whether round or box body and independent or universal jaws are wanted.

Box Body Chucks with Recess for Face Plate



Round Body Chucks

Nominal Size, Inches	Price Each	Hole Through Body, Inches	Diameter Recess, Inches	Jaws Open, Inches	Weight, Pounds	Extra Slip Jaws Machinery Steel, Price per Pair
4 1/2	\$20.00	1	4 1/8	2	10	\$2.00
6	24.00	1 1/4	5 5/8	2 1/2	20	2.50
7	30.00	1 1/2	5 5/8	3	33	2.50
9	35.00	1 3/4	5 5/8	4	49	3.00
12	45.00	2 1/4	6 5/8	6	79	3.75

Box Body Chucks

Nominal Size, Inches	Price Each	Diameter Recess, Inches	Jaws Open, Inches	Length Body, Inches	Width Body, Inches	Weight, Pounds	Extra Slip Jaws Machinery Steel, Price per Pair
7	\$32.00	4 3/4	3	7	3	20	\$2.50
9	39.00	5 5/8	4	9	4	31	3.00
12	48.00	7	6	12	4 1/2	48	3.75
15	60.00	7	8	15	5	75	4.50
18	85.00	9 1/2	10	18	5 5/8	125	5.00

One pair Machinery Steel Slips furnished: Tool Steel Slips can be furnished at a small advance in price.

Skinner Planer Chucks

Round Swivel Base

Square Base



For holding straight or taper work. Adjusted instantly. Jaws will not raise from the bed, are heavy and will permit of repeated dressing.

Round Base Chucks have a rib $1\frac{1}{4}$ inches wide cast on bottom to fit planer table and Square Base Chucks have a flange on all sides for clamping to planer table.

Forged steel wrench furnished with each chuck.

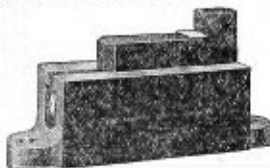


Number.....	6	8	10	12	15	18	24	30
Length of Jaw, inches.....	7	9	11	13	15 $\frac{1}{2}$	18 $\frac{1}{2}$	24 $\frac{1}{4}$	30 $\frac{3}{4}$
Depth of Jaw, inches.....	1 $\frac{1}{2}$	1 $\frac{3}{4}$	2 $\frac{1}{2}$	2 $\frac{3}{4}$	2 $\frac{3}{4}$	2 $\frac{3}{4}$	2 $\frac{3}{4}$	3
Jaws will open, inches.....	3 $\frac{1}{2}$	5	6	8	9 $\frac{1}{2}$	11 $\frac{1}{4}$	16	21 $\frac{1}{2}$
*Space required, Rd. Base.....	10	11 $\frac{1}{2}$	14	16	20	22	26	33
Space required, Sq. Base.....	7 $\frac{1}{2}$ x11	9x12 $\frac{1}{2}$	11x15	13x17	15 $\frac{1}{2}$ x21	18 $\frac{1}{2}$ x24	24 $\frac{1}{4}$ x28	30 $\frac{3}{4}$ x34
Weight lbs., Round Base.....	77	95	165	220	310	442	722	1200
Weight lbs., Square Base.....	55	68	110	130	234	320	508	1056
Price Each, Round Base.....	\$32.00	\$38.00	\$45.00	\$54.00	\$70.00	\$90.00	\$130.00	\$200.00
Price Each, Square Base.....	22.00	27.00	32.00	38.00	50.00	64.00	92.00	175.00

*When necessary to use chuck of 45° angle, space required will be greater.

Skinner Reversible Face Plate Jaws

For drill tables. Similar in construction to the planer chuck, but more portable and convenient for drill work. Also used on planers, shapers, milling machines, etc. Jaws are faced with steel. Nuts and screws are hardened. Provided with lugs so it may be tipped for drilling holes at right angles.



Lgth. of Jaws, Inches	Price per Set of Four		Price per Set of Three		Weight per Set of Four
	All Steel	Iron Body	All Steel	Iron Body	
4		\$ 40.00		\$ 30.00	34
6	\$ 72.00	52.00	\$ 54.00	39.00	100
8	92.00	64.00	69.00	48.00	185
10	120.00	80.00	90.00	60.00	240
12	160.00	112.00	120.00	84.00	270
14	220.00	144.00	165.00	108.00	375

Massey Planer, Milling Machine, Shaper, and Drill Press Vise

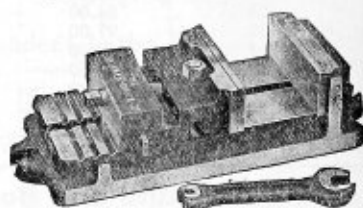


With Lightning Chucking Device

The front jaw is adjustable to all shapes. For drill press the long center slot gives the drill a free range. Particularly useful on a moving table for surface grinding. When straight or taper work is chucked the jaws "C" are forced down and carry the work into the bed of vise.

Vise No.	Width of Jaw, Inches	Depth of Jaw, Inches	Jaw Opens, Inches	Weight, Pounds	List Price Each
41	4	1 $\frac{1}{4}$	9 $\frac{1}{4}$	38	\$15.00
42	4	2	9 $\frac{1}{4}$	43	17.00
43	4	1 $\frac{1}{2}$	11 $\frac{3}{4}$	65	30.00
44	5	3	11 $\frac{3}{4}$	80	25.00
46	8	2	9 $\frac{1}{2}$	150	45.00
47	8	2	11 $\frac{1}{2}$	165	47.00
48	8	2	13 $\frac{1}{2}$	176	49.00
49	8	2	15 $\frac{1}{2}$	195	51.00
50	8	3	9	165	47.00
51	8	3	11	178	49.00
52	8	3	13	191	51.00
53	8	3	15	200	53.00

Skinner Drill Press Vise

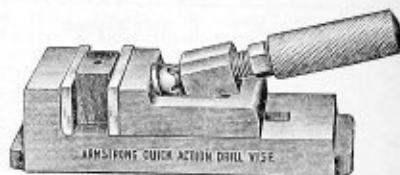


For use on large face plates and boring mill tables, these jaws are a satisfactory substitute for chucks. Jaws are adjustable and reversible. A rib $1\frac{1}{4}$ inches wide is cast on the bottom which adds strength and can be machined to fit slot.

All steel jaws are recommended for the heaviest work.

No.	Width Jaws, Ins.	Depth Jaw, Ins.	Jaws Open, Ins.	Shipping Weight, Pounds	Space Required, Inches	Price Each
4 $\frac{1}{2}$	4 $\frac{1}{2}$	2	5	37	14 x 5 $\frac{1}{4}$	\$15.00
5 $\frac{1}{2}$	5 $\frac{1}{2}$	2	6	43	15 x 6	18.00
7 $\frac{1}{2}$	7 $\frac{1}{2}$	2 $\frac{1}{2}$	9	98	19 $\frac{3}{4}$ x 9	30.00

Armstrong Drill Press Vise



An extremely handy vise for toolmakers and general machine shop use. One turn of handle instantly sets or releases the vise. Can be instantly adjusted to any size within its capacity. Sides are ground true and at right angles with the bottom. Will hold work perfectly true and solid as the sliding jaw draws down.

No.	Width of Jaw, Inches	Depth of Jaw, Inches	Opens, Inches	Weight, Pounds	Price Each
1-V	2	$\frac{5}{8}$	1 $\frac{1}{4}$	4 $\frac{1}{2}$	\$ 6.00
2-V	2 $\frac{1}{2}$	1 $\frac{1}{8}$	2 $\frac{1}{2}$	8 $\frac{1}{2}$	9.00
3-V	3 $\frac{1}{2}$	1 $\frac{1}{8}$	3	16	14.00

Brown & Sharp

Milling Machine and Planer Vises

Plain Vises

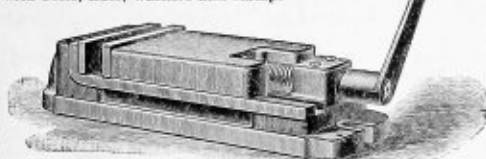
The vises shown below have jaws of case hardened steel unless otherwise ordered.



Size	Width of Jaws, Inches	Depth of Jaws, Inches	Jaws Open, Inches	Weight, Pounds	Price
1-P	4 1/2	1 1/2	2	16	\$14.00
2-P	5 1/2	1 1/2	2 1/2	24	15.00
3-P	6 1/2	1 1/2	3 1/2	43	20.00
4-P	7 1/2	2	4 1/2	78	31.00

Flanged Vises

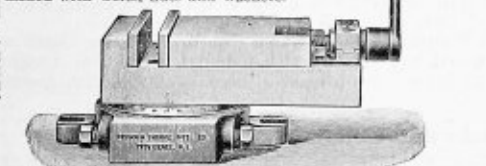
With flanges for clamping to table. Furnished with bolts, nuts, washers and clamp.



Size	Width of Jaws, Inches	Depth of Jaws, Inches	Jaws Open, Inches	Weight, Pounds	Price
1-F	4 1/2	1 1/2	2	16	\$15.00
2-F	5 1/2	1 1/2	2 1/2	28	17.00
3-F	6 1/2	1 1/2	3 1/2	50	26.00
4-F	7 1/2	2	4 1/2	95	38.00
5-F	8 1/2	2 1/2	7	180	53.00

Swivel Vises

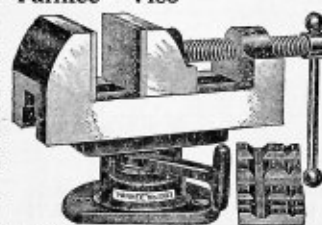
Furnished with tongues as follows: No. 2-8, 1/4-inch; Nos. 3-8 and 4-8, reversible for either 1/4-inch or 1/2-inch slots and can be used on any table fitted with corresponding T slots. Furnished with bolts, nuts and washers.



Size	Width of Jaws, Inches	Depth of Jaws, Inches	Jaws Open, Inches	Weight, Pounds	Price
2-8	5 1/2	1 1/2	2 1/2	45	\$20.00
3-8	6 1/2	1 1/2	3 1/2	70	28.00
4-8	7 1/2	2	4 1/2	110	40.00

"Yankee" Vise

Mounted on a swivel base for bench or machine and quickly detached for drill press, shaper, etc. Base 4 1/2 inches diam. Three bosses on under side to give a level bearing. Tapered on top for sliding jaw. Jaws 2 1/2 ins. wide, 1 1/2 ins. deep and open 3 1/2 ins. Extreme height, 5 1/2 ins.; extreme length, 8 1/4 in. Price each.



Weight 13 1/4 lbs.

\$8.00

Graham Drill Vise

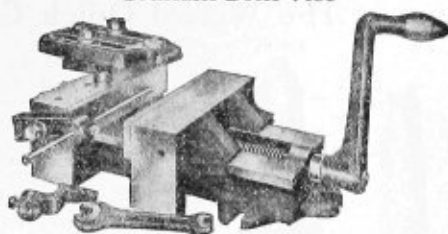


Fig. 1. Complete with Jig Attachments

Holds work in the same manner as an ordinary drill vise. Duplicate parts may be clamped in exactly the same position and drilled as accurately as in a special jig.

Serves as a base upon which to fasten plates with several bushings. Special jaws and fixtures, saving costly jigs.

With Jig Attachments

No. 3. Jaws 6 inches long, 1 1/2 inches deep; will open 4 1/2 inches. Weight, 36 pounds. Price.....\$22.00
No. 4. Jaws 9 inches long, 2 inches deep; will open 7 inches. Weight, 70 pounds. Price.....\$27.50
No. 5. Jaws 12 inches long, 2 1/2 inches deep; will open 9 1/2 inches. Weight, 138 pounds. Price.....\$40.00

Without Jig Attachments

No. 3. Jaws 6 inches long, 1 1/2 inches deep; will open 4 1/2 inches. Weight, 30 pounds. Price.....\$20.00
No. 4. Jaws 9 inches long, 2 inches deep; will open 7 inches. Weight, 60 pounds. Price.....\$25.00
No. 5. Jaws 12 inches long, 2 1/2 inches deep; will open 9 1/2 inches. Weight, 122 pounds. Price.....\$36.00

Extra

V-Jaws.—Machine steel, drilled, tapped and case hardened.

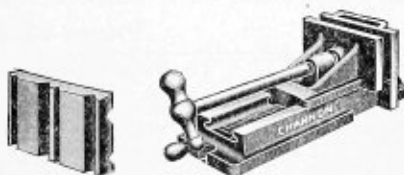
Number.....3 4 5
Price each.....\$2.50 \$3.50 \$5.00

Bushings.—Holes up to 1 1/2-inch (length 1 1/2 x 1 1/2-inch diameter. Price each.....\$0.60

Shell Jaws.—Number.....3 4 5
Price per pair.....\$1.00 \$1.50 \$2.00

Adj. Bushing Holder.—Number.....3 4 5
Price each.....\$6.00 \$7.50 \$9.00

Marvel Drill Press Vise



Deep liberal jaws. Of medium weight with quick sliding jaw, strong but not cumbersome. Machined true on all sides. May be laid on side. Has clamping strip around entire edge. An elongated slot in the solid jaw for clamping bushing holders for jig work. The jaws have sufficient overhang at side to take upright pieces 2 1/2 inches diameter on the No. 40 and 3 inches on the No. 41.

No.	Capacity, Inches	Width of Jaws, Inches	Height of Jaws, Inches	Weight, Pounds	Price Each
40	3	5 1/2	2 1/2	28	\$10.00
41	8	7	4	56	12.25

Finished cast iron V blocks.
2 1/2 x 5 1/2 inches, to fit No. 40 vise.....\$2.00
4 x 7 inches, to fit No. 41 vise.....2.50

The Wizard Quick Change Chucks and Collets

Fig. 1.

Fig. 2.

Fig. 5.

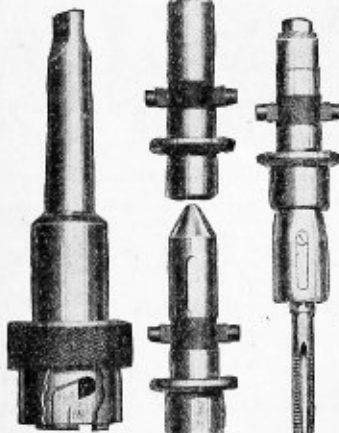


Fig. 3.

In all classes of jig work, and wherever it is desired to use more than one tool in succession on the same job, the Wizard chuck will actually save 25 to 50% of time and labor. It converts any single spindle drill press into a multiple spindle drill press. With it all sizes and kinds of tools can be used. You can drill, tap, ream, set studs, counterbore, etc., in rapid succession, without stopping the machine and when running at any speed.

A Wizard outfit consists of one chuck for the spindle and one collet for each tool or operation on the job.

Fig. 1 is the Wizard chuck which is inserted directly into the drill press spindle or wherever it is desired to use it. Made in three sizes, and each size may be had with different sizes of Morse Taper shank to fit the machine.

Fig. 2 is a blank collet left soft for boring out to receive straight or special shanks.

Fig. 3 is the regular Morse Taper collet, furnished with various sizes of Morse Taper holes. Furnished either with or without the "No-Needa-Tang" feature described below.

Fig. 5 is the Wizard friction drive tapping collet, and when used with the Wizard chuck will obviate broken taps. It can also be used in turret lathe tapping. Each size tap has its own friction drive properly adjusted to its size. Friction slips as soon as tap bottoms meet undue resistance.

The "No-Needa-Tang" Feature

This feature is provided, when desired, on the Fig. 3 collet, and will save enough drills to pay for the complete Wizard outfit. The illustration is self-explanatory. The key is made from drill rod and is imbedded three fourths its diameter in wall of collet. When a tang is broken off a Morse Taper drill or reamer, it is only necessary to grind a flat on it or mill a groove, and the drill is good as new. It will save time and tangs, as well as the drill press spindle.



Wizard Chucks

In ordering a WIZARD outfit, decide whether size A, B or C, is desired, which depends on maximum range desired. If it will not be required to use tools with shanks larger than Number 2 Morse Taper, size A will be large enough. Any size Chuck takes smallest tools. Only difference is in maximum range.

In addition to stating whether size A, B or C chuck is desired, also state which size Morse Taper shank is preferred on the Chuck to fit the Drill Press spindle. Chucks will be furnished with shanks left soft and straight at regular prices if desired, so they may be turned to suit any special conditions. Prices on chucks with special straight or taper shanks will be furnished on application.

Prices, Wizard Chucks and Collets

Size of Chuck	Price Each	Size of Chuck Shank	Range of Fig. 3 Collet	Diam. of Collet, Inches	Largest Diam. of Chuck
A	\$6.50	Morse taper 2 or 3	Morse taper 1 and 2	$\frac{3}{8}$	$2\frac{3}{8}$
B	8.00	Morse taper 3 or 4	Morse taper 1, 2, and 3	$1\frac{1}{4}$	$2\frac{5}{8}$
C	12.85	Morse taper 4 or 5	Morse taper 1, 2, 3 and 4	$1\frac{5}{8}$	$3\frac{3}{8}$

In ordering Wizard Collets, give number and state size of chuck, (A, B or C).

Fig. 3 Collets—Regular

Collet No.	Description	Price for each Chuck size		
		A	B	C
Collet No. 31	For any tool with No. 1 Morse taper shank	\$1.90	\$2.50	\$3.60
Collet No. 32	For any tool with No. 2 Morse taper shank	1.90	2.50	3.60
Collet No. 33	For any tool with No. 3 Morse taper shank		2.50	3.60
Collet No. 34	For any tool with No. 4 Morse taper shank			3.60
Collet No. 20	Blank, so that special tool can be fitted by purchaser	1.10	1.50	2.20

Price Fig. 3 Collets with "No-Needa-Tang" Feature No. 31. Size A \$2.10, Size B \$2.75, Size C \$3.95 net.

Fig. 5 Collet

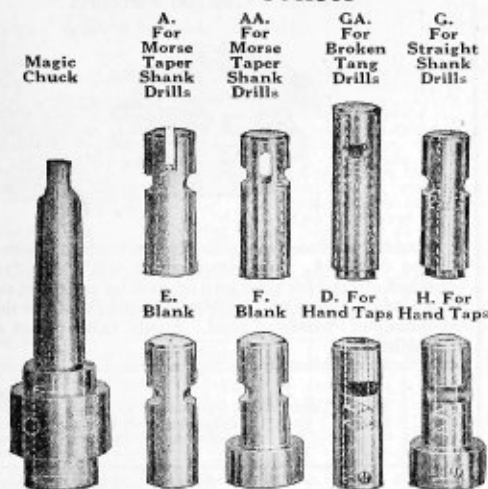
Collet No.	Description	Price for each Chuck size		
		A	B	C
Collet No. 51	Takes all sizes of Beaman & Smith shank taps from $\frac{1}{4}$ to $\frac{3}{8}$	\$6.75	\$7.75	\$9.50
Collet No. 52	Takes all sizes of Beaman & Smith shank taps from $\frac{3}{8}$ to $\frac{5}{8}$	6.75	7.75	9.50
Collet No. 53	Takes all sizes of Beaman & Smith shank taps from $\frac{5}{8}$ to $1\frac{1}{4}$		7.75	9.50

Collets

Magic Chucks and Equipment

The Magic chuck is designed for use in the spindles of drill presses, lathes, screw machines and other revolving spindle machines. Permits rapid changing of tools without stopping the machine. It practically converts a single spindle machine into a multiple spindle one with as many holes as you have tools to use.

This is made possible by the use of collets for holding various kinds of tools, which may be rapidly inserted and withdrawn from the chuck, effecting a great saving in time.



Specifications and Prices

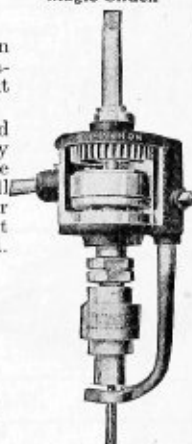
Chucks				Collets						
No.	Price	Morse Taper Size of Shank	Outside Diam., Inches	No.	Outside Diam., Inches	Prices				
						A & AA	D & G	E	F	H
0	\$ 5.60	No. 1-2	1 1/8	0	1 1/8	\$1.40	\$1.50	\$0.80	\$1.60	\$ 2.30
1	6.00	No. 2 3/4-4	2	1	1 1/8	1.50	1.70	1.00	1.80	2.75
2	8.00	No. 3-4-5	2 1/2	2	1 1/2	1.80	2.00	1.20	2.20	4.00
3	12.00	No. 4-5-6	3	3	1 3/4	2.50	4.00	1.40	2.75	5.00
4	18.00	No. 4-5-6	3 3/4	4	2 1/2	6.00	6.25	2.25	4.00	8.00
5	35.00	No. 5-6	4 1/2	5	3 1/2	8.50	9.00	3.75	5.60	10.50
										GA
										None
										\$1.80
										2.20
										4.25
										6.75
										9.50

Modern Tapping Attachments

Equipped with Skinner Chuck



Equipped with Magic Chuck



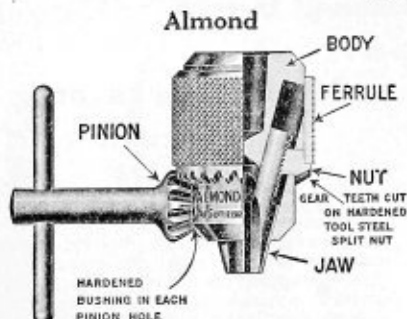
The "Modern" tapping attachment is used in any machine having an upright revolving spindle and is valuable for doing successive operations, such as drilling a hole, tapping it and setting a stud, without removing the work.

This attachment is new in construction and has many improved features. It drives tools through holes or to a bottom and is easily adjusted to stop automatically at any desired point. It will drive tools in, stop automatically and by simply raising the spindle will back out without stopping or reversing the machine. Raise the lever as soon as the gears release and the tool will immediately back out with an accelerated reverse motion. No reversing of belt required. Not only saves time, taps and handling but does better work.

Prices

Equipped with:	No. 1	No. 2
Magic chuck.....	\$25.00	\$35.00
Skinner chuck.....	\$2.50	\$2.50
Tap size, inches.....	1/8 to 3/8	3/8 to 1

Drill Chucks



The Almond geared nut chuck is small in diameter and carries a large drill.

Geared teeth on a tool steel nut meshing with an unbreakable tool steel pinion of large diameter gives a direct drive with increased tightening power.

The bushed pinion holes do away with elongating of the holes in the chuck body. This insures a perfect contact when the pinion is in mesh with the gear teeth on the nut.

Any Almond pinion showing wear or breakage, if returned to the Almond Company will be replaced without charge.

It is accurate, well balanced, powerful and easily operated.

The most expensive factor in the up-keep of geared chucks has been the replacement of the case hardened ferrule and pinion. This excessive and needless expense has been eliminated in the new Almond geared nut chuck. Note the wide teeth on tool steel nut and pinion.

Its construction insures long life, with practically no cost for maintenance.

No.	Price Each	Capacity, Inches	Outside Diameter, Inches	Length of Body, Inches	Approx. Weight, Pounds
5	\$ 5.50	0 to 3/8	1 1/2	1 1/2	1 1/2
7	5.50	0 to 3/8	1 1/2	2 1/2	3 1/2
9	9.00	0 to 3/8	1 1/2	2 1/2	1 1/2
10	15.00	0 to 3/8	2 1/2	4 1/2	5 1/2
11	25.00	3/8 to 1	3 1/2	4 1/2	7

Prices on Extra Parts

No. of chuck	5	7	9	10	11
Jaws, per set	\$1.50	\$1.50	\$2.70	\$4.50	\$6.75
Keys, each	1.00	1.00	1.00	1.00	1.00

Jacobs

A popular and well known drill chuck, convenient, accurate, efficient and durable. The Nos. 1A and 2A have a flat back. Easily taken apart and assembled. All parts are interchangeable.

No.	Price Each	Capacity, Inch	Outside Diameter, Inches	Length of Body, Inches	Approx. Weight, Pounds
1-A	\$ 5.50	0 to 3/8	1 1/2	1 1/2	1 1/2
2-A	5.50	0 to 3/8	1 1/2	2 1/2	3 1/2
3	9.00	0 to 3/8	2 1/2	3	2 1/2
4	15.00	3/8 to 1	2 1/2	3 1/2	4 1/2
5	25.00	3/8 to 1	3 1/2	4	6 1/2

Prices on Extra Parts

No. of Chuck	1-A	2-A	3	4	5
Jaws, per set	\$1.65	\$1.65	\$2.70	\$4.50	\$6.75
Keys, each	.30	.30	.45	.75	1.25



Skinner "New Model"

Especially adapted for all light and rapid drilling such as is done on sensitive drills and hand lathes. Operated by hand and tightened by spanner wrench. May be taken apart for cleaning and oiling. A hole the full capacity may be drilled through the chuck, for holding rods, etc.

No.	Price Each	Capacity, Inches	Outside Diameter, Inches	Length of Body, Inches	Length Overall Jaws Extended
11	\$5.50	0 to 3/8	1 1/2	1 1/2	2 1/2
12	5.50	0 to 3/8	1 1/2	2 1/2	3 1/2
13	9.00	0 to 3/8	2 1/2	3 1/2	4 1/2

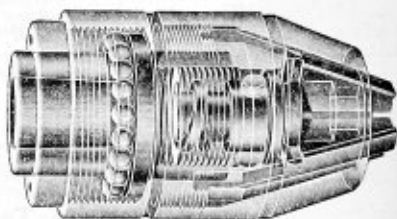
Skinner "Geared Pattern"



Accurate and convenient. Gears enclosed beneath surface of chuck, away from chips and dirt. Hand operated, except for final grip on drill by means of common wrench, which will not revolve spindle of the lightest machine. Made of steel. Easily taken apart and assembled.

No.	Price Each	Capacity, Inch	Outside Diameter, Inches	Length of Body, Inches	Total Length Jaws Extended, Inches
21	\$ 6.00	0 to 1/4	1 1/2	1 1/2	2 1/2
22	7.00	0 to 3/8	2 1/2	2 1/2	3 1/2
23	9.00	0 to 1/2	2 1/2	3 1/2	4 1/2
24	15.00	3/8 to 3/4	3 1/2	3 1/2	5 1/2

Horton-Morrow

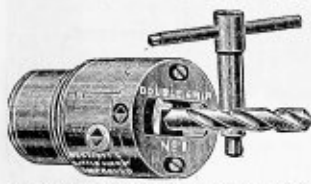


A hand-operated, ball-gearing drill chuck, self-tightening, with automatic grip. No wrench is needed. Drives high speed drills without slipping. Releases quick without resistance. Does not mar the shank of tools. Head of chuck and threaded ring, thoroughly hardened and ground, between which the ball bearings are placed, insuring long life and durability. Jaws are made of special alloy high carbon steel. Ground all over and are strictly interchangeable. Drills will run true from shank to point in this chuck.

No.	Price Each	Capacity, Inch	Outside Diameter, Inches	Lgh. Body, Inches	Length Overall Jaws Extended	Extra Jaws Per Set
1	\$ 7.00	0 to 1/4	1 1/2	2 1/2	2 1/2	\$1.75
2	7.50	0 to 3/8	1 1/2	3 1/2	3 1/2	1.75
3	9.00	0 to 1/2	2 1/2	3 1/2	4 1/2	2.00
4	18.00	3/4 to 3/4	3 1/2	4 1/2	5 1/2	2.25
5	25.00	3/4 to 1	3 1/2	4 1/2	5 1/2	2.25

Drill Chucks

"Little Giant" Double Grip



One of the best and most powerful chucks made for use on bolt cutting and screw machines for holding iron to be threaded with a die or for any work where a chuck of extra strength is needed. This chuck has a forged steel cap which acts

not only as a clamp, but having flanges, becomes a tie plate. This tie plate is applied to back of jaws and is independent of other adjustments.

No.	Price Each	Capacity, Inches	Diam., Inches	Lgth. Body, Inches	Extra Jaws, per Set	Screws, Price Each
0	\$ 9.00	0 to 1/2	2 1/2	3 1/2	\$3.60	\$1.65
1	10.00	0 to 3/4	3	3 3/4	4.00	1.70
2	11.00	0 to 1	3 1/2	3 3/4	4.35	1.80
2 1/2	12.00	*0 to 1 1/4	4	3 3/4	4.70	1.80
3	20.00	0 to 1 1/2	6	4 1/4	7.80	4.00
4	25.00	0 to 2	6 1/2	4 3/4	9.60	4.80

*Extra strong.

Sizes No. 0 to No. 2 1/2 are for use with Arbor.

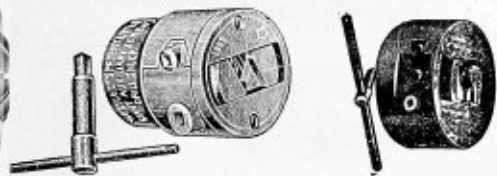
Nos. 3 and 4 are for face plate.

When ordering duplicate parts, state whether chuck is stamped with a * or not, and if so, whether it is stamped refitted. Also state of manufacture (not date of patent) stamped on end (number of month and year), and whether Little Giant Improved or Little Giant Double Grip.

Little Giant Auxiliary Screw

1/2 to 1 1/4-inch, Inclusive

1 1/2 to 4-inch



The auxiliary screw entirely overcomes the tendency of gripping part of jaws to crowd away from right and left hand screw and outer end to draw toward it, which tendency is found in all side screw chucks. This auxiliary screw also greatly increases the gripping power of chuck.

Size, Inches	Price Each	Capacity, Inches	Jaws per Set	Right and Left Hand Screw	Auxiliary Screw
1/2	\$ 9.00	0 to 1/2	\$ 4.45	\$ 1.65	\$0.70
3/4	10.00	0 to 3/4	4.75	1.70	.75
1	11.00	0 to 1	5.50	1.80	.90
1 1/4	17.00	1/4 to 1 1/4	8.40	3.25	1.20
1 1/2	20.00	1/2 to 1 1/2	9.80	4.90	1.95
2	25.00	3/4 to 2	13.80	6.15	2.05
2 1/2	35.00	1 1/2 to 2 1/2	16.45	6.75	2.10
3	45.00	2 to 3	19.70	8.75	2.20
3 1/2	60.00	2 1/2 to 3 1/2	28.20	10.50	2.35
4	70.00	3 to 4	33.00	11.00	2.50

1/2, 3/4, 1 and 1 1/4 are for use with Arbor.

1 1/2, 2, 2 1/2, 3, 3 1/2 and 4 are for face plate.

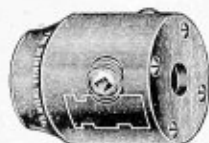
Weights and Dimensions

Size, inches.....	1/2	3/4	1	1 1/4	1 1/2
Diameter body, inches.....	2 1/2	3	3 1/2	4 1/2	6
Weight, pounds.....	2 1/2	5 1/2	7 1/2	19 1/2	28
Size, inches.....	2	2 1/2	3	3 1/2	4
Diameter body, inches.....	6 3/4	7 1/2	9	11 1/2	13 1/4
Weight, pounds.....	34 1/2	43	68	115	148

Standard Improved

This is a very serviceable chuck for holding round or square work. It has no projecting jaws, and the plate prevents the chuck from being used on larger work than it is intended.

Jaws are guided by three gibs, and the operating screw is larger than is usually furnished with this type of chuck. Hole in back is tapered to receive arbor, but can be bored out and threaded by customer if desired.



No.	Price Each	Capacity, Inches	Diam. Body, Inches	Lgth. Body, Inches	Jaws per Set	Screws, Price Each
00	\$ 6.00	0 to 1/2	1 1/2	2 1/2	\$1.75	\$1.00
0	6.50	0 to 3/4	1 3/4	2 3/4	2.00	1.00
1	7.00	0 to 1	2 1/2	2 3/4	2.25	1.00
2	8.00	0 to 1 1/4	2 3/4	3 1/2	2.50	1.10
3	10.00	0 to 1 1/2	3 1/2	4 1/4	2.75	1.25

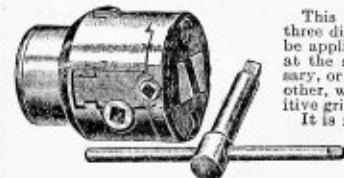
Skinner "Positive Drive"



The positive driving section of the positive drive jaws adjust with the friction or centering jaws, so that fastening of tool is done in one operation. It is unnecessary to grip tightly with the friction jaws, insuring accuracy and prolonging the life of the chuck.

No.	Price Each	Capacity, Inches	Diameter, Inches	Length, Inches
50	\$ 8.00	0 to 3/4	1 1/2	2 1/4
51	9.00	0 to 1	1 3/4	2 3/4
52	10.00	0 to 1 1/4	2 1/2	3
53	12.00	0 to 1 1/2	2 3/4	3 1/4

National Round Body Triple Grip



This chuck is made with three distinct grips that can be applied to the same tool at the same time, if necessary, or independent of each other, which makes it a positive gripping chuck.

It is not necessary to use each of these grips in all classes of work, but when needed will be found

very convenient to hold the tool positive.

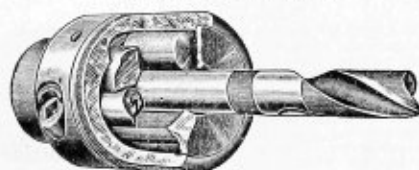
Jaws and screws made from tool steel and carefully hardened.

No.	Price Each	Capacity, Inches	Diameter Body, Inches	Length Body, Inches
18	\$ 8.00	0 to 1/2	1 1/2	2 1/4
19	8.00	0 to 3/4	1 3/4	2 1/4
20	9.00	0 to 1	2 1/2	2 3/4
21	10.00	0 to 1 1/4	2 3/4	3 1/4
22	11.00	0 to 1 1/2	3	3 1/4
22 1/2	12.00	0 to 1 3/4	3 1/2	3 1/4
23	20.00	0 to 1 1/2	4	4 1/4
24	25.00	0 to 2	6 1/2	4 1/2

If your requirements are not shown in this catalogue, write us,

Drill Chucks

Weaver's Roller Jaw



Drives straight shank drills without slipping. Does not mar or bruise drill shank. Especially adapted for high speed work and heavy service.

Three hardened steel rolls acting between shank of drill, and three cam faces of inner walls of body constitutes the entire construction and operation of chuck.

The grip of the rolls or jaws increases automatically with every ounce of pressure thrown on the drill. The cage spaces and controls the rolls upon the cams.

The rolls are hardened tool steel ground absolutely true. A slight pressure brings them into contact with shank of tool and the grip increases in proportion to the working resistance.

Arbors, straight or taper shank can be furnished. State size desired when ordering.

Solid One-Piece Body



Solid One-Piece Cage

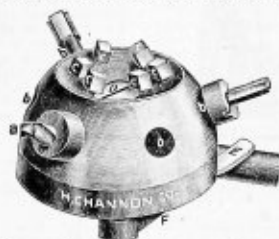


Roller Jaws



No.	Price Each	Capacity, Inches	Diameter of Body, Inches	Length of Body, Inches	Approx. Weight, Pounds
1	\$ 7.00	1/4 to 3/8	1 1/4	2 3/4	1 1/4
1 1/2	7.50	3/8 to 1/2	1 1/2	2 3/4	1 1/2
2	9.50	3/8 to 5/8	2 1/4	3 3/4	2 1/4
2 1/2	10.00	1/2 to 3/4	2 1/2	3 3/4	2 1/2
3	12.50	3/4 to 1	2 3/4	4 1/4	4 3/4

The Almond Turret Head Tool



Lowers the cost and increases the accuracy of duplicate work by converting an ordinary lathe into a six tool turret lathe.

No.	Diameter, Inches	Socket Holes, Inches	Weight, Pounds	Price Each
1	3 1/2	5/8 x 1	3 1/2	\$13.00
2	5 1/4	3/4 x 1 1/2	14	25.00

Star



This is a strong, well finished and accurate drill chuck, holding round or square work, at a moderate price.

It has three jaws, carefully adjusted in a socket, opening with a spring and closing with pressure from spindle. Springs are protected from injury and will not get out of order.

Made with round straight shank or Morse taper. In ordering always specify kind and size of shank desired.

No.	Price Each	Capacity, Inches	Diam. Body, Inches	Diam. Shank, Inches	Length Shank, Inches	Approx. Weight, Ounces
5	\$2.25	0 to 1/4	1	1/2	1 1/2	7
6	3.15	0 to 3/8	1 1/4	1/2	3 3/8	12
7	4.20	0 to 1/2	1 1/2	3/4	4 1/2	20

Above chuck with No. 1 or No. 2 Morse taper shank, 50c extra. Specify style of shank desired when ordering.

Star Chuck



No. 15



No. 16

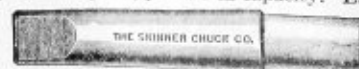
These chucks are of the bit stock pattern, permitting chucks to be used in bit braces, breast drills, and other tools.

Numbers.....	15	16	17
Capacity, inches.....	0-1/4	0-3/8	0-1/2
Outside diameter of chuck, inches.....	1	1 1/4	1 1/2
Length of shank, inches.....	2	2 1/4	2 1/2
Weight, ounces.....	6	10	17
Price each.....	\$2.85	\$3.75	\$4.60

Drill Chuck Arbors



1/2 or 5/8-inch shank. For blacksmith's drill press. Fitting chucks up to 1 1/2-inch capacity. Each...\$1.00
Fitting chucks up to 3/4 and 1-in capacity. Each 1.50



With taper shanks as shown in illustration.
Fitting Morse Socket No. 1 2 3 4 5
Price each.....\$1.50 \$1.50 \$2.00 \$2.50 \$3.00

Agrippa Turning Tool Holders

The maximum of economy, strength and efficiency and relief from the troubles common to this class of tools, is assured in the Williams' "Agrippa" tool holders.

The cam-fastening is always rapid and positive—the greater the pressure the tighter the lock. It offers full freedom for operation without removal from tool post, and imposes no obstruction to cutting facilities. Both types of cam are interchangeable, and extra cams can be furnished at a slight extra charge.

The form in which cutters are furnished requires the minimum of grinding for either right or left hand usage. Unless otherwise specified hexagon head cam will be furnished.



Left Hand
No. 276



No. 977 Straight

Sizes and Prices

Number			Holder, Size	Price		
Left Hand	Straight	Right Hand		Cutter Size Square	Inter-changeable Cams, Extra	Complete
00-L	00-S	00-R	$\frac{1}{2} \times \frac{1}{4} \times 4\frac{1}{2}$	$\frac{1}{2}$	\$0.60	\$1.65
0-L	0-S	0-R	$\frac{3}{8} \times \frac{1}{8} \times 5\frac{1}{2}$	$\frac{3}{8}$	.65	1.75
1-L	1-S	1-R	$\frac{1}{2} \times \frac{1}{8} \times 6\frac{1}{2}$	$\frac{1}{2}$	.75	1.95
2-L	2-S	2-R	$\frac{3}{4} \times \frac{1}{8} \times 8$	$\frac{3}{4}$	.81	2.55
3-L	3-S	3-R	$\frac{7}{8} \times \frac{1}{8} \times 9\frac{1}{2}$	$\frac{7}{8}$	.90	3.35
4-L	4-S	4-R	$\frac{1}{2} \times \frac{1}{2} \times 10\frac{1}{2}$	$\frac{1}{2}$	1.00	4.25
5-L	5-S	5-R	$1 \times 2 \times 12\frac{1}{2}$	$\frac{3}{4}$	1.10	5.45



Right Hand
No. 276

Side Tool Holders

Agrippa Cutting-Off Tool Holders

The cutter blades, furnished from high speed steel and ground ready for use, assure an extended service of high class cutting qualities and great wear. Unless otherwise specified hexagon head cam will be furnished with the holder.



Left Hand No. 279



Right Hand No. 278



Straight No. 280

Right	Number		Holder, Size	Cutter Blade, Finished Size		Price			
	Right Hand	Left Hand		Cut-ting-off Tool	Side Tool	Extra Cut-ting-off Tool Blade High Speed	Extra Side-Tool Blade High Speed	Comp. Holder With Cut-ting-off Tool Blade High Speed	With Side-Tool Blade High Speed
						Prices on application	Prices on application		
20-R	030-R	030-L	$\frac{1}{2} \times \frac{3}{4} \times 1\frac{1}{2}$	$\frac{1}{2} \times \frac{1}{2}$	$\frac{1}{2} \times \frac{1}{2}$	\$1.90	\$2.40		
20-R	30-R	30-L	$\frac{3}{8} \times \frac{3}{8} \times 1\frac{1}{2}$	$\frac{3}{8} \times \frac{3}{8}$	$\frac{3}{8} \times \frac{3}{8}$	1.90	2.65		
21-R	31-R	31-L	$\frac{1}{2} \times 1 \times 2\frac{1}{2}$	$\frac{1}{2} \times \frac{1}{2}$	$\frac{1}{2} \times \frac{1}{2}$	2.15	3.00		
22-R	32-R	32-L	$\frac{3}{4} \times 1 \times 3\frac{1}{2}$	$\frac{3}{4} \times \frac{3}{4}$	$\frac{3}{4} \times \frac{3}{4}$	2.75	3.75		
23-R	33-R	33-L	$\frac{1}{2} \times 1 \times 4\frac{1}{2}$	$\frac{1}{2} \times 1$	$\frac{1}{2} \times 1$	3.60	5.00		
24-R	34-R	34-L	$\frac{3}{4} \times 1 \times 5\frac{1}{2}$	$\frac{3}{4} \times 1\frac{1}{2}$	$\frac{3}{4} \times 1\frac{1}{2}$	4.55	6.25		

Agrippa Boring Tool Holders

Furnished with plain or sleeve bar, cutter and hardened wrenches.

With this excellent holder, encumbering sleeves or bushings are unnecessary for interchangeable bars. Commercial forms of bar steel are adaptable without machining.

The sleeve-bar fastening provides for the rapid adjustment of either straight or angular cutters without the use of extra parts; it has greater strength than others of the same general design. Plain bar provides for use with either straight or angular cutters in the simplest manner possible, and is furnished with headless set screws.

Unless otherwise specified maximum size sleeve-bar will be furnished.



No. 281



No. 282

No.	Holder, Size	Holder Capacity for Bars, Size	Standard Bar, Size	Price	
				Complete Holder Plain Bar High Speed Cutters	Sleeve Bar High Speed Cutters
080	$\frac{1}{2} \times \frac{3}{4}$	$\frac{1}{2}$ to $\frac{1}{2}$	$\frac{1}{2}$	\$3.05	\$3.45
80	$\frac{3}{8} \times \frac{3}{8}$	$\frac{1}{4}$ to $\frac{3}{8}$	$\frac{3}{8}$	3.05	3.45
81	$\frac{1}{2} \times 1$	$\frac{1}{4}$ to $\frac{3}{4}$	$\frac{1}{2}$	3.70	4.25
82	$\frac{3}{4} \times 1\frac{1}{2}$	$\frac{3}{8}$ to $\frac{1}{2}$	$\frac{3}{4}$	4.90	5.70
83	$\frac{1}{2} \times 1\frac{1}{2}$	$\frac{1}{2}$ to $1\frac{1}{2}$	$1\frac{1}{2}$	6.95	8.05

Agrippa Threading Tools



Furnished with special headless cam lock nut, alloy steel cutter and hardened wrench.

A highly perfected tool for fine or coarse threading or other lathe work. The nut for lockable-spring head provides for the perfectly rigid backing required for coarse threading and heavy cuts, and when it is loosened the holder becomes a spring-tool for finishing work. It is equally excellent used as a turning-tool holder, for which purpose the self-hardening or high speed cutters furnished with the turning-tool holders can be supplied.

The cam-fastening is always rapid and positive—the greater the pressure the tighter the lock. It offers full freedom for operation without removal from tool post and imposes no obstruction to cutting facilities. Extra cams can be furnished at a slight extra charge.

The cutter, made from highest grade of alloy steel, is ground all over to special size, the point forming an angle of 60 degrees.

No.	Holder, Size	Cutter Size Square	Price	
			Ground Cutter, Alloy Steel	Complete Tool
50	$\frac{3}{8} \times 1 \frac{7}{8}$	$\frac{1}{4}$	Prices on application	\$2.25
51	$\frac{1}{2} \times 1 \frac{1}{2}$	$\frac{3}{8}$		2.75
52	$\frac{3}{4} \times 1 \frac{1}{2}$	$\frac{1}{2}$		3.50

Agrippa Special Cutter Tool Holder



For Lathe, Planer and Shaper
"The Holders That Hold"



A universally efficient and high-class heavy service tool, whether used with lathe, planer or shaper—practically equal to hand-forged tools, and vastly more economical.

The holder is composed of but three parts, all of which are of assured greater simplicity, strength and wearing qualities.

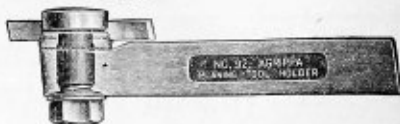
The cutters, which are furnished separately, are drop-forged from high speed steel, and have greater diameter of shank than is commonly supplied—breakage minimized.

The headless cam fastening imposes no obstruction to complete length of cuts. Furnished with either headless or square head cam and hardened wrench.

Unless otherwise specified square head cam will be furnished.

No.	Holder, Size	Height from Point of Cutter to Bottom of Shank	Cutter Shank, Diameter	Price	
				Inter-changeable Cams, Extra	Holder With-out Cutters
101	$\frac{1}{2} \times 1 \frac{1}{2} \times 7 \frac{1}{2}$	1 $\frac{1}{2}$	$\frac{3}{8}$	\$0.58	\$1.80
102	$\frac{3}{4} \times 1 \frac{1}{2} \times 9$	1 $\frac{3}{4}$	$\frac{1}{2}$	.63	2.30
103	$\frac{1}{2} \times 1 \frac{1}{2} \times 10 \frac{1}{2}$	1 $\frac{1}{2}$	$\frac{1}{2}$	.68	3.10
105	1 x 2 x 14	2	$\frac{3}{4}$	.84	5.00
106	$1 \frac{1}{4} \times 2 \frac{1}{4} \times 16$	2 $\frac{1}{4}$	$\frac{1}{2}$	.95	7.50

Agrippa Planing Tools



Furnished with one cutter and hardened drop-forged wrench. A rugged, substantial tool of absolute efficiency and great dependability on either lathe or planer. Because of its numerous angles of adjustment it also makes an excellent offset turning tool.

The construction assures perfect seat and holding quality for the cutters; the convex face of clamp nut provides uniform locking pressure for cutters of either square or rectangular form; the serrations in holder provide for quicker, finer and maximum number of cutter adjustments.

The serrated washer, or adjustment ring, which receives fastening and working impact, is hardened and tempered—relieves holder of wear.

No.	Holder, Size	Cutter Size	Adjustment Ring, Extra	Price	
				Cutters Only High Speed	Complete Holder High Speed Cutters
91	$\frac{1}{2} \times 1 \frac{1}{2} \times 7$	$\frac{1}{4} \times \frac{3}{8}$	\$0.40		\$ 2.30
92	$\frac{3}{4} \times 1 \frac{1}{2} \times 8 \frac{1}{2}$	$\frac{3}{8} \times \frac{1}{2}$	.45		3.70
93	$\frac{1}{2} \times 1 \frac{1}{2} \times 10 \frac{1}{2}$	$\frac{1}{2} \times \frac{3}{8}$	.55		4.80
94	1 x $1 \frac{1}{2} \times 13 \frac{1}{2}$	$\frac{1}{2} \times \frac{3}{4}$	.70	Prices on application	7.50
95	$1 \frac{1}{4} \times 2 \frac{1}{4} \times 16 \frac{1}{2}$	$\frac{3}{4} \times \frac{1}{2}$	1.00		12.50
96	$1 \frac{1}{4} \times 2 \frac{1}{4} \times 19$	$\frac{3}{4} \times 1$	1.50		18.00
97	$2 \frac{1}{2} \times 2 \frac{1}{2} \times 22$	$\frac{3}{4} \times 1 \frac{1}{2}$	2.25		28.50

"Agrippa" Special Cutters



Extra heavy in design, drop-forged from "Agrippa" high speed steel and hardened and ground ready for lathe use.



*Cutter Mark	Style of Cutter	Price					
		For Holder Number					
		101	102	103	105	106	
	Diameter of Cutter Shank	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	
A L	Side, left hand	\$0.45	\$0.70	\$1.00	\$1.80	\$2.80	
A R	Side, right hand	.45	.70	1.00	1.80	2.80	
B L	Diamond point, left hand	.45	.70	1.00	1.80	2.80	
B R	Diamond point, right hand	.45	.70	1.00	1.80	2.80	
C L	Diamond point, left hand offset	.45	.70	1.00	1.80	2.80	
C R	Diamond point, right hand offset	.45	.70	1.00	1.80	2.80	
D L	Roughing, left hand	.45	.70	1.00	1.80	2.80	
D R	Roughing, right hand	.45	.70	1.00	1.80	2.80	
E R	Threading, right hand	.55	.85	1.20	2.20	3.40	
E S	Threading, straight	.55	.85				
F	Flat nose	.55	.85	1.20	2.20	3.40	
G R	Cutting-off, right hand	.55	.85				
H L	Hog nose, left hand	.45	.70	1.00	1.80	2.80	
H R	Hog nose, right hand	.45	.70	1.00	1.80	2.80	
	Complete set of any 12 minimum price cutters, mounted on special carriers	5.10	8.00	11.40	20.50	28.50	

*When cutters are ordered ground for use on planer or shaper the letter "X" will be added to the cutter mark for identification.

Agrippa Drop Head Turning Holders



Right Hand



Left Hand

Designed for use on lathes with clamp-tool rests and low centers, and excellently adapted for shaper and planer work.

The cam-fastening is always rapid and positive—the greater the pressure the tighter the lock. It offers full freedom for operation without removal of holder from tool post, and imposes no obstruction to cutting facilities. Both types of cam are interchangeable, and extra cams can be furnished at a slight extra charge.

The form in which cutters are furnished requires the minimum of grinding for either right or left hand usage.

Unless otherwise specified Hex Head Cam will be furnished.

Number			Holder Size	Cutter Size Square	Height from Bottom of Shank to Cutter Point	Price		
Right Hand	Left Hand	Right Hand				Inter-changeable Cams, Extra	Cut's Only High Speed	Comp. Tool With High Speed Cutter
0200-S	0200-R	0200-L	$\frac{3}{8} \times \frac{3}{8} \times 6$	$\frac{1}{2}$	$\frac{1}{2}$	\$0.60	Prices on application	\$1.85
200-S	200-R	200-L	$\frac{3}{8} \times \frac{3}{8} \times 7$	$\frac{3}{4}$	$\frac{1}{2}$	.66		2.10
201-S	201-R	201-L	$\frac{3}{8} \times \frac{3}{8} \times 8$	$\frac{1}{2}$	$\frac{1}{2}$	.73		2.65
202-S	202-R	202-L	$\frac{1}{2} \times 1 \times 9$	$\frac{3}{4}$	$\frac{1}{2}$	.81		3.50
204-S	204-R	204-L	$1 \frac{1}{2} \times 1 \frac{1}{2} \times 11$	$\frac{3}{2}$	$1 \frac{1}{2}$	1.00		5.45

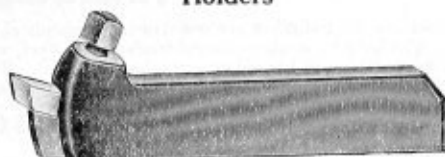
Agrippa Knurling Tool Holder



The knurls, fitted in a revolving head, provide for coarse, medium and fine work, and a minimum of time losses common in changing them. Like the pins or axes, they are made from hardened and tempered crucible tool steel. Furnished with three pairs of knurls as illustrated.

Number	Holder, Size	Standard Knurls Size	Price	
			Knurls Pair	Complete Holder
11-K	$\frac{1}{2} \times 1 \frac{1}{4} \times 6 \frac{1}{2}$	$\frac{3}{8} \times \frac{3}{4}$	\$0.75	\$6.00

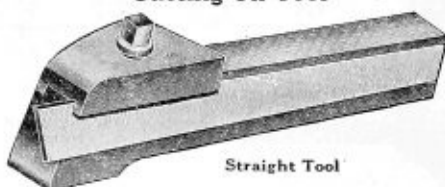
Champion Straight and Offset Tool Holders



Will not break taking heavy cuts on rapid work, because, with the support, under cutting edge of tool holder will not mash down under the continual strain of cutting. Cutters can be used up close to the shoulder, thus effecting a saving in expensive steels, while the shape of the head allows use of large cutters. Points of screws are hardened and extra large.

No. Straight	No. Right Hand	No. Left Hand	Size Holder, Straight	Size Holder, R. & L. Hand	Size of Cutters In. Sq.	Price Each
0	15	30	$\frac{3}{8} \times \frac{3}{4} \times 5$	$\frac{3}{8} \times \frac{3}{4} \times 7$	$\frac{1}{2}$	\$1.65
1	16	31	$\frac{1}{2} \times 1 \times 6$	$\frac{1}{2} \times 1 \times 8$	$\frac{3}{8}$	1.80
2	17	32	$\frac{3}{8} \times 1 \frac{1}{4} \times 7$	$\frac{3}{8} \times 1 \frac{1}{4} \times 9$	$\frac{3}{8}$	2.30
3	18	33	$\frac{3}{8} \times 1 \frac{1}{2} \times 8$	$\frac{3}{8} \times 1 \frac{1}{2} \times 10$	$\frac{3}{8}$	3.00
4	19	34	$\frac{3}{8} \times 1 \frac{3}{4} \times 9$	$\frac{3}{8} \times 1 \frac{3}{4} \times 11$	$\frac{1}{2}$	3.80
5	20	35	$1 \times 1 \frac{1}{2} \times 10$	$1 \times 1 \frac{1}{2} \times 12$	$\frac{3}{4}$	4.75
6	21	36	$1 \frac{1}{4} \times 2 \times 12$	$1 \frac{1}{4} \times 2 \times 14$	$\frac{3}{4}$	7.00

Champion Straight and Offset Cutting Off Tool



Straight Tool

Plenty of material in stock, where bearing down strain comes; clamp is V or wedge shape, arranged to shift backward or forward, allowing blades of different sizes to be used. Tool cuts right up to the shoulder.

No.	Size of Holder	Size of Blade	Price Complete
60	$\frac{3}{8} \times \frac{3}{4} \times 5$	$\frac{3}{8} \times \frac{3}{8} \times 5$	\$1.65
61	$\frac{1}{2} \times 1 \times 6$	$\frac{3}{8} \times \frac{3}{8} \times 6$	1.80
62	$\frac{3}{8} \times 1 \frac{1}{4} \times 7$	$\frac{3}{8} \times \frac{3}{8} \times 7$	2.30
63	$\frac{3}{8} \times 1 \frac{1}{2} \times 8$	$\frac{3}{8} \times 1 \times 8$	3.00
64	$\frac{3}{8} \times 1 \frac{3}{4} \times 9$	$\frac{3}{8} \times 1 \frac{1}{4} \times 9$	3.80
65	$1 \times 1 \frac{1}{2} \times 10$	$\frac{1}{2} \times 1 \frac{1}{4} \times 10$	4.75
66	$1 \frac{1}{4} \times 2 \times 11$	$\frac{3}{4} \times 1 \frac{1}{2} \times 11 \frac{1}{2}$	6.50

Right Hand Tool



Furnished right or left hand.
Right hand tool cutter faces head stock.
Left hand tool cutter faces tail stock.

No. R. H.	No. L. H.	Size of Holder	Size of Blade	Price Complete
70	70	$\frac{3}{8} \times \frac{3}{4} \times 5$	$\frac{3}{8} \times \frac{1}{2} \times 5$	\$1.65
71	71	$\frac{1}{2} \times 1 \times 6$	$\frac{3}{8} \times \frac{1}{2} \times 6$	1.80
72	72	$\frac{3}{8} \times 1 \frac{1}{4} \times 7$	$\frac{3}{8} \times \frac{1}{2} \times 7$	2.30
73	73	$\frac{3}{8} \times 1 \frac{1}{2} \times 8$	$\frac{3}{8} \times 1 \times 8$	3.00
74	74	$\frac{3}{8} \times 1 \frac{3}{4} \times 9$	$\frac{3}{8} \times 1 \frac{1}{4} \times 9$	4.80
75	75	$1 \times 1 \frac{1}{2} \times 10$	$\frac{1}{2} \times 1 \frac{1}{4} \times 10$	4.75
76	76	$1 \frac{1}{4} \times 2 \times 11$	$\frac{3}{4} \times 1 \frac{1}{2} \times 11$	6.50

Armstrong Tool Holders

Armstrong Tool Holders are convenient, economical, efficient and meet every requirement of the average machine shop. The holders are drop forged from special steel, screws are made from tool steel and the cutters can be furnished made from either self-hardening or high speed steel. These tools have every advantage over those made of one piece of steel, as the cutters can be replaced at a very small cost.

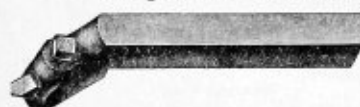
Straight and Offset Tool Holders



Each tool is carefully packed in a cardboard box, and price includes one drop forged wrench and one cutter ground to shape.

Number			Price With High Speed Cutters	Size of Holder, Inches	Size of Cutters, Sq. Ins.	Weight, Pounds
Left Hand	Straight	Right Hand				
00-L	00-S	00-R	\$ 1.80	$\frac{1}{2} \times \frac{1}{2} \times 4 \frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
0-L	0-S	0-R	1.90	$\frac{1}{2} \times \frac{1}{2} \times 5$	$\frac{1}{2}$	$\frac{1}{2}$
1-L	1-S	1-R	2.15	$\frac{1}{2} \times 1 \frac{1}{2} \times 6$	$\frac{1}{2}$	$1 \frac{1}{2}$
2-L	2-S	2-R	2.70	$\frac{1}{2} \times 1 \frac{1}{2} \times 7$	$\frac{1}{2}$	$2 \frac{1}{2}$
3-L	3-S	3-R	3.60	$\frac{1}{2} \times 1 \frac{1}{2} \times 8$	$\frac{1}{2}$	$3 \frac{1}{2}$
4-L	4-S	4-R	4.60	$\frac{1}{2} \times 1 \frac{1}{2} \times 9$	$\frac{1}{2}$	$4 \frac{1}{2}$
5-L	5-S	5-R	5.85	$1 \times 2 \times 11$	$\frac{1}{2}$	$7 \frac{1}{2}$
6-L	6-S	6-R	8.75	$1 \times 2 \times 13$	$\frac{1}{2}$	$11 \frac{1}{2}$
7-L	7-S	7-R	15.00	$1 \times 2 \times 16$	$\frac{1}{2}$	20
750-L	750-S	750-R	22.00	$1 \times 2 \times 18$	1	25
800-L	800-S	800-R	28.50	$1 \times 2 \times 20$	$1 \frac{1}{2}$	37

Drop Head Tool Holders

Right Hand
Offset.Straight
Shank.Left Hand
Offset.

Head and screw are extra heavy, and the cutter point, while retaining the correct cutting angle, is dropped to a position suitable for use on lathes with high slide rest or low centers, while its "Goose Neck" shape makes it exceptionally efficient when used on the planer.

Left Hand Off- Set No.	Str. Shank No.	Right Hand Off- Set No.	Price Each Complete With High Speed Cutters	Size of Holder, Inches	Size Cut- ter, In.	Hgt. Cut- ter, Pt.
100-L	100-S	100-R	\$ 1.90	$\frac{1}{2} \times \frac{1}{2} \times 6$	$\frac{1}{2}$	$\frac{1}{2}$
101-L	101-S	101-R	2.25	$\frac{1}{2} \times \frac{1}{2} \times 7 \frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
201-L	201-S	201-R	2.85	$\frac{1}{2} \times \frac{1}{2} \times 8 \frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
102-L	102-S	102-R	3.65	$\frac{1}{2} \times 1 \times 9 \frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
301-L	301-S	301-R	4.60	$1 \times 1 \frac{1}{2} \times 10 \frac{1}{2}$	$\frac{1}{2}$	$1 \frac{1}{2}$
103-L	103-S	103-R	5.80	$1 \frac{1}{2} \times 1 \frac{1}{2} \times 11 \frac{1}{2}$	$\frac{1}{2}$	$1 \frac{1}{2}$
104-L	104-S	104-R	8.60	$1 \frac{1}{2} \times 1 \frac{1}{2} \times 13 \frac{1}{2}$	$\frac{1}{2}$	$1 \frac{1}{2}$
105-L	105-S	105-R	13.80	$1 \frac{1}{2} \times 1 \frac{1}{2} \times 15 \frac{1}{2}$	$\frac{1}{2}$	$1 \frac{1}{2}$
106-L	106-S	106-R	20.50	$1 \frac{1}{2} \times 2 \times 17 \frac{1}{2}$	$\frac{1}{2}$	$1 \frac{1}{2}$
107-L	107-S	107-R	27.50	$2 \frac{1}{2} \times 2 \frac{1}{2} \times 19 \frac{1}{2}$	1	2

Extra Cutters

Size Inches Square	Price Each High Speed	Size Inches Square	Price Each High Speed
$\frac{1}{2}$	\$0.25	$\frac{1}{2}$	\$2.50
$\frac{3}{4}$	.30	$\frac{3}{4}$	4.10
$\frac{1}{2}$	.45	$\frac{1}{2}$	6.00
$\frac{3}{4}$	.65	1	8.60
$\frac{1}{2}$	1.00	$1 \frac{1}{2}$	11.90
$\frac{1}{2}$	1.45		

Improved Lathe
Tool Post

It is stronger and stiffer than the ordinary tool post, will not slip or chatter and consequently it will do more accurate work.

As there is no side projection, it is peculiarly adapted for working close up to the chuck.

It has a great range of adjustment without loss of holding power, as the rocker jaws adjust themselves on parallel lines.

The open side design permits rapid and convenient change and adjustment of tools.



No.	Price Each	For Tools, Size, Inches	Swing of Lathe, Ins.	Weight Pounds
1-T	\$ 5.50	$\frac{1}{2} \times 1$ and less	12 to 14	8
2-T	7.00	$\frac{1}{2} \times 1 \frac{1}{2}$ and $\frac{3}{4} \times 1 \frac{1}{2}$	16 to 18	10
3-T	9.00	$\frac{3}{4} \times 1 \frac{1}{2}$ and $\frac{1}{2} \times 1 \frac{1}{2}$	20 to 22	12
4-T	12.00	$\frac{1}{2} \times 1 \frac{1}{2}$ and $1 \times 1 \frac{1}{2}$	24 to 32	15

Armstrong Tools

Cutting Off Tools



Straight Shank



Left Hand Off-Set



Right Hand Off-Set

The nature of the work renders occasional breaking of cutting-off tools unavoidable and in the case of forged tools it involves reforging and grinding, the lathe meanwhile standing idle; with the Armstrong Cutting-Off Tool the delay is but momentary, as the blade can be extended and then sharpened in a few minutes. The blades are beveled on both sides and are held on an angle with proper clearance and rake to insure a clean cutting tool.

Left and Off-Set No.	Str. Shank No.	Right Hand Off-Set No.	Price Each Complete With High Speed Blade	Size of Holder, Inches	Size of Blade, Ins.	Approx. Wt., Lbs.
19-L	19	29-R	\$1.90	$\frac{1}{2} \times 1 \frac{1}{2}$	$\frac{1}{2} \times 1 \frac{1}{2}$	$\frac{1}{2}$
20-L	20	30-R	1.90	$\frac{3}{8} \times 1 \frac{1}{2}$	$\frac{3}{8} \times 1 \frac{1}{2}$	$\frac{3}{4}$
21-L	21	31-R	2.15	$\frac{1}{2} \times 1 \frac{1}{2}$	$\frac{1}{2} \times 1 \frac{1}{2}$	1 $\frac{1}{4}$
22-L	22	32-R	2.75	$\frac{3}{8} \times 1 \frac{1}{2}$	$\frac{3}{8} \times 1 \frac{1}{2}$	2 $\frac{1}{2}$
23-L	23	33-R	3.60	$\frac{1}{2} \times 1 \frac{1}{2}$	$\frac{1}{2} \times 1 \frac{1}{2}$	3 $\frac{1}{2}$
24-L	24	34-R	4.50	$\frac{3}{8} \times 1 \frac{1}{2}$	$\frac{3}{8} \times 1 \frac{1}{2}$	4 $\frac{1}{2}$
25-L	25	35-R	5.75	1 $\times 2$	$\frac{1}{2} \times 1 \frac{1}{2}$	6 $\frac{1}{2}$
26-L	26	36-R	7.75	1 $\frac{1}{2} \times 2 \frac{1}{2}$	$\frac{1}{2} \times 1 \frac{1}{2}$	8

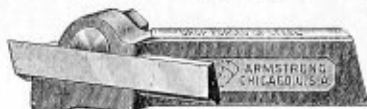
Extra Blades

Order blades for straight, left or right hand tool as wanted.

Size, Inches	Price Each High Speed	Size, Inches	Price Each High Speed
$\frac{1}{2} \times 1 \frac{1}{2}$	\$0.60	$\frac{1}{2} \times 1$	\$2.15
$\frac{3}{8} \times \frac{5}{8}$	.60	$\frac{7}{8} \times 1 \frac{1}{2}$	2.75
$\frac{1}{2} \times \frac{3}{4}$	.85	$\frac{1}{2} \times 1 \frac{1}{4}$	4.00
$\frac{3}{8} \times \frac{3}{8}$	1.30	$\frac{1}{2} \times 1 \frac{3}{8}$	4.65

Side Tools

Off Set Shank.



Right Hand Side Tool

Left Hand Side Tool



The design of the Armstrong Side Tools is typical of the entire Armstrong system of Tool Holders, embodying the prime needs of a practical lathe tool, viz., convenience, simplicity and strength.

No. Left Hand	No. Right Hand	Price Each Complete With High Speed Cutter	Size of Shank, Inches	Approx. Weight, Pounds
69-L	69-R	\$ 2.40	$\frac{1}{2} \times \frac{3}{4}$	$\frac{1}{2}$
70-L	70-R	2.65	$\frac{3}{8} \times \frac{3}{4}$	$\frac{3}{4}$
71-L	71-R	3.00	$\frac{1}{2} \times 1 \frac{1}{4}$	1 $\frac{1}{2}$
72-L	72-R	3.75	$\frac{3}{8} \times 1 \frac{1}{4}$	2 $\frac{1}{4}$
73-L	73-R	5.00	$\frac{1}{2} \times 1 \frac{1}{4}$	3 $\frac{1}{2}$
74-L	74-R	6.25	$\frac{3}{8} \times 1 \frac{1}{4}$	6
75-L	75-R	8.25	1 $\times 2$	8 $\frac{1}{2}$
76-L	76-R	11.50	1 $\frac{1}{2} \times 2 \frac{1}{2}$	13

Extra Cutters

To Fit Tool Number	Price Each High Speed	To Fit Tool Number	Price Each High Speed
69	\$0.55	73	\$2.40
70	.60	74	3.60
71	.95	75	5.00
72	1.60	76	7.75

Straight Shank Side Tools



Left Hand Tool



Right Hand Tool

Straight Shank Side Tools are well adapted to use on the Taper and Shaper for many classes of work on which they are found exceptionally convenient and efficient.

Prices

Complete with Wrench and One Cutter.

No. Left Hand	No. Right Hand	Price Each Complete With High Speed Cutter	Size of Holder, Inches	Approx. Wt., Lbs.
79-L	79-R	\$ 2.40	$\frac{1}{2} \times \frac{3}{4} \times 4 \frac{1}{2}$	$\frac{1}{2}$
80-L	80-R	2.65	$\frac{3}{8} \times \frac{3}{4} \times 5$	$\frac{3}{4}$
81-L	81-R	3.00	$\frac{1}{2} \times 1 \frac{1}{4} \times 6$	1 $\frac{1}{4}$
82-L	82-R	3.75	$\frac{3}{8} \times 1 \frac{1}{4} \times 7$	2
83-L	83-R	5.00	$\frac{1}{2} \times 1 \frac{1}{4} \times 8$	3 $\frac{1}{4}$
84-L	84-R	6.25	1 $\times 1 \frac{1}{4} \times 9$	5
85-L	85-R	8.25	1 $\frac{1}{2} \times 2 \times 11$	7 $\frac{1}{2}$
86-L	86-R	11.00	1 $\frac{1}{2} \times 2 \frac{1}{2} \times 13$	11
87-L	87-R	15.75	1 $\frac{1}{2} \times 2 \frac{1}{2} \times 15$	16

Extra Cutters

To fit tool number.....	79	80	81	82	83	84	85	86	87
Price each.....	\$0.55	\$0.60	\$0.95	\$1.60	\$2.40	\$3.60	\$5.00	\$7.75	\$12.00

Armstrong Tools

Threading Tools



Simplicity, strength, and permanence of adjustments are prominent features of this tool. Cutters require grinding on top edge only, to sharpen, and always remain true to form and of correct angle, insuring perfect fitting threads. Cutters are backed off to afford proper clearance. Each tool is provided with one single point cutter V. United States or Whitworth Standard and a drop forged wrench.

No.	Price Each Complete		Size of Holder Inches	Approx. Weight Pounds
	With High Speed Cutter	With Carbon Steel Cutter		
00T	\$2.75	\$2.25	$\frac{1}{2} \times \frac{3}{4} \times 5$	$\frac{3}{8}$
50	2.75	2.25	$\frac{3}{4} \times \frac{3}{4} \times 5$	$\frac{3}{4}$
51	3.35	2.75	$\frac{1}{2} \times 1 \frac{1}{4} \times 6$	$1 \frac{1}{2}$
52	4.25	3.50	$\frac{3}{4} \times 1 \frac{1}{4} \times 7$	$2 \frac{1}{4}$
53	5.50	4.50	$\frac{1}{2} \times 1 \frac{1}{2} \times 8$	$3 \frac{1}{2}$
54	6.50	5.50	$\frac{3}{4} \times 1 \frac{1}{2} \times 9$	$4 \frac{1}{4}$
55	8.25	7.00	$1 \times 2 \times 10$	6

Cutters for Threading Tools



Grind Cutter on a line from point to center, being careful to adjust it so that cutting edge is in a horizontal line, A to A.

List of Cutters Furnished

No.	Single Point Cutters
00T and 50	All standard pitches, 6 to 20, inclusive **.
51	All standard pitches, 5 to 20, inclusive **.
52	All standard pitches, 4 to 20, inclusive **.
53, 54 and 55	All standard pitches, 3 to 20, inclusive **.

No.	Chaser Cutters
00T and 50	14, 16, 18, 20, 24*.
51	11 $\frac{1}{2}$ *, 12, 13 $\frac{1}{2}$, 14, 16, 18, 20, 24*.
52	8, 9, 10, 11, 11 $\frac{1}{2}$ *, 12, 13 $\frac{1}{2}$, 14, 16, 18, 20.
53 and 54	8, 9, 10, 11, 11 $\frac{1}{2}$ *, 12, 13 $\frac{1}{2}$, 14, 16, 18, 20.

*V Thread only. †Not made in Whitworth.

Prices

Single point cutters are the type mostly used. Chasers have a double tooth and are used principally for shaping top of thread.

Tool Number	Kind	U. S. Std., V. Std. and Whitworth Std. Form	
		High Speed	Carbon Steel
00T & 50	Sgl. Point	\$1.50	\$0.75
51	Sgl. Point	1.80	.90
52	Sgl. Point	2.30	1.15
53 & 54	Sgl. Point	2.80	1.40
55	Sgl. Point	3.95	1.95

Note.—When ordering cutters (except single point V cutters) it is necessary to specify exact pitch or number of threads per inch.

Planer Tool

Costs less than a High Speed Forged Tool.

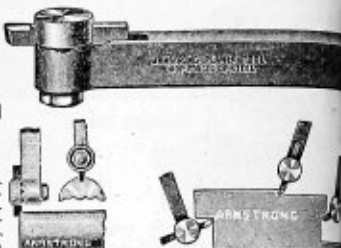


Fig. A shows Planer Tool cutting keyway with cutter reversed and tool turned around, thus throwing cutting point behind center of tool and working as a "goose neck" tool.

Fig. B shows Planer Tool at work in close corners, giving a good general idea of clearance obtained. It shows also a few angles at which cut can be set.

Price includes wrench and two cutters.

No.	Price Each Complete With High Speed Cutters	Size of Holder Inches	Size of Cutter, Inches	Wgt. Lbs.
40	\$ 3.10	$\frac{1}{2} \times 1 \times 7$	$\frac{1}{4} \times \frac{3}{4}$	1 $\frac{1}{2}$
401	4.00	$\frac{3}{4} \times 1 \frac{1}{4} \times 8 \frac{1}{2}$	$\frac{1}{4} \times \frac{3}{4}$	2 $\frac{1}{2}$
41	5.25	$\frac{1}{2} \times 1 \frac{1}{2} \times 10$	$\frac{3}{4} \times \frac{3}{4}$	3 $\frac{1}{2}$
42	8.25	$1 \frac{1}{2} \times 1 \frac{1}{2} \times 13$	$\frac{1}{2} \times \frac{3}{4}$	12
43	12.75	$1 \frac{1}{2} \times 2 \times 16$	$\frac{3}{4} \times \frac{3}{4}$	20
44	19.50	$1 \frac{1}{2} \times 2 \frac{1}{2} \times 19$	$\frac{1}{2} \times 1$	33
45	30.00	$2 \frac{1}{2} \times 2 \frac{1}{2} \times 22$	$\frac{3}{4} \times 1 \frac{1}{4}$	52

Extra Cutters

For tool No. 40 401 41 42 43 44 45
High speed, each. \$0.45 \$0.65 \$0.95 \$2.15 \$3.60 \$5.30 \$8.25

Gang Planer Tool

For surfacing large castings the tool will effect a saving of 50 to per cent in time required to do the same job with a single point tool. The head is graduated, thus enabling tool to be quickly and accurately to any desired feed. This makes possible to always have the tool cutting at the greatest speed practicable on metals of varying degrees of hardness. It will carry with a feed and depth of cut much greater than is possible when using an ordinary tool, and there is much less tendency to "break out" at end of cut.



No.	Price Each Complete With High Speed Cutters	Size Shank, Inches	Lgth. Over All, Ins.	Size Cutter, Inches	Feed Adjustment, Inches
61	\$13.00	$1 \frac{1}{4} \times 1 \frac{1}{4} \times 7 \frac{1}{2}$	10	$\frac{1}{4} \times \frac{1}{2}$	0 to 1
62	22.00	$1 \frac{1}{2} \times 2 \frac{1}{4} \times 9$	12	$\frac{1}{2} \times \frac{1}{2}$	0 to 1
63	38.50	$2 \times 2 \frac{1}{2} \times 11$	14	$\frac{3}{4} \times \frac{1}{2}$	0 to 1

Weights, No. 61—10 lbs. No. 62—20 lbs. No. 63 34 lbs.

Extra Cutters

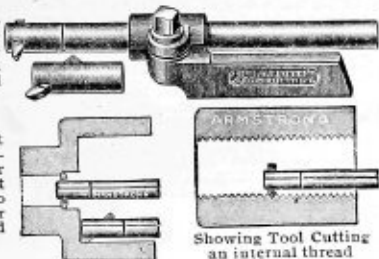
Size Cutter, inches. $\frac{1}{4} \times \frac{1}{2}$ $\frac{1}{2} \times \frac{1}{2}$ $\frac{3}{4} \times \frac{1}{2}$
High Speed, each. \$0.85 \$1.70 \$2.50

Armstrong Tools

Boring Tools

Require no forging or tempering and very little grinding. They are always ready for use, are very stiff and will bore close up to a shoulder or bottom.

One Armstrong Boring Tool will take the place of a dozen forged boring tools.



This cut shows Double-headed Cutter boring out a hole; also single cutter boring and grinding end.

Showing Tool Cutting an internal thread

No.	Price Each Complete With High Speed Cutters	Size Shank, Inches	Diam. Bar, Inch	Size Cutter Inch Sq.	Approx. Weight, Pounds
008	\$ 3.25	$\frac{1}{8} \times \frac{3}{4}$	$\frac{1}{2}$	$\frac{1}{8}$	1 $\frac{1}{2}$
8	3.25	$\frac{1}{4} \times \frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{8}$	1 $\frac{3}{4}$
9	3.85	$\frac{1}{2} \times \frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{8}$	2 $\frac{3}{4}$
10	5.10	$\frac{3}{4} \times \frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{8}$	7
11	7.25	$\frac{3}{4} \times \frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{8}$	11
12	10.75	$\frac{3}{4} \times \frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{8}$	17
13	15.00	1 $\times \frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{8}$	25

Extra Cutter—Stock Shapes only

Size Inches Square	Price Each High Speed	Size Inches, Square	Price Each, High Speed
$\frac{1}{8}$	\$0.25	$\frac{1}{8}$	\$0.90
$\frac{1}{4}$	.30	$\frac{1}{4}$	1.20
$\frac{3}{8}$	.45	$\frac{3}{8}$	2.00
$\frac{1}{2}$	.65	$\frac{1}{2}$	3.60

Boring Tools, Less Shank

In many cases it is very convenient and desirable to have a boring tool equipped with bars of different sizes. We are prepared to furnish extra bars, these extra bars, to be of practical use, must necessarily be equipped with wrench, caps, etc., making it a complete tool with exception of the shank. Price includes bar with straight and 45 deg. end caps, cutter, wrench and bushing. No bushing with Nos. 8, 014, 015.

No.	Price Each Complete With High Speed Cutters	Dimensions of Bar Diam. Ins. Lgth. Ins.	Size of Cutter Ins. Square	With Bushing to Fit Shank Number
08	\$2.00	$\frac{1}{4}$ 8	$\frac{1}{8}$	8, 9 or 10
09	2.00	$\frac{1}{4}$ 9	$\frac{1}{8}$	9, 10 or 11
10	2.50	$\frac{3}{8}$ 11	$\frac{1}{8}$	10, 11 or 12
11	3.60	$\frac{1}{2}$ 13	$\frac{1}{8}$	11, 12 or 13
12	5.00	$\frac{3}{4}$ 16	$\frac{1}{8}$	12 or 13
13	7.00	1 $\frac{1}{2}$ 18	$\frac{1}{8}$	13
14	8.75	1 $\frac{1}{2}$ 21	$\frac{1}{8}$	None
15	11.00	1 $\frac{1}{2}$ 24	$\frac{1}{8}$	None
16	14.75	2 $\frac{1}{4}$ 30	$\frac{1}{8}$	None

Note.—In ordering, be careful to give size of shank (number of tool) in which bar is to be used. When this information is not given no bushing will be included.

Boring Tools

For Use on Lathes with Clamp Tool Rest



Complete with holder and bar, straight and 45 deg. end caps, One cutter and double head wrench.

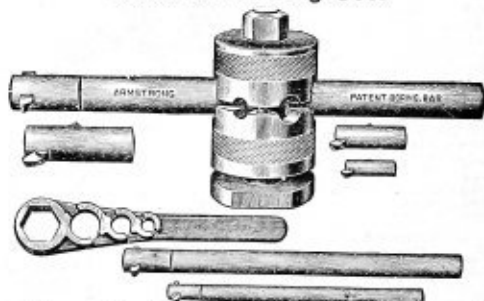
No.	Price Each Complete With High Speed Cutters	Size Shank, Inches	Dimensions of Bar Diam. Ins. Lgth. Ins.	Size of Cutter Inch Square	Wt. Each Complete Lbs.
108	\$ 2.75	$\frac{1}{4} \times \frac{1}{2}$	$\frac{1}{8}$ 9	$\frac{1}{8}$	1 $\frac{3}{4}$
109	3.25	1 $\times \frac{1}{2}$	$\frac{1}{8}$ 11	$\frac{1}{8}$	3
110	4.35	$\frac{1}{2} \times \frac{1}{2}$	$\frac{1}{8}$ 13	$\frac{1}{8}$	5 $\frac{1}{4}$
111	6.25	$\frac{3}{4} \times \frac{1}{2}$	$\frac{1}{8}$ 15	$\frac{1}{8}$	9 $\frac{1}{4}$
112	8.75	$\frac{1}{2} \times \frac{1}{2}$	$\frac{1}{8}$ 18	$\frac{1}{8}$	15
113	11.50	2 $\times \frac{1}{2}$	$\frac{1}{8}$ 21	$\frac{1}{8}$	21
114	15.00	2 $\frac{1}{2} \times \frac{1}{2}$	$\frac{1}{8}$ 24	$\frac{1}{8}$	34
115	20.25	2 $\frac{3}{4} \times \frac{1}{2}$	$\frac{1}{8}$ 30	$\frac{1}{8}$	62

A slight turn of one nut releases or fastens both bar and holder.

Bars can be changed as needed instantly, allowing operator to use stiffest bar possible for each job, with result that speeds and feeds are increased.

Only one wrench required.

Three Bar Boring Tool



Set consists of holder and three boring bars, with straight and 45 degree end caps and cutters, a piece of each size steel for extra cutters and one wrench.

No. of tool	1-B	2-B
Length of bars	\$ 11, 16	9, 13, 18
Diameter of bars	$\frac{1}{2}$, $\frac{3}{4}$, $1 \frac{1}{2}$	$\frac{1}{2}$, $1 \frac{1}{2}$, $1 \frac{3}{4}$
Size of cutters	$\frac{1}{8}$, $\frac{3}{8}$, $\frac{1}{2}$	$\frac{1}{8}$, $\frac{3}{8}$, $\frac{1}{2}$
For lathes	14 to 16	16 to 18
Set with high-speed cutters	\$13.00	\$17.25
Weight, pounds	19	28
No. of tool	3-B	4-B
Diameter of bars	$\frac{3}{4}$, $1 \frac{1}{2}$, $1 \frac{3}{4}$	$\frac{1}{2}$, $1 \frac{1}{2}$, $1 \frac{3}{4}$
Length of bars	11, 16, 21	13, 18, 24
Size of cutters	$\frac{1}{8}$, $\frac{3}{8}$, $\frac{1}{2}$	$\frac{1}{8}$, $\frac{3}{8}$, $\frac{1}{2}$
For lathes	20 to 22	21 to 23
Set with high-speed cutters	\$22.75	\$30.00

Weight, pounds 51 76

Extra cutters are listed in opposite column. When not otherwise specified, self-hardening cutters will be shipped.

Note.—Bolt head and bottom part of holder are made of ample size to allow for fitting, which is necessary on account of the great variation in height of centers above slide rest and difference in sizes of T slots.

Fitting.—An extra charge of \$3.00 net will be made for tools ordered fitted to special dimensions.

Armstrong Tools

Slotter Tool with Hollow Bar

For exceptionally heavy duty work. Will rotate for working into corners and difficult positions. Cutter makes clean curling chip without excessive top grinding. Has spring relief block which relieves cutter point on return stroke.



No.	Price Each Complete With High Speed Cutters	For Slotting Machine Inches Stroke	Diam. of Bar Ins.	Lgth. Over All Ins.	Size of Cutter Ins.	Apprx. Wgt. Lbs.
91	\$20.75	6 and 8	1 1/2	16	5/8 x 5/8	21
92	31.00	10 and 12	2	22	1/2 x 1/2	55
93	46.50	14 and 16	2 1/4	27	5/8 x 3/4	78
94	67.00	18 and 20	2 1/2	32	3/4 x 3/4	108
95	98.50	22 and 24	2 3/4	37	1 x 1	152

Extra Cutters

Size, inches	1/2 x 1/2	1/2 x 3/4	3/4 x 1/2	3/4 x 3/4	1 x 1
Price each, high speed	\$1.35	\$1.80	\$2.35	\$3.60	\$5.30

Adjustable Boring Tool

This tool combines convenience, adjustability and rigidity and is well adapted to a wide range of work. Holder is easily adjustable to different heights and will hold bars of various diameters. Bars are high carbon steel seamless tubing of heavy gauge and extremely stiff. Cutter can be adjusted and solidly fixed at various angles for boring, facing or turning.

Price includes Holder, One Bar, One Cutter and Wrench.

No.	Price Each Complete With High Speed Cutters	Capacity of Holder Diameter Bars Inches	Size Bar Furnished Inches	Size Cutter In. Sq.	For Lathes Swinging Inches
212	\$16.50	1/4 to 1 1/2	1 1/2 x 21	3/4	14 to 18
213	21.75	3/8 to 1 3/4	1 1/2 x 24	1	16 to 20
214	29.00	1/2 to 1 3/4	1 1/2 x 28	1 1/2	18 to 24
215	41.25	3/4 to 2 1/4	2 1/4 x 36	2	20 to 36

Note—Bolt Head is made large enough to allow for fitting T slots of various sizes. Fitting—An extra charge of \$0.75 net will be made for fitting Bolt Head to special dimensions.

No. of Tool	212	213	214	215
Weight, pounds	28	44	75	120

Extra Bars

Including One Bar of Size Specified, One Cutter and Wrench.

Size of Bar		Size Cutter, Inches Square	Price Each With High Speed Cutters	Price Each Extra Cutters
Diameter, Inches	Length, Inches			
3/4	14	3/8	\$3.25	\$ 0.25
1/2	16	1/2	4.00	.30
1 1/4	18	3/4	5.10	.45
1 1/2	21	3/4	6.50	.65
1 3/4	24	1	8.75	.90
1 3/4	28	1 1/2	12.00	1.20
2 1/4	36	2	16.25	2.00

Boring Tool Holder

For Small, Light Boring, Threading, Etc.

This tool will be found very handy in tool rooms or in boring work of small internal diameter, threading, brass turning, etc. Boring bars are best tool.



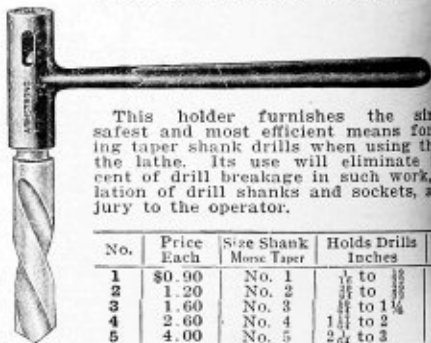
Price includes Holder, Wrench, Two Boring Bars and one Cutter.

No.	Price Each Complete	Extra Square Cutters Each	Size of Shank, Inches	Size of Bars Furnished Diam., Inches	Size of Cutter, Inches
15	\$2.75	\$0.30	3/8 x 3/8	1/8 and 1/4	1/8
16	3.50	.45	1/2 x 1	1/4 and 3/8	1/4
17	4.50	.65	5/8 x 1 1/4	3/8 and 1/2	3/8
18	5.75	1.00	3/4 x 1 1/2	1/2 and 3/4	1/2

Extra Boring Bars

Diam., ins.	1/8	1/4	3/8	1/2	3/4	1
Length, ins.	4	4 1/2	5	6	7	8
Price each	\$0.20	\$0.25	\$0.30	\$0.40	\$0.55	\$0.75

Drill and Reamer Holder



This holder furnishes the simplest and most efficient means for holding taper shank drills when using them in the lathe. Its use will eliminate 90 per cent of drill breakage in such work, and injury to the operator.

No.	Price Each	Size Shank Morse Taper	Holds Drills Inches	Weight Pounds
1	\$0.90	No. 1	1/8 to 3/8	1 1/2
2	1.20	No. 2	3/8 to 1/2	2
3	1.60	No. 3	1/2 to 1 1/4	3
4	2.60	No. 4	1 1/4 to 2	4
5	4.00	No. 5	2 to 3	14

"U" Clamp Drill Holder



For holding Straight Shank Drills, Reamers or similar tools, with safety for the operator and without danger of injury to the tool held.

No.	Price Each	Capacity Inches	Length Inches	Weight Pounds
200	\$1.20	1/4 to 1	11	2 1/2
300	1.60	1/2 to 1 1/2	13	4 1/2
400	2.60	1 to 2	15 1/2	8 1/2
500	4.00	1 1/2 to 3	18	18



Straight Shank Turning Tool



Left Hand Off-Set Side Tool



Straight Shank Cut-Off Tool



Left Hand Off-Set Cut-Off Tool



Left Hand Turning Tool

Armstrong Lathe Tool Sets

Each set includes ten tools shown herewith and is so complete as to cover the entire range of lathe work and to render entirely unnecessary the forging of tools with the attendant waste of time and material.

Price List

No.	Price of Set		Size of Tool Shanks, Inches	For Lathes (See Note)
	With High Speed Cutters	With Self-Hardening Cutters*		
00	\$15.77	\$13.68	$\frac{1}{2} \times \frac{3}{4}$	7 to 10-in. Swing
0	16.38	14.04	$\frac{3}{8} \times \frac{1}{2}$	10 to 12-in. Swing
1	18.72	15.84	$\frac{1}{2} \times \frac{1}{2}$	14 to 16-in. Swing
2	23.94	20.16	$\frac{3}{4} \times \frac{1}{2}$	16 to 18-in. Swing
3	31.86	26.64	$\frac{1}{2} \times 1$	18 to 20-in. Swing
4	41.04	34.56	$\frac{3}{4} \times \frac{1}{2}$	24 to 30-in. Swing
5	53.64	44.82	1 x 2	36 to 48-in. Swing

Note.—As there is a wide variation in the proportions of lathes of different manufacture, it is only possible to give approximate size or swing of lathes adapted to the use of tools of different sizes. Tool posts should be carefully measured before ordering tools.

*Except threading tool cutter of carbon steel.



Boring Tool



Right Hand Off-Set Side Tool



Threading Tool



Right Hand Off-Set Cut-Off Tool



Right Hand Turning Tool

Lathe Tool Cabinet

Especially Adapted for Armstrong Lathe Tool Sets

These handsome cabinets not only add to the systematic and orderly appearance of the shop, but they will save much time that is ordinarily wasted hunting for mislaid tools, as they keep together each man's tools, chuck, waste and other equipment within easy reach at all times. They also conform to the modern shop practice of replacing wood with non-combustible materials wherever possible, and furnish separate, automatic closing receptacles for clean and oily waste, as required by the insurance rules.



No.	Price Each	Dimensions, Inches	Suitable for Lathe Tool Sets
0-1	\$17.28	18x16x34	Nos. 0 and 1
2-3	19.44	21x19x34	Nos. 2 and 3
4-5	21.60	24x22x34	Nos. 4 and 5

Planer Jacks

For leveling work on planers, milling machines, etc. Perfectly adjustable and solid, insuring true surfaced work. Bottom and tilting cap are faced true and smooth. Jack screw can be locked in position, and when locked cannot be jarred down.



No.	Price Each	Height, Inches	Weight, Pounds
1	\$0.74	2 $\frac{1}{2}$ -3 $\frac{1}{4}$	1 $\frac{1}{2}$
2	1.48	3 $\frac{1}{2}$ -5 $\frac{1}{4}$	3
3	1.98	5 $\frac{1}{2}$ -7 $\frac{1}{2}$	6
4	2.22	7 $\frac{1}{2}$ -12	12

Armstrong Cutter Steel

High Speed and Self-Hardening

Prices on application.

For high speeds and heavy feeds. For use in tool holders. In three-foot bars only.

Squares



For use in Armstrong turning and boring tools.

For Turning Tools

Size, Inches	Length, Inches
$\frac{1}{8}$	1 $\frac{3}{4}$
$\frac{1}{4}$	2 $\frac{1}{8}$
$\frac{3}{8}$	2 $\frac{3}{8}$
$\frac{1}{2}$	3 $\frac{1}{4}$
$\frac{5}{8}$	3 $\frac{3}{4}$
1	4 $\frac{1}{4}$
1 $\frac{1}{8}$	5
1 $\frac{1}{4}$	5 $\frac{3}{4}$
1 $\frac{3}{8}$	6 $\frac{1}{2}$
1 $\frac{1}{2}$	7 $\frac{1}{4}$
1 $\frac{3}{4}$	8

For Boring Tools

Size, Inches	Length, Inches
$\frac{1}{8}$	1
$\frac{1}{4}$	1 $\frac{1}{4}$
$\frac{3}{8}$	1 $\frac{3}{4}$
$\frac{1}{2}$	1 $\frac{3}{4}$
$\frac{5}{8}$	2 $\frac{1}{4}$
1	2 $\frac{3}{4}$
1 $\frac{1}{8}$	2 $\frac{3}{4}$
1 $\frac{1}{4}$	2 $\frac{3}{4}$
1 $\frac{3}{8}$	2 $\frac{3}{4}$
1 $\frac{1}{2}$	2 $\frac{3}{4}$
1 $\frac{3}{4}$	2 $\frac{3}{4}$
2	2 $\frac{3}{4}$
2 $\frac{1}{4}$	2 $\frac{3}{4}$
2 $\frac{3}{4}$	2 $\frac{3}{4}$
3	2 $\frac{3}{4}$
3 $\frac{1}{4}$	2 $\frac{3}{4}$
3 $\frac{3}{4}$	2 $\frac{3}{4}$
4	2 $\frac{3}{4}$
4 $\frac{1}{4}$	2 $\frac{3}{4}$
4 $\frac{3}{4}$	2 $\frac{3}{4}$
5	2 $\frac{3}{4}$

Flats



For use in Armstrong planer and slotter tools.

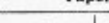
For Planer Tools

Size, Inches	Length, Inches
$\frac{1}{8} \times \frac{3}{8}$	2 $\frac{1}{2}$
$\frac{3}{8} \times \frac{1}{2}$	3
$\frac{1}{2} \times \frac{3}{4}$	3 $\frac{1}{2}$
$\frac{3}{4} \times 1$	4 $\frac{1}{4}$
$\frac{1}{2} \times 1$	4 $\frac{1}{4}$
$\frac{3}{4} \times 1$	5
$\frac{1}{2} \times 1$	5 $\frac{1}{4}$
$\frac{3}{4} \times 1$	5 $\frac{1}{4}$
$\frac{1}{2} \times 1$	6
$\frac{3}{4} \times 1$	7

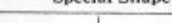
For Slotter and Cane Planer Tools

Size, Inches	Length, Inches
$\frac{1}{8} \times \frac{3}{8}$	3 $\frac{1}{2}$
$\frac{3}{8} \times \frac{1}{2}$	3 $\frac{3}{4}$
$\frac{1}{2} \times \frac{3}{4}$	4 $\frac{1}{4}$
$\frac{3}{4} \times 1$	5
$\frac{1}{2} \times 1$	5 $\frac{1}{4}$
$\frac{3}{4} \times 1$	5 $\frac{1}{4}$
$\frac{1}{2} \times 1$	6
$\frac{3}{4} \times 1$	7

Taper



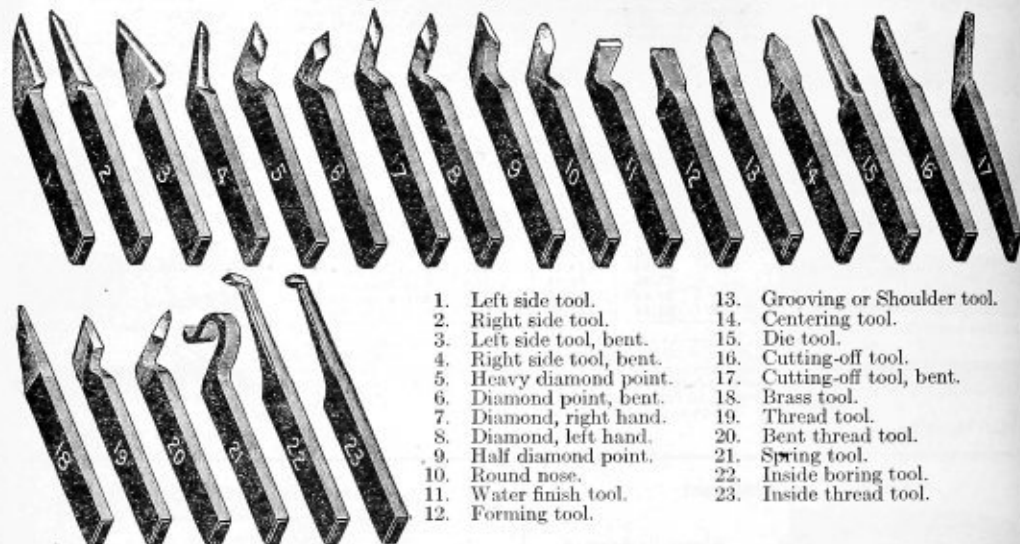
Special Shape



Size of Steel Inches	Size of Steel Inches	Size of Steel on Lines AA and BB, Ins.	Size of Steel on Lines AA and BB, Ins.
$\frac{1}{8} \times \frac{1}{2}$	$\frac{1}{8} \times 1$	$\frac{1}{8} \times \frac{1}{2}$	$\frac{1}{8} \times 1$
$\frac{1}{4} \times \frac{1}{2}$	$\frac{1}{4} \times 1$	$\frac{1}{4} \times \frac{1}{2}$	$\frac{1}{4} \times 1$
$\frac{3}{8} \times \frac{1}{2}$	$\frac{3}{8} \times 1$	$\frac{3}{8} \times \frac{1}{2}$	$\frac{3}{8} \times 1$
$\frac{1}{2} \times \frac{1}{2}$	$\frac{1}{2} \times 1$	$\frac{1}{2} \times \frac{1}{2}$	$\frac{1}{2} \times 1$
$\frac{3}{4} \times \frac{1}{2}$	$\frac{3}{4} \times 1$	$\frac{3}{4} \times \frac{1}{2}$	$\frac{3}{4} \times 1$
$\frac{1}{2} \times 1$	$\frac{1}{2} \times 1$	$\frac{1}{2} \times 1$	$\frac{1}{2} \times 1$

Lathe Tools

Hand Forged from High Grade Carbon Tool Steel



Size of shank, inches.....	$\frac{1}{4} \times \frac{3}{8}$	$\frac{1}{4} \times \frac{1}{2}$	$\frac{5}{8} \times \frac{5}{8}$	$\frac{3}{8} \times \frac{3}{4}$	$\frac{1}{2} \times 1$	$\frac{5}{8} \times 1\frac{1}{4}$	$\frac{3}{4} \times 1\frac{1}{2}$	1×2
Length, inches.....	$4\frac{1}{4}$	$4\frac{1}{4}$	$4\frac{3}{4}$	5	7	9	12	14
Price each, carbon steel.....	\$0.50	\$0.50	\$0.50	\$0.60	\$0.85	\$1.50	\$3.00	\$5.00

When ordering lathe tools, always specify size of shank wanted. Prices on high speed tools on application.

Planer and Shaper Tools—Hand Forged Carbon Steel



Size, Inches	Length, Inches	Price Each
$\frac{1}{2} \times 1$	7	\$0.85
$\frac{5}{8} \times 1\frac{1}{4}$	9	1.50
$\frac{3}{4} \times 1\frac{1}{2}$	12	3.00
1×2	14	5.00

24, left side tool; 25, right side tool; 26, right hand diamond point; 27, left hand diamond point; 28, right half diamond point; 29, left half diamond point; 30, grooving tool; 31, finishing tool for cast iron; 32, finishing tool for steel; 33, spring tool; 34, cut-off tool; 35, cutting-down tool; 36, right siding tool; 37, left siding tool; 38, round nose tool; 39, right hand bevel tool; 40, left hand bevel tool.

High Speed Tools for Tool Holders

Square Tools

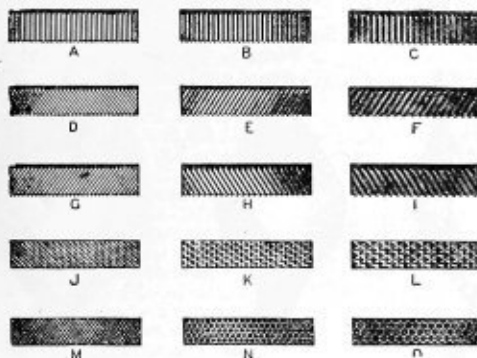


Size, Inches	Length, Inches	Price Each
$\frac{1}{8}$	$1\frac{3}{4}$	\$0.25
$\frac{1}{4}$	$2\frac{1}{8}$	.30
$\frac{3}{8}$	$2\frac{3}{8}$	.45
$\frac{1}{2}$	$3\frac{1}{8}$	.65
$\frac{5}{8}$	$3\frac{3}{8}$	1.00
$\frac{3}{4}$	$4\frac{1}{8}$	1.45
$\frac{7}{8}$	$4\frac{3}{8}$	2.50
1	$5\frac{1}{8}$	4.10
$1\frac{1}{8}$	$6\frac{3}{8}$	6.00
$1\frac{1}{2}$	$7\frac{1}{2}$	8.60

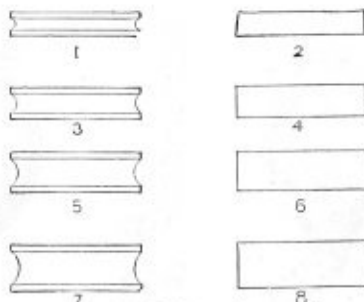
These high speed tool bits contain from 16 to 18 per cent tungsten and are ready for use, requiring grinding only.

Furnished with plain ends, easily ground to the shapes shown or to special shapes if required.

Knurls or Milling Wheels



Letters Indicate Pattern or Design



Numbers Indicate Shape and Width of Face

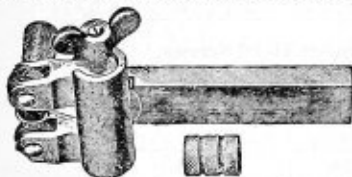
The designs shown are the ones most commonly used. If a special pattern is desired, send sample or impression. In ordering, state pattern and shape wanted.
 Price each \$0.50 Per pair \$1.00
 These knurls will not fit either the Armstrong or Billings knurling tool.

Adjustable Knurl Handle



For holding the knurls or milling cutters listed above, or other knurls up to 1/4-inch thick. Parallel sides. Length, 9 inches.
 Price each \$1.00

Billings Improved Knurling Tool For Use in Engine Lathe for Knurling Metal



The movable arms holding the knurls, in connection with the rocking joint, have a positive opening and closing movement in parallel lines, actuated by a right and left hand screw moving the knurls to and from each other. Weight of tool about 1 1/2 pounds. Shank 1/2-1.

Price of holder, with one pair of knurls, each \$5.00

Knurls for Billings and Armstrong Knurling Tools

Furnished coarse, medium and fine. Same as styles D, E and F above. When two are used together they will produce the checked type as J, K and L. 3/4-inch diameter, 1/4-inch wide, 1/4-inch hole. Extra knurls, price per pair \$1.00



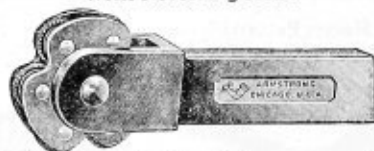
Armstrong Knurling Tool



A good knurling tool should be self centering with as little lost motion as possible, and the knuckle or joint must have ample bearing to resist the severe strains of both end and side thrust. In both of these essentials as well as in general design and high quality of material and workmanship the Armstrong knurling tool is unexcelled.

No.	Size, Inches	Price Each, Complete	Approximate Weight, Lbs.
1-K	1/2 x 1 1/8 x 6 1/2	\$4.50	1 1/2

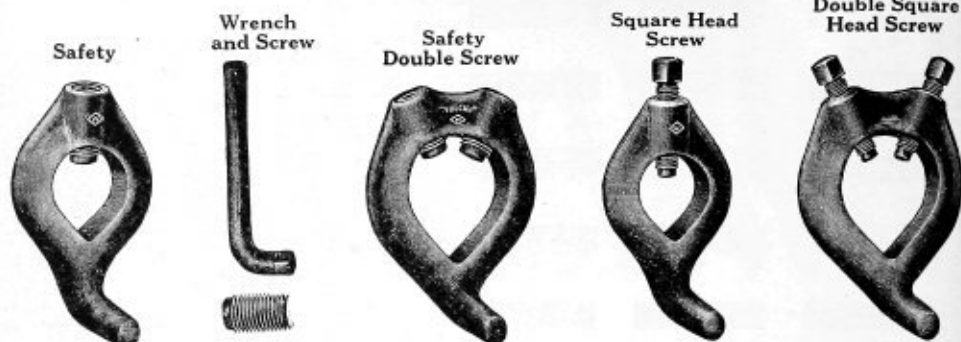
Armstrong Knurling Tool With Revolving Head



The advantages of this tool are apparent at a glance. The revolving head is fitted with three pairs of knurls, fine, medium and coarse, either of which can be used without the inconvenience and loss of time incident to changing knurls.

No.	Size, Inches	Price Complete	Weight, Pounds
3-K	1/2 x 1 1/8 x 6 1/2	\$6.00	1 1/2

Drop Forged Lathe Dogs



Drop forged from a special grade of open hearth steel, which is extremely tough and at the same time possess the stiffness so essential in a good lathe dog. Hubs are large enough to permit retapping. Safety and square head screws are not interchangeable. In ordering state which style is wanted. Price of Safety Dogs does not include wrench, but wrench is furnished with Safety Dogs unless otherwise ordered. Threads on all dogs are United States Standard. Square Head Screw Dogs are furnished unless otherwise ordered. Dogs with straight tail furnished at regular prices.

Standard—With Safety or Square Head Screw

Number	D-1	D-2	D-3	D-4	D-5	D-6	D-7	D-8	D-9	D-10	D-11	D-12	D-13
Capacity, inches	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	$1\frac{3}{4}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	5
Weight, pounds	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	$1\frac{1}{2}$	2	$2\frac{3}{4}$	$3\frac{1}{2}$	$5\frac{1}{4}$	$6\frac{3}{4}$	$8\frac{1}{2}$	12	17
Square Head or Safety Screw, price each	\$0.50	\$0.55	\$0.60	\$0.70	\$0.85	\$1.00	\$1.20	\$1.40	\$1.80	\$2.30	\$3.00	\$4.50	\$8.00
Wrenches, extra	.06	.07	.08	.08	.10	.12	.12	.15	.19	.24	.30	.37	.45

Dimensions of Screws

Number of Lathe Dog	1	2	3	4	5	6	7	8	9	10	11	12	13
Safety, diameter, inches	$\frac{7}{16}$	$\frac{9}{16}$	$\frac{3}{8}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{5}{8}$	$\frac{7}{8}$	1	$1\frac{1}{8}$	$1\frac{1}{4}$	$1\frac{3}{8}$	$1\frac{1}{2}$	$1\frac{5}{8}$
Safety, length, inches	$\frac{5}{8}$	$\frac{9}{16}$	$\frac{1}{2}$	$1\frac{1}{4}$	$1\frac{1}{2}$	$1\frac{5}{8}$	$1\frac{3}{4}$	$1\frac{7}{8}$	2	$2\frac{1}{8}$	$2\frac{1}{2}$	$2\frac{5}{8}$	$3\frac{1}{8}$
Square Head, diam., inches	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	$1\frac{1}{2}$	$1\frac{1}{2}$	$\frac{3}{4}$	$\frac{5}{8}$	$\frac{11}{16}$	$\frac{3}{4}$	$\frac{7}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1
Square Head, length, inches	$1\frac{1}{4}$	$1\frac{1}{4}$	$1\frac{5}{8}$	2	$2\frac{1}{4}$	$2\frac{3}{8}$	$2\frac{1}{2}$	$2\frac{3}{4}$	3	$3\frac{1}{4}$	$3\frac{1}{2}$	$3\frac{3}{4}$	$4\frac{1}{4}$

Extra Heavy with Double Safety or Square Head Screws

Capacity, Inches	With Square Head Screw		With Safety Screw		Weight, Pounds
	Number	Price	Number	Price	
4	12A	\$ 8.00	12AS	\$ 8.00	15
5	13A	12.00	13AS	12.00	21
6	14A	17.00	14AS	17.00	29

Heavy Pattern



Steel Lathe Dogs

Heavy Pattern

Made from the best refined steel castings and provided with U. S. Standard Steel Screws with hardened points, turned in lathes. The hubs on the heavy pattern are made large enough to permit retapping.

Heavy Pattern

Number.....	H-1	H-2	H-3	H-4	H-5	H-6	H-7	H-8	H-9	H-10	H-11
Capacity, inches.....	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1	$1\frac{1}{8}$	$1\frac{1}{4}$	$1\frac{3}{8}$	$1\frac{1}{2}$	$1\frac{3}{4}$
Price, each.....	\$0.40	\$0.50	\$0.60	\$0.60	\$0.70	\$0.70	\$0.80	\$0.80	\$0.95	\$0.95	\$1.10
<hr/>											
Number.....		H-12	H-13	H-14	H-15	H-16	H-17	H-18	H-19	H-20	H-21
Capacity, inches.....		2	$2\frac{1}{4}$	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5	$5\frac{1}{2}$	6
Price, each.....		\$1.20	\$1.35	\$1.45	\$1.60	\$1.80	\$2.10	\$2.75	\$3.25	\$4.00	\$5.00

Armstrong "U"

Clamp Lathe Dog

This dog is so constructed as to combine the convenient features of the clamp dog with the simplicity and strength of the ordinary lathe dog. It will accommodate itself readily to work of any shape and will hold it securely and squarely, being especially adapted for use on finished work which would be liable to be damaged by the set screw of a common lathe dog. The sliding jaw is operated by a loose fitting U bolt, and can be adjusted to size very quickly, a wrench being necessary to tighten only. One advantage of his dog is that it can be applied without removing work from centers. It possesses a wide range of adjustment.



No.	Price Each	Capacity, Inches	Weight Pounds
1	\$0.65	$\frac{3}{8}$ to $\frac{5}{8}$	$\frac{3}{4}$
2	.90	$\frac{1}{2}$ to 1	$\frac{1}{2}$
3	1.40	$\frac{3}{4}$ to $1\frac{1}{2}$	$\frac{3}{4}$
4	2.00	$\frac{1}{2}$ to 2	$\frac{1}{2}$
5	2.90	$\frac{3}{4}$ to 3	$\frac{1}{2}$
6	4.00	1 to 4	$1\frac{1}{2}$
7	5.00	$1\frac{1}{2}$ to 5	20

Adjustable Center Combination Lathe Dogs

For holding all kinds of crank shafts, such as used in automobile and marine engines, eccentrics, etc., as well as any straight work where a common lathe dog can be used.

The turning up of a crank shaft has always been done under difficulties, except in shops where they are made in large numbers, on specially designed machinery.



Pair

With the use of a pair of crank shaft lathe dogs, the operation is made quick and simple. The work is first entered by laying off and centering in the drill press in the lathe with the use of a steady rest. The driving dog is fastened on one end and the work placed between centers. The straight or tailless dog is fastened on the other end.

The dogs are light yet strong, with the weight just here it is needed. The adjustable centers take the place of a dozen pairs of old style heavy blocks.

Made in the two sizes priced below. Adjustable the dogs under 2 inches or over 8 inches made to order.

to 6 in. swing. Holds $1\frac{3}{4}$ in. stock. Price each. \$10.00
to 8 in. swing. Holds $2\frac{3}{8}$ in. stock. Price each. 20.00

Steel Dog Wrenches

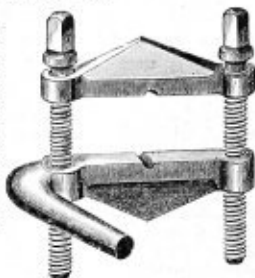


Fitting screw heads from $\frac{3}{8}$ to $\frac{3}{4}$ inch square. Will answer for both dogs and tool posts.

Price each. \$0.30

Armstrong Clamp Lathe Dog

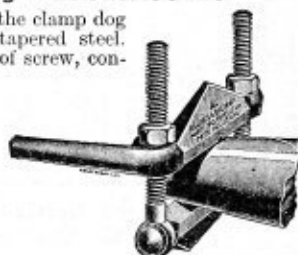
The under face of screw heads is convex, fitting into a concave seat, and as the holes in upper bar are larger than the screw, this allows for considerable tilting without bending the screws. The clamp bars are forged from a stiff open hearth steel, carefully machined and hardened.



No.	Price Each	Distance between Screws, Inches	Weight, Pounds	Extra Screws, Each
A11	\$1.50	$1\frac{1}{4}$	$\frac{3}{4}$	\$0.10
A12	2.00	$2\frac{1}{4}$	1	.15
A13	2.50	$3\frac{1}{4}$	$1\frac{1}{4}$	.20
A14	3.50	$5\frac{1}{2}$	$2\frac{1}{4}$	.30

Clamp Dog with Swivel Jaws

Illustration shows the clamp dog holding a piece of tapered steel. Top jaw rolls in eye of screw, conforming to taper of material held, holding it securely. The dog can also be used with straight material. The swivel jaw feature makes this tool indispensable for the machine shop.

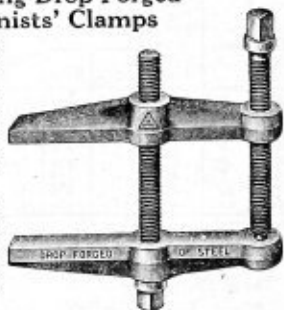


No.	Price Each	Distance between Screws, Inches	Weight, Pounds	Extra Screws, Each
B00	\$0.75	$\frac{3}{4}$	$\frac{3}{4}$	\$0.10
B0	1.25	$1\frac{1}{4}$	1	.10
B1	1.75	$1\frac{3}{4}$	$1\frac{1}{4}$	.12
B2	2.25	$2\frac{1}{4}$	$2\frac{1}{4}$	.18
B3	2.75	$2\frac{3}{4}$	3	.20

Armstrong Drop Forged Machinists' Clamps

Forged from stiff open hearth steel, carefully hardened and machined. Under face of center screw is convex, fitting into concave seat to allow for tilting.

Jaws are extra heavy, will not bend or spring on a short bite and are faced true. Screws are hardened.



No.	Price Each	Capacity, Inches	Weight, Pounds	Extra Screws, Each
1	\$1.50	$1\frac{1}{4}$	$\frac{3}{4}$	\$0.10
2	2.00	$2\frac{1}{4}$	1	.12
3	2.50	$3\frac{1}{4}$	$1\frac{1}{4}$	.15
4	3.00	$4\frac{1}{4}$	$2\frac{1}{4}$	.20

H. Channon Company Chicago

Williams Drop Forged "C" Clamps

Improved Drop Forged "C" Clamp

These are drop-forged from a strong, tough grade of carefully selected steel and their form is such as to utilize the metal to the greatest advantage.

They are submitted to a special refining process or "heat treatment" after forging which increases their stiffness and strength and reduces the liability of springing.

The screws, threaded U. S. standard, are made of a special grade of steel, well adapted to the purpose and are hardened and tempered; given lengths are under-head dimensions.

In respective order as per table the minimum capacities of clamps are approximately as follows: $\frac{1}{8}$, $\frac{3}{16}$, $\frac{1}{4}$, $\frac{5}{16}$, $\frac{3}{8}$, $\frac{1}{2}$, 2 , $2\frac{1}{2}$, $3\frac{1}{2}$, $4\frac{1}{4}$, $6\frac{3}{4}$, $7\frac{3}{4}$.

For convenience of dealers, each clamp up to 8-inch size, is packed in a box.



Drop Forged "C" Clamps

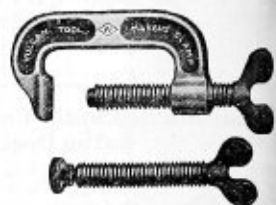
Medium Weight



No.	Capty.	Depth of Throat from Center of Screw	Extreme Dimensions of Body		Screw	Size Handle		Approximate Weight Each Pound	Price	
			Length	Width		Diam.	Length		Screw and Nut	Clamps
104	4	2 1/8	8 1/2	5 1/2	6	3/8	7	4 1/2	\$9.70	\$2.25
106	6	2 1/4	10 1/2	5 1/2	6	3/8	7	5 1/2	.70	2.75
108	8	2 1/4	12 1/2	5 1/2	6	3/8	7	6	.70	3.25
110	10	2 1/4	14 1/2	5 1/2	6	3/8	7	7 1/2	.70	3.75
112	12	2 1/4	16 1/2	6	6	3/8	7	9	.70	4.25
115	15	2 1/4	20 1/2	6 1/2	8 1/2	3/4	8	13 1/2	1.20	5.50
118	18	3 1/4	23 1/2	7	8 1/2	3/4	8	17	1.20	7.00

Williams' "Vulcan" Drop-Forged Strap Clamps

Black are oil treated only, Bright have surfaces and edges ground, panel black. Bright clamps with swivel screws furnished unless otherwise specified.



With Plain Screw

No.	Capty.	Depth of Throat	Extreme Dimensions of Clamp		Screw, Plain		Price		
			Length	Width	Diam.	Length	Extra Screw, Plain	Clamp Black	Clamp Bright
201	1	5/8	2 1/2	1 1/2	3/8	1 1/2	\$0.20	\$0.50	\$0.65
202	2	5/8	3 1/2	1 1/2	3/8	2 1/2	.25	.65	.80
203	3	5/8	4 1/2	1 1/2	3/8	3 1/2	.30	.85	1.00
204	4	1 1/8	6 1/2	2 1/2	3/4	4 1/2	.40	1.25	1.50

Per Set (Bright clamps, in specially prepared box, without extra charge) 3.25 4.00

With Removable-Swivel Screw

No.	Capty.	Depth of Throat	Extreme Dimensions of Clamp		Screw with Swivel		Price		
			Length	Width	Diam.	Length	Extra Screw, with Swivel	Clamp Black	Clamp Bright
201	1	5/8	2 1/2	1 1/2	3/8	1 1/2	\$0.45	\$0.75	\$0.90
202	2	5/8	3 1/2	1 1/2	3/8	2 1/2	.50	.90	1.05
203	3	5/8	4 1/2	1 1/2	3/8	3 1/2	.60	1.15	1.30
204	4	1 1/8	6 1/2	2 1/2	3/4	4 1/2	.75	1.60	1.85

No.	Capty.	Depth of Throat from Center of Screw	Extreme Dimensions of Body		Screw		Approx. Wt. Each, Lbs.	Price	
			Length	Width	Diam.	Length		Extra Screws Each	Clamps Complete
0	3/8	3/4	2 1/2	1 1/2	5/16	1 1/2	3/4	\$0.08	\$0.50
1	1/2	1 1/4	3 1/4	2 1/4	3/8	1 3/4	3/4	.11	.75
1 1/2	1 1/2	1 1/2	3 1/4	2 1/4	3/8	1 3/4	1 1/2	.14	1.25
2	2 1/4	1 1/4	5 1/2	4 1/2	5/8	2 1/8	3 3/8	.20	1.75
3	3 1/4	2 1/4	7 1/4	5 1/4	3/4	3 1/4	6 1/2	.28	2.50
4	4 1/2	2 1/4	8 1/2	6 1/2	3/4	4 1/2	9 1/8	.38	3.25
5	5 1/2	3 1/8	10 1/8	7 1/8	7/8	5 1/8	12 1/4	.50	4.00
6	6 1/2	3 1/8	12 1/8	8 1/8	7/8	7 1/8	16 1/2	.65	5.00
8	8 1/2	4 1/8	16 1/8	9 1/8	1 1/8	7	24	.85	7.00
10 1/2	10 1/2	4 1/8	16 1/8	9 1/8	1 1/8	7	28	.85	9.50
12 1/2	12 1/2	4 1/2	19 1/8	9 1/4	1 1/2	8	40	1.20	12.50

Williams' "Light Service" Drop-Forged "C" Clamps

Light Weight

Drop forged from special steel toughened by a special treatment and equipped with a rapid moving wrought steel screw.

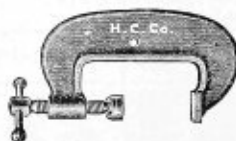


No.	Capty.	Depth Throat from Center of Screw	Extreme Dimensions		Screw		Approx. Wt. Each, Lbs.	Price	
			Length	Width	Diam.	Length		Screw H'd'd and Swivel	Clamps Complete
402	2	1 1/2	4 1/2	3 1/2	1 1/4	4 1/2	3 1/4	\$0.30	\$0.75
403	3	2	5 1/2	3 1/2	1 1/4	5 1/2	1 1/4	.35	.90
404	4	2 1/2	6 1/2	4 1/2	1 1/2	7 1/2	2	.40	1.10
*444	4	1 1/2	6 1/2	3 1/2	5/8	6 1/2	1 1/4	.40	1.10
406	6	3	9 1/2	5 1/2	1 1/2	8 1/2	3	.50	1.50
408	8	3 1/2	11 1/2	5 1/2	1 1/2	10	4 1/2	.60	2.00
410	10	3 1/2	14 1/2	6 1/2	1 1/2	11 1/2	6	.75	2.50
412	12	4	16 1/2	6 1/2	1 1/2	12 1/2	7 1/2	1.00	3.75

Extra Heavy Steel Machinists' Clamps

These clamps are of extra heavy malleable iron and will stand the most severe service.

The foot on the clamp is planed and the screw is provided with an oscillating tip.



No.	Price Each	Capacity, Inches	Depth of Throat, Inches	Size of Screw, Inches
1	\$1.75	2	2 1/2	3/4
2	2.00	3	2 1/2	3/4
3	2.25	4	2 1/2	3/4
4	2.50	5	2 1/2	3/4
5	2.75	6	2 1/2	3/4
6	3.25	8	2 1/2	3/4
7	3.75	10	2 1/2	3/4
8	4.25	12	2 1/2	3/4

Carriage Clamps

The frames of these clamps are strong malleable castings.

The screws are rough steel and have lean cut, square heads.

Order by giving capacity wanted.



Capacity in.....	2	2½	3	4	5	6
Depth Throat.....	1½	1¾	1¾	1¾	2	2½
Price per doz.....	\$2.00	\$2.60	\$3.00	\$4.20	\$5.00	\$6.50
Price each.....	.20	.25	.30	.40	.50	.65
Capacity in.....	2	2½	3	4	5	6
Depth Throat.....	1½	1¾	1¾	1¾	2	2½
Price per doz.....	\$7.80	\$9.00	\$11.00	\$13.50		
Price each.....	.75	.90	1.10	1.35		

Colts Eccentric and Adjustable Screw Clamps



To operate the eccentric clamp place the button on end of clamp against the work and slide the moveable jaw against the opposite side of the work. Raise the lever and moveable jaw is instantly, and continuously jarring will not loosen it.

The screw clamp is operated similarly, except that tension applied by turning screw instead of merely raising a lever. Same price for either style.

Capacity, inches.....	0*	1*	2*	3*	4*	5
Price per doz.....	\$3.60	\$4.80	\$6.00	\$8.40	\$10.20	\$12.60
Price each.....	.35	.45	.65	.80	1.00	1.25
Capacity, inches.....	0*	1*	2*	3*	4*	5
Price per doz.....	\$14.40	\$16.20	\$18.00	\$21.60	\$25.20	\$28.80
Price each.....	1.40	1.60	1.80	2.15	2.50	2.85

*These sizes furnished with eccentric clamp only.

Colts Extra Heavy Clamps

We can furnish these clamps made extra heavy throughout sizes 12 to 72 inches. Prices upon request.

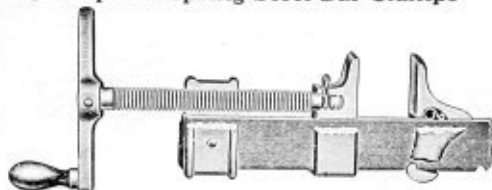
Cabinet Makers' Malleable Clamp



These fixtures, attached to hardwood bars, make a strong, light and easily operated wood frame clamp. The screws are ½ inch diameter, 7 inches long with deep square cut threads at stem rolled steel. The sliding head is supported by malleable sides, thus relieving the screws of any bending strain when clamping irregularly shaped or thin stock. They also keep the head from turning when applied. The heads are easily hung and will not get loose or out of line with the frame. Mounted on ear maple bars, oil finish; size, 1½x2½ inches.

Price per set, fixtures only.....	Dozen	Each
Price each, mounted on 3-foot bar.....	\$10.80	\$1.05
Price each, mounted on 4-foot bar.....	16.50	1.65
Price each, mounted on 5-foot bar.....	18.25	1.80
Price each, mounted on 6-foot bar.....	20.00	2.00
Price each, mounted on 7-foot bar.....	21.75	2.15

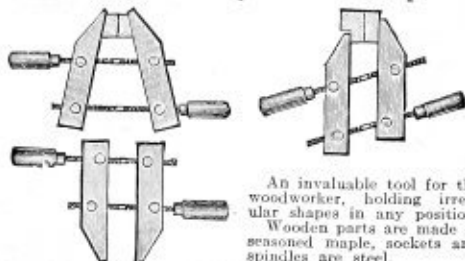
Tempered Spring Steel Bar Clamps



Screws, ½-inch diameter, 7 inches long; square thread cut from cold rolled steel; sliding head, 1½x2 inches. Saddle held in bar notches by indestructible spring. Bars, ½ x 1½-inch tempered steel. Quick acting. Extra heavy pressure.

Price, 2½ feet.....	Dozen	Each
Price, 3 feet.....	22.50	2.25
Price, 4 feet.....	25.00	2.50
Price, 5 feet.....	28.00	2.80
Price, 6 feet.....	31.00	3.10
Price, 7 feet.....	34.00	3.40

The Peerless Adjustable Clamp



An invaluable tool for the woodworker, holding irregular shapes in any position. Wooden parts are made of seasoned maple, sockets and spindles are steel.

No.	Price Per Dozen	Price Each	Length Jaw Inches	Opens Inches
0	\$13.20	\$1.50	8	4
1	15.60	1.55	10	6
2	17.40	1.70	12	8
3	19.20	1.90	14	10
4	22.80	2.25	16	12
5	26.40	2.60	18	14

Wood Hand Screws



The jaws of these hand screws are made of well seasoned Michigan hard maple, sanded and oiled.

Spindles are made of selected second growth hickory, air seasoned, and are tough and practically unbreakable. The threads do not lessen the natural strength of the wood in these spindles, the thread being saw cut with a special machine which does not tear and bruise the grain of the wood.

No.	Price per Dozen	Price Each	Diam. Screw, Inches	Length Screw, Inches	Length Jaw, Inches	Size Jaw, Inches	Open, Inches
800	\$40.00	\$4.00	1½	28	24	3 x 3	17
801	35.00	3.50	1½	26	22	2½ x 2½	15½
804	28.50	2.85	1½	22	18	2½ x 2½	12½
806	25.00	2.50	1	20	16	2½ x 2½	11
808	22.00	2.20	¾	18	14	2½ x 2½	10
810	18.50	1.85	¾	16	12	1½ x 1½	8½
811	17.00	1.70	¾	14	12	1½ x 1½	7½
812	14.50	1.45	¾	12	10	1½ x 1½	5½
813	12.00	1.20	¾	10	8	1½ x 1½	4½
814	9.50	.95	¾	8	7	1½ x 1½	3

If your requirements are not shown in this catalog, write us.

H.Channon Company Chicago

Williams' "Vulcan" Drop-Forged Strap Clamps

Single End



Double End



Plain Slot Pattern



Adjustable Step Pattern



U Pattern



Gooseneck Pattern



These forgings are made from a strong, tough grade of carefully selected steel and are put through a special process after forging which increases their strength and stiffness.

On planer, lathe, drill press, milling and boring machine work they are time saving and effective.

Finger Pattern, Double End

Number	Length	Width Center	Thickness Center	Diameter Hole	Finger Dimensions	Price
30	3	1 1/2	3/8	3/8	1/2 and 1/2	\$0.20
35	3 1/2	1 3/4	3/8	3/8	5/8 and 5/8	.25
40	4	1 3/4	3/8	3/8	3/4 and 3/4	.35

Finger Pattern, Single End

Number	Length	Width Center	Thickness Center	Diameter Hole	Finger Dimensions	Price
44	4	1 1/2	3/8	3/8	1/2 and 1/2	\$0.30
46	6	1 1/2	3/8	3/8	5/8 and 5/8	.50
48	8	1 1/2	3/8	3/8	3/4 and 3/4	.85

"U" Pattern

Number	Length	Width Center	Thickness Center	Diameter Hole	Finger Dimensions	Price
64	4 1/2	1 1/2	3/8	3/8	1/2 x 1 1/2	\$0.30
66	6 1/2	1 1/2	3/8	3/8	5/8 x 5/8	.50
68	8 1/2	1 1/2	3/8	3/8	3/4 x 3/4	.85

Plain Slot Pattern

Number	Lgth	Width Ends	Width Center	Thickness Ends	Thickness Center	Slot Min. Dimensions Length Width	Price
54	4	1 1/2	1 1/2	3/8	3/8	1 1/2 x 3/8	\$0.30
56	6	1 1/2	1 1/2	3/8	3/8	1 1/2 x 3/8	.50
58	8	1 1/2	1 1/2	3/8	3/8	1 1/2 x 3/8	.85
59	10	1 1/2	1 1/2	3/8	3/8	1 1/2 x 3/8	1.40

Adjustable Step Pattern

Number	Length	Width Ends	Width Center	Thickness Ends	Thickness Center	Slot Min. Dimensions Length Width	Price
54A	4	1 1/2	1 1/2	3/8	3/8	1 1/2 x 3/8	\$0.14
56A	6	1 1/2	1 1/2	3/8	3/8	1 1/2 x 3/8	.18
58A	8	1 1/2	1 1/2	3/8	3/8	1 1/2 x 3/8	.25
59A	10	1 1/2	1 1/2	3/8	3/8	1 1/2 x 3/8	.35

Goose Neck Pattern

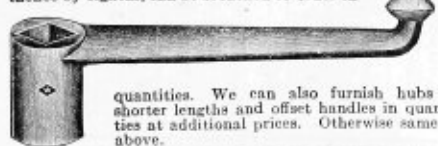
Number	Length	Width Ends	Width Center	Thickness Ends	Thickness Center	Slot Min. Dimensions Length Width	Price
74	4	1 1/2	1 1/2	3/8	3/8	1 1/2 x 3/8	\$0.30
76	6	1 1/2	1 1/2	3/8	3/8	1 1/2 x 3/8	.50
78	8	1 1/2	1 1/2	3/8	3/8	1 1/2 x 3/8	.85

Drop Forged Crank Handle

Unfinished are plain forgings without hole in hub.

Bronched have holes finished and hubs counter-bored in free end.

Finished are bronched, counterbored, ground, polished, casehardened all over and lacquered to prevent rusting. Smaller openings than standard and special sizes, running by sixteenths from 1/2 to 1 inch, inclusive, and thence by eighths, can be bronched to order in



quantities. We can also furnish hubs of shorter lengths and offset handles in quantities at additional prices. Otherwise same as above.

Drop Forged Machine Handles

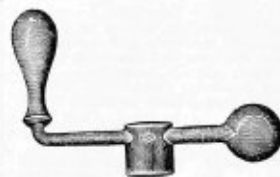


Unfinished handled are smooth enough for use or can be polished without machining.

Finished handled are centered, turned and polished; machined all over and only require fitting.

Number	Extreme Length	Standard Length Shank	Diameter Shank	Price
00	2	1 1/2	1/8	\$0.07
0	2 1/4	1 3/4	1/8	.08
1	2 1/2	1 3/4	1/8	.10
2	2 3/4	1 3/4	1/8	.13
3	3 1/4	1 3/4	1/8	.17
4	3 1/2	1 3/4	1/8	.22
5	3 3/4	1 3/4	1/8	.27
6	4 1/4	1 3/4	1/8	.33
7	4 3/4	1 3/4	1/8	.40

Drop Forged Balance Handle



Unfinished are plain forgings without any hole in hub.

Bronched have hole finished but are otherwise plain forgings.

Finished are bronched, ground, polished, casehardened all over and lacquered to prevent rusting. The bronched openings are made with corners slightly rounded to prevent breakage and a slight clearance is provided.

Holes are regularly finished to standard sizes given below. Smaller openings than standard and special sizes can be bronched to order in quantities. Handles can also be supplied with round holes in hub; details on application.

Length		Hub		Square Size Hole Bronched		Price	
C Hub to C Handle	Extreme	Handle Above Arm	Length	Diam.	Standard in Stock	Maximum to Order	Unfinished
1 1/2	3 1/2	1 1/2	3 1/2	3/8	3/8	3/8	\$0.45
1 3/8	4	1 1/2	3 1/2	3/8	3/8	3/8	.50
1 1/4	5	1 1/2	3 1/2	3/8	3/8	3/8	.55
2 1/4	5 1/2	2 1/4	1	1 1/4	1 1/4	1 1/4	.60
2 1/2	6	2 1/4	1 1/2	1 1/4	1 1/4	1 1/4	.70
2 3/4	7	2 1/4	1 1/2	1 1/4	1 1/4	1 1/4	.85

Length		Hub		Square Hole Side Bronched		Price	
Center to Center	Extreme	Handle Above Arm	Lgth.	Diam.	Standard in Stock	Maximum to Order	Unfinished
00	1 1/2	2 1/2	2 1/2	1 1/4	1	1	\$0.40
0	2 1/4	3 1/2	3 1/2	1 1/4	1	1	.45
1	3 1/4	4 1/2	4 1/2	1 1/2	1 1/2	1 1/2	.50
2	4 1/4	5 1/2	5 1/2	1 3/4	1 3/4	1 3/4	.60
4	6 1/4	7 1/2	7 1/2	2 1/4	2 1/4	2 1/4	.75
6	8 1/4	9 1/2	9 1/2	3 1/4	3 1/4	3 1/4	.95
8	10 1/4	11 1/2	11 1/2	4 1/4	4 1/4	4 1/4	1.20
10	12 1/4	13 1/2	13 1/2	5 1/4	5 1/4	5 1/4	1.50
12	14 1/4	15 1/2	15 1/2	6 1/4	6 1/4	6 1/4	1.70
14	16 1/4	17 1/2	17 1/2	7 1/4	7 1/4	7 1/4	2.25
16	18 1/4	19 1/2	19 1/2	8 1/4	8 1/4	8 1/4	2.95

Williams' Drop Forged Steel Wrench Sets

Original "Extra Capacity" Set, "Big Six," Nos. 4 and 7.

No.	U. S. Nuts Diam. Bolts		U. S. Cap Screws Diam. Screw		Openings Milled U. S. Standard	Ex- treme Length	Thick- ness Heads	Price per Set in Canvas Roll		
	Small Head	Large Head	Small Head	Large Head				Un- finished	Semi- finished	Fin- ished
725		$\frac{1}{4}$	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{5}{16}$ and $\frac{1}{2}$	4 $\frac{1}{2}$	$\frac{5}{16}$			
27C		$\frac{3}{8}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{8}$ and $\frac{1}{2}$	5 $\frac{1}{2}$	$\frac{3}{8}$			
28	$\frac{3}{8}$	$\frac{1}{2}$			$\frac{1}{2}$ and $\frac{3}{4}$	6 $\frac{1}{2}$	$\frac{1}{2}$	\$2.45	Set No. 4 \$3.39	\$4.89
729		$\frac{1}{2}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$ and $\frac{3}{4}$	6 $\frac{1}{2}$	$\frac{3}{4}$		Set No. 7 \$3.97	\$5.74
34	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{3}{4}$	1	$\frac{3}{4}$ and 1	9 $\frac{1}{2}$	1	2.85	3.97	5.74
736		$\frac{3}{4}$	$\frac{3}{4}$	1	1 and 1 $\frac{1}{4}$	11 $\frac{1}{2}$	1 $\frac{1}{2}$	2.00	2.94	4.44
Price No. 4 set, without roll								2.40	3.52	5.29
Price No. 7 set, without roll										

No. 7 set same as No. 4, but also includes spark plug wrench.

"Extra Capacity" Garage, Etc., Set, "Big Ten," No. 10

No.	U. S. Nuts Diameter Bolts		U. S. Cap Screws Diam. Screw		S. A. E. Standard Nuts and Cap Screws	A. L. A. M. Standard Nuts and Cap Screws	Openings Milled	Price per Set in Canvas Roll		
	Small Head	Large Head	Small Head	Large Head				Un- finished	Semi- finished	Fin- ished
731	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{8}$ & $\frac{1}{4}$			
23	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{8}$ & $\frac{1}{4}$			
735A	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{8}$ & $\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{8}$ & $\frac{1}{4}$			
27	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{8}$ & $\frac{1}{4}$			
729		$\frac{1}{2}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$ & $\frac{3}{4}$	$\frac{1}{2}$	$\frac{1}{2}$ & $\frac{3}{4}$	\$4.19	\$5.82	\$8.26
731B		$\frac{1}{2}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$ & $\frac{3}{4}$	$\frac{1}{2}$	$\frac{1}{2}$ & $\frac{3}{4}$			
32	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{8}$ & $\frac{1}{4}$			
33C		$\frac{1}{2}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$ & $\frac{3}{4}$	$\frac{1}{2}$	$\frac{1}{2}$ & $\frac{3}{4}$			
737	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{8}$	1	$\frac{1}{8}$ & $\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{8}$ & $\frac{1}{4}$			
38	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{8}$	1	$\frac{1}{8}$ & $\frac{1}{4}$	1	$\frac{1}{8}$ & $\frac{1}{4}$	3.59	5.22	7.66
Price per set, without roll										

"Extra Capacity" Set, "Thin Six," No. 34

With openings for most popular U. S. Standard nuts and cap screws.

No.	Nuts		Cap Screws		Openings, Milled	Ex- treme Length	Thickness Heads	Price per Set in Canvas Rolls		
	Small Head	Large Head	Small Head	Large Head				Un- finished	Semi- finished	Fin- ished
623D	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{8}$ & $\frac{1}{4}$	4 $\frac{1}{2}$	$\frac{1}{8}$ & $\frac{1}{4}$			
626X	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{8}$ & $\frac{1}{4}$	5 $\frac{1}{2}$	$\frac{1}{8}$ & $\frac{1}{4}$			
628	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{8}$ & $\frac{1}{4}$	5 $\frac{1}{2}$	$\frac{1}{8}$ & $\frac{1}{4}$	\$2.34	\$3.14	\$4.34
629D		$\frac{1}{2}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$ & $\frac{3}{4}$	6 $\frac{1}{2}$	$\frac{1}{2}$ & $\frac{3}{4}$			
634	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{3}{4}$	1	$\frac{3}{4}$ & 1	8 $\frac{1}{2}$	1 & 1 $\frac{1}{4}$			
635E		$\frac{3}{4}$	$\frac{3}{4}$	1	1 & 1 $\frac{1}{4}$	10 $\frac{1}{2}$	1 $\frac{1}{4}$ & 1 $\frac{1}{2}$	1.89	2.69	3.89
Price per set, without roll										

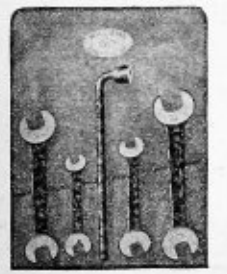
Ford Set No. A

Number	Class	Opening Size	Extreme Length	Price per Set in Canvas Roll		
				Un- finished	Semi- finished	Finished
27	D. H. Engineers'	$\frac{1}{4}$ and $\frac{3}{8}$	5 $\frac{1}{4}$	\$4.33	\$6.20	\$8.12
702	S. H. Cap Screw	$\frac{1}{4}$	4 $\frac{1}{4}$			
963D	Offset Socket	$\frac{1}{4}$	4 $\frac{1}{4}$			
964A	Offset Socket	$\frac{1}{4}$	5 $\frac{1}{4}$			
965D	Straight Socket	$\frac{1}{4}$	5 $\frac{1}{4}$			
965D	Offset Socket	$\frac{1}{4}$	5 $\frac{1}{4}$			
965A	Offset Socket	$\frac{1}{4}$	5 $\frac{1}{4}$			
966D8	Offset Socket	$\frac{1}{4}$	11			
967A	Offset Socket	$\frac{1}{4}$	6 $\frac{1}{4}$			
967D	Offset Socket	$\frac{1}{4}$	6 $\frac{1}{4}$			
968A	Offset Socket	$\frac{1}{4}$	7 $\frac{1}{4}$	3.73	5.60	7.52
969A	Offset Socket	$\frac{1}{4}$	8 $\frac{1}{4}$			
Price per set, without roll.....						

*Use wrench No. 967A as lever for wrench No. 965D.

Ford Set No. B

Number	Class	Opening Size	Extreme Length	Price per Set in Canvas Roll		
				Un- finished	Semi- finished	Finished
27C	D. H. Engineers'	$\frac{3}{8}$ and $\frac{9}{16}$	5 $\frac{1}{4}$			
729	D. H. Cap Screw	$\frac{3}{8}$ and $\frac{1}{2}$	6 $\frac{1}{4}$			
33C	D. H. Engineers'	$\frac{3}{8}$ and 1	8 $\frac{1}{4}$	\$2.16	\$2.99	\$4.24
734	D. H. Cap Screw	$\frac{3}{8}$ and 1 $\frac{1}{4}$	9 $\frac{3}{4}$			
966DS	S. H. Socket	$\frac{1}{4}$	11			
Price per set, without roll				1.71	2.54	3.79



H. Channon Company Chicago

Williams' Drop Forged Steel Wrench Sets Automobile Set No. 5-S

Number	S. A. E. Standard Nuts	Openings Milled	Extreme Length	Thickness Heads	Price per Set in Canvas Roll		
					Un-finished	Semi-finished	Finished
725	$\frac{1}{4}$ and $\frac{3}{8}$	$\frac{3}{8}$ and $\frac{1}{2}$	$4\frac{1}{2}$	$\frac{5}{16}$	\$2.16	\$2.97	\$4.22
727	$\frac{3}{8}$ and $\frac{1}{2}$	$\frac{1}{2}$ and $\frac{5}{8}$	$5\frac{1}{2}$	$\frac{3}{8}$			
731A	$\frac{1}{2}$ and $\frac{3}{4}$	$\frac{3}{4}$ and $\frac{7}{8}$	$7\frac{1}{2}$	$\frac{1}{2}$			
33C	$\frac{3}{4}$ and $\frac{1}{1}$	$\frac{1}{1}$ and $1\frac{1}{2}$	$8\frac{3}{4}$	$\frac{3}{4}$			
37	$\frac{1}{1}$ and $1\frac{1}{2}$	$1\frac{1}{2}$ and $1\frac{3}{4}$	$11\frac{1}{2}$	1			
Price per set, without roll					1.71	2.52	3.77



Carriage Makers' Set No. 1, "Light"

Number	For Manufacturers' Standard Nuts; Size Bolts	Openings Milled	Extreme Length	Thickness Heads	Price per Set in Canvas Roll		
					Un-finished	Semi-finished	Finished
675	$\frac{1}{4}$ and $\frac{1}{2}$	$\frac{3}{8}$ and $\frac{1}{2}$	$6\frac{1}{4}$	$\frac{1}{4}$	\$2.03	\$2.74	\$3.50
677	$\frac{1}{4}$ and $\frac{3}{8}$	$\frac{1}{2}$ and $\frac{5}{8}$	$7\frac{1}{4}$	$\frac{3}{8}$			
679	$\frac{3}{8}$ and $\frac{1}{2}$	$\frac{1}{2}$ and $\frac{5}{8}$	$8\frac{1}{4}$	$\frac{1}{2}$			
681	$\frac{1}{2}$ and $\frac{3}{4}$	$\frac{3}{4}$ and $\frac{7}{8}$	$9\frac{1}{4}$	$\frac{3}{4}$			
683	$\frac{3}{4}$ and 1	1 and $1\frac{1}{2}$	$10\frac{3}{4}$	1			
Price per set, without roll					1.58	2.29	3.05



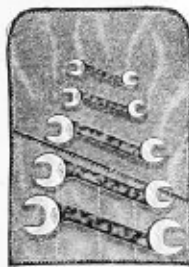
S. A. E. Standard (Automobile) Set No. 2-S

Number	For S. A. E. Standard Nuts	Openings Milled	Extreme Length	Thickness Heads	Price per Set in Canvas Roll		
					Un-finished	Semi-finished	Finished
6778	$\frac{1}{4}$ and $\frac{3}{8}$	$\frac{3}{8}$ and $\frac{1}{2}$	$7\frac{1}{4}$	$\frac{5}{16}$	\$2.55	\$3.47	\$4.43
6798	$\frac{3}{8}$ and $\frac{1}{2}$	$\frac{1}{2}$ and $\frac{5}{8}$	$8\frac{1}{4}$	$\frac{3}{8}$			
681A	$\frac{1}{2}$ and $\frac{3}{4}$	$\frac{3}{4}$ and $\frac{7}{8}$	$9\frac{1}{4}$	$\frac{1}{2}$			
683A	$\frac{3}{4}$ and 1	1 and $1\frac{1}{2}$	$10\frac{3}{4}$	$\frac{3}{4}$			
685C	1 and $1\frac{1}{2}$	$1\frac{1}{2}$ and $1\frac{3}{4}$	12	1			
Price per set, without roll					2.10	3.02	3.97



"Extra Capacity" Automobile Set No. 44, 22 $\frac{1}{2}$ ° Angle Wrenches For 47 Most Popular Openings in U. S., S. A. E. and A. L. A. M. Standards of Nuts and Cap Screws

No.	Openings	For U. S. Std.				For S. A. E. Std.				For A. L. A. M. Std.				Price per Set in Canvas Roll		
		Nuts		Cap Screws		Nuts		Cap Screws		Nuts		Cap Screws		Un-finished	Semi-finished	Finished
		Sm. Hd.	Lg. Hd.	Sm. Hd.	Lg. Hd.	Sm. Hd.	Lg. Hd.	Sm. Hd.	Lg. Hd.	Sm. Hd.	Lg. Hd.	Sm. Hd.	Lg. Hd.			
		Sm. Hd.	Lg. Hd.	Sm. Hd.	Lg. Hd.	Sm. Hd.	Lg. Hd.	Sm. Hd.	Lg. Hd.	Sm. Hd.	Lg. Hd.	Sm. Hd.	Lg. Hd.			
760Y	$\frac{1}{8}$ and $\frac{1}{4}$			$\frac{1}{4}$	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{2}$	\$2.55	\$3.49	\$4.94
761Y	$\frac{1}{4}$ and $\frac{3}{8}$			$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{8}$	$\frac{1}{2}$			
762A	$\frac{3}{8}$ and $\frac{1}{2}$			$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{3}{4}$			
762Y	$\frac{1}{2}$ and $\frac{3}{4}$			$\frac{3}{4}$	1	$\frac{3}{4}$	1	$\frac{3}{4}$	1	$\frac{3}{4}$	1	$\frac{3}{4}$	1			
764Y	$\frac{3}{4}$ and 1			1	$1\frac{1}{2}$	1	$1\frac{1}{2}$	1	$1\frac{1}{2}$	1	$1\frac{1}{2}$	1	$1\frac{1}{2}$			
765X	1 and $1\frac{1}{2}$			$1\frac{1}{2}$	$1\frac{3}{4}$	$1\frac{1}{2}$	$1\frac{3}{4}$	$1\frac{1}{2}$	$1\frac{3}{4}$	$1\frac{1}{2}$	$1\frac{3}{4}$	$1\frac{1}{2}$	$1\frac{3}{4}$	2.10	3.04	4.49
Price per set, without roll																



Automobile Sets "Duplex" Nos. 8 and 9

Number	U. S. Standard Nuts and Cap Screws	Openings Milled U. S. Standard	Extreme Length	Thickness Heads	Price per Set in Canvas Roll		
					Un-finished	Semi-finished	Finished
725	$\frac{1}{4}$ and $\frac{3}{8}$	$\frac{3}{8}$ and $\frac{1}{2}$	$4\frac{1}{2}$	$\frac{5}{16}$	\$2.67	Set No. 9 \$3.72	\$5.39
25	$\frac{3}{8}$ and $\frac{1}{2}$	$\frac{1}{2}$ and $\frac{5}{8}$	$4\frac{1}{2}$	$\frac{3}{8}$			
27C	$\frac{1}{2}$ and $\frac{3}{4}$	$\frac{3}{4}$ and $\frac{7}{8}$	$5\frac{1}{2}$	$\frac{1}{2}$			
288	$\frac{3}{4}$ and 1	1 and $1\frac{1}{2}$	$6\frac{1}{2}$	$\frac{3}{4}$			
731A	1 and $1\frac{1}{2}$	$1\frac{1}{2}$ and $1\frac{3}{4}$	$7\frac{1}{2}$	1			
34	$\frac{3}{8}$ and $\frac{1}{2}$	$\frac{1}{2}$ and $\frac{5}{8}$	$9\frac{1}{4}$	$\frac{3}{8}$	3.07	Set No. 8 4.30	6.24
736	$\frac{1}{2}$ and $\frac{3}{4}$	$\frac{3}{4}$ and $\frac{7}{8}$	$11\frac{1}{2}$	$\frac{1}{2}$			
Price No. 9 set, without roll					2.22	3.27	4.94
Price No. 8 set, without roll					2.62	3.85	5.79



No. 8 set same as No. 9, but also includes spark plug wrench.

Williams Drop Forged Steel Wrenches

The steel from which our drop forged wrenches are made is selected for this particular purpose. Every detail of forging, milling and finishing is given closest attention. All drop forge, steel wrenches will be furnished under the following headings:

"Unfinished"—Plain forging, not hardened with openings either milled or unmilled. Milled openings sent unless otherwise ordered.

"Semi-Finished"—Edges ground, case hardened, heads bright, openings milled.

"Finished"—Openings milled, ground, polished, case-hardened, lacquered, with heads finished bright.

Unless otherwise ordered we will fill all orders with Semi-Finished Wrenches.

Engineers' Wrenches

15 Degree Angle, Single Head



No.	For U. S. Standard Nut; Size Bolt	Openings Milled	Extreme Length Approx.	Thickness Head	Price		
					Un-finished	Semi-finished	Finished
00	1/4	3/8	3	3/4	\$ 0.09	\$ 0.14	\$ 0.22
0	1/2	3/4	3 1/2	1	.10	.15	.25
1	3/8	7/8	4	1 1/4	.12	.18	.28
2	1/2	1	4 1/2	1 1/2	.15	.22	.32
3	5/8	1 1/8	5	1 3/4	.18	.26	.38
4	3/4	1 1/4	6 1/2	2	.22	.32	.45
5	7/8	1 3/8	7 1/2	2 1/4	.26	.38	.54
6	1	1 1/2	8 1/2	2 1/2	.31	.46	.65
7	1 1/8	1 5/8	9 1/4	2 3/4	.40	.57	.82
8	1 1/4	2	10 1/8	3	.55	.78	1.05
9	1 3/8	2 1/8	11 1/8	3 1/4	.85	1.15	1.52
10	1 1/2	2 1/4	12 1/8	3 1/2	1.20	1.60	2.10
11	1 3/4	2 3/8	13 1/8	3 3/4	1.65	2.10	2.80
12	2	2 1/2	14 1/8	4	2.20	2.85	3.70
13	2 1/8	2 3/4	15 1/8	4 1/4	2.80	3.65	4.70
14	2 1/4	3	16 1/8	4 1/2	3.45	4.60	5.80
15	2 3/8	3 1/8	17 1/8	4 3/4	4.15	5.60	7.10
16	2 1/2	3 1/4	18 1/8	5	4.90	6.70	8.50
16A	2 3/4	3 3/8	19 1/8	5 1/4	4.90	6.70	8.50
17	3	3 1/2	20 1/8	5 1/2	7.50	10.25	13.00
18	3 1/4	3 3/4	21 1/8	5 3/4	11.50	14.75	18.00
19	3 1/2	4	22 1/8	6	17.00	21.00	25.00
19A	3 3/4	4 1/8	23 1/8	6 1/4	17.00	21.00	25.00
20	4	4 1/4	24 1/8	6 1/2	25.00	31.00	37.00
20A	4 1/8	4 1/2	25 1/8	6 3/4	25.00	31.00	37.00
21A	4 1/4	4 3/8	26 1/8	7	40.00	52.00	64.00
21B	4 1/2	4 3/4	27 1/8	7 1/4	40.00	52.00	64.00
21C	4 3/8	4 5/8	28 1/8	7 1/2	40.00	52.00	64.00
22A	4 1/2	5	29 1/8	7 3/4	80.00	102.00	124.00
22B	5	5 1/4	30 1/8	8	80.00	102.00	124.00

Engineers' Wrenches

15 Degree Angle, Double Head



No.	For U. S. Standard Nut; Size Bolt	Openings Milled	Extreme Length Approx.	Thickness Head	Price		
					Un-finished	Semi-finished	Finished
21	1/4	3/8	3 1/2	3/4	\$0.12	\$0.17	\$0.26
22	1/2	3/4	4	1	.14	.21	.32
23	3/8	7/8	4 1/2	1 1/4	.14	.21	.32
24	1/2	1	4 3/4	1 1/2	.17	.25	.38
25	5/8	1 1/8	5 1/4	1 3/4	.17	.25	.38
26	3/4	1 1/4	5 1/2	2	.21	.31	.46
27	7/8	1 3/8	6 1/4	2 1/4	.21	.31	.46
28	1	1 1/2	6 3/4	2 1/2	.25	.37	.56
29	1 1/8	1 5/8	7 1/4	2 3/4	.25	.37	.56
30	1 1/4	2	7 3/4	3	.30	.45	.68
31	1 1/2	2 1/4	8 1/4	3 1/4	.30	.45	.68
32	1 3/8	2 3/8	8 3/4	3 1/2	.37	.55	.85
33	1 1/2	2 3/4	9 1/4	3 3/4	.37	.55	.85
34	1 3/4	3	9 3/4	4	.46	.68	1.08
35	1 3/8	3 1/8	10 1/4	4 1/4	.46	.68	1.08
36	1 1/2	3 1/4	11 1/4	4 1/2	.66	.96	1.40
37	1 3/4	3 3/8	11 3/4	4 3/4	.66	.96	1.40
38	2	4	12 1/4	5	1.00	1.40	1.90
39	2 1/8	4 1/4	13 1/4	5 1/4	1.00	1.40	1.90
40	2 1/4	4 1/2	14 1/4	5 1/2	1.40	1.90	2.60
41	2 3/8	4 3/4	15 1/4	5 3/4	1.40	1.90	2.60
42	2 1/2	5	16 1/4	6	1.90	2.65	3.50
43	2 3/4	5 1/4	17 1/4	6 1/4	1.90	2.65	3.50

Light Cap Screw Wrenches

For Hexagon Head Cap Screws

Single Head, 15 Degree Angle

Double Head, 15 Degree Angle

No.	For U. S. Standard Nut; Size Bolt	Openings Milled	Extreme Length Approx.	Thickness Head	Price		
					Un-finished	Semi-finished	Finished
00	1/4	3/8	3	3/4	\$0.09	\$0.14	\$0.22
700	1/2	3/4	3 1/2	1	.10	.15	.25
701	3/8	7/8	4	1 1/4	.12	.18	.28
701A	1/2	1	4 1/2	1 1/2	.12	.18	.28
702	5/8	1 1/8	5	1 3/4	.15	.22	.32
703	3/4	1 1/4	5 1/2	2	.18	.26	.38
704	7/8	1 3/8	6 1/4	2 1/4	.22	.32	.45
705	1	1 1/2	7 1/4	2 1/2	.26	.38	.54
705A	1 1/8	1 5/8	8 1/4	2 3/4	.26	.38	.54
706	1 1/4	2	9 1/4	3	.31	.46	.65
707	1 1/2	2 1/4	10 1/4	3 1/4	.40	.57	.82
708	1 3/8	2 3/8	11 1/4	3 1/2	.55	.78	1.05
708A	1 1/2	2 1/2	12 1/4	3 3/4	.55	.78	1.05
709	1 3/4	2 3/4	13 1/4	4	.85	1.15	1.52
710	2	3	14 1/4	4 1/4	1.20	1.60	2.10

No.	For U. S. Standard Nut; Size Bolt	Openings Milled	Extreme Length Approx.	Thickness Head	Price		
					Un-finished	Semi-finished	Finished
721	1/4	3/8	3 1/2	3/4	\$0.12	\$0.17	\$0.26
722	1/2	3/4	4	1	.14	.21	.32
723	3/8	7/8	4 1/2	1 1/4	.14	.21	.32
723A	1/2	1	4 3/4	1 1/2	.14	.21	.32
724	5/8	1 1/8	5 1/4	1 3/4	.17	.25	.38
725A	3/4	1 1/4	5 1/2	2	.17	.25	.38
725B	1	1 1/2	6 1/4	2 1/4	.17	.25	.38
726	1 1/8	1 5/8	7 1/4	2 3/4	.21	.31	.46
727	1 1/4	2	8 1/4	3	.21	.31	.46
728	1 1/2	2 1/4	9 1/4	3 1/4	.25	.37	.56
729	1 3/8	2 3/8	10 1/4	3 1/2	.25	.37	.56
730	1 1/2	2 1/2	11 1/4	3 3/4	.30	.45	.68
731A	1 3/4	2 3/4	12 1/4	4	.30	.45	.68
731B	1 1/2	2 1/2	13 1/4	4 1/4	.30	.45	.68
732	2	3	14 1/4	4 1/2	.37	.55	.85
733	2 1/8	3 1/8	15 1/4	4 3/4	.37	.55	.85
734	2 1/4	3 1/4	16 1/4	5	.46	.68	1.08
735	2 3/8	3 3/8	17 1/4	5 1/4	.46	.68	1.08
736	2 1/2	3 1/2	18 1/4	5 1/2	.66	.96	1.40

Williams Drop Forged Steel Wrenches

Heavy Cap Screw Wrenches

15° Angle, Double Head

For Hexagon Head Cap Screws



This is a line of extra weight designed to withstand the strain in turning cap screws, and is considerably stronger than the screws themselves. *For smaller sizes and lighter cap screw wrenches, see other pages.

In stock with openings for U. S. Standard Hexagon Head Cap Screws; Whitworth Standard, Metric Measure or special openings milled to order.

No.	For Hexagon Head Cap Screws; Diameter Screws	Openings Milled	Ex-treme Length	Thick-ness Heads	Price, Each		
					Un-finished	Semi-finished	Fin-ished
126	1/4 & 3/8	5/8 & 3/4	5 3/4	1 1/4 & 1 1/2	\$0.20	\$0.30	\$0.45
127	1/2 & 5/8	1 & 1 1/8	5 3/4	1 1/4 & 1 1/2	.20	.30	.45
128	3/4 & 3/4	1 1/2 & 1 1/2	6 3/8	1 1/4 & 1 1/2	.25	.37	.54
129	1 & 1 1/8	1 3/4 & 1 3/4	6 3/8	1 1/4 & 1 1/2	.25	.37	.54
130	1 1/8 & 1 1/8	1 3/4 & 1 3/4	7	1 1/4 & 1 1/2	.30	.45	.68
131	1 1/4 & 1 1/4	1 3/4 & 1 3/4	7	1 1/4 & 1 1/2	.30	.45	.68
132	1 1/2 & 1 1/2	1 3/4 & 1 3/4	7 3/4	1 1/4 & 1 1/2	.37	.55	.85
133	1 3/4 & 1 3/4	1 3/4 & 1 3/4	7 3/4	1 1/4 & 1 1/2	.37	.55	.85
134	2 & 1 3/4	1 3/4 & 1 3/4	8 3/8	1 1/4 & 1 1/2	.45	.68	1.05
135	2 1/8 & 2 1/8	1 3/4 & 1 3/4	8 3/8	1 1/4 & 1 1/2	.45	.68	1.05
136	2 1/4 & 2 1/4	1 3/4 & 1 3/4	10 1/4	1 1/4 & 1 1/2	.65	.90	1.30
137	2 3/8 & 2 3/8	1 3/4 & 1 3/4	10 1/4	1 1/4 & 1 1/2	.65	.90	1.30
138	2 1/2 & 2 1/2	1 3/4 & 1 3/4	11 3/8	1 1/4 & 1 1/2	.95	1.25	1.70
139	2 3/4 & 2 3/4	1 3/4 & 1 3/4	11 3/8	1 1/4 & 1 1/2	.95	1.25	1.70
140	3 & 1	1 3/4 & 1 3/4	13 1/4	1 1/4 & 1 1/2	1.30	1.65	2.20
141	3 1/8 & 1 1/8	1 3/4 & 1 3/4	13 1/4	1 1/4 & 1 1/2	1.30	1.65	2.20
142	3 1/4 & 1 1/4	1 3/4 & 1 3/4	14 3/4	1 1/4 & 1 1/2	1.70	2.15	2.80
143	1 & 1 1/4	1 1/4 & 1 1/4	14 3/4	1 1/4 & 1 1/2	1.70	2.15	2.80
144	1 & 1 1/4	1 1/4 & 1 1/4	16 3/4	1 1/4 & 1 1/2	2.15	2.75	3.50
145	1 1/8 & 1 1/8	1 1/8 & 1 1/8	16 3/4	1 1/4 & 1 1/2	2.15	2.75	3.50

Heavy Cap Screw Wrenches

15° Angle, Single Head

For Hexagon Head Cap Screws

No.	For Hexagon Head Cap Screws; Diameter Screws	Openings Milled	Ex-treme Length	Thick-ness Heads	Price, Each		
					Un-finished	Semi-finished	Fin-ished
103	1/4 & 3/8	5/8 & 3/4	5	1 1/4 & 1 1/2	\$0.17	\$0.25	\$0.37
104	1/2 & 5/8	1 & 1 1/8	5 3/4	1 1/4 & 1 1/2	.21	.31	.44
105	3/4 & 3/4	1 1/2 & 1 1/2	6 1/2	1 1/4 & 1 1/2	.26	.38	.54
106	1 & 1 1/8	1 3/4 & 1 3/4	7 3/4	1 1/4 & 1 1/2	.32	.46	.66
107	1 1/4 & 1 1/4	1 3/4 & 1 3/4	8	1 1/4 & 1 1/2	.40	.57	.80
108	1 1/2 & 1 1/2	1 3/4 & 1 3/4	9 1/4	1 1/4 & 1 1/2	.52	.72	1.00
109	1 3/4 & 1 3/4	1 3/4 & 1 3/4	11	1 1/4 & 1 1/2	.72	.96	1.30
110	2 & 1 3/4	1 3/4 & 1 3/4	12 1/2	1 1/4 & 1 1/2	1.00	1.30	1.70
111	2 1/8 & 2 1/8	1 3/4 & 1 3/4	12 1/2	1 1/4 & 1 1/2	1.35	1.70	2.20
112	2 1/4 & 2 1/4	1 3/4 & 1 3/4	15 1/2	1 1/4 & 1 1/2	1.70	2.10	2.75
113	2 3/8 & 2 3/8	1 3/4 & 1 3/4	17	1 1/4 & 1 1/2	2.10	2.60	3.40

Carriage Makers' or Light Service Wrenches

22 1/2 Degree Angle, Double Head



A very popular wrench for general utility work.

No.	Openings Milled	Ex-treme Length	Thick-ness Heads	Price, Each		
				Un-finished	Semi-finished	Fin-ished
675B	3/8 & 1/2	6 1/4	1 1/4	\$0.18	\$0.27	\$0.38
675A	3/8 & 1/2	6 1/4	1 1/4	.18	.27	.38
675	3/8 & 1/2	6 1/4	1 1/4	.18	.27	.38
677B	1/2 & 5/8	7 1/4	1 3/8	.23	.34	.47
677	1/2 & 5/8	7 1/4	1 3/8	.23	.34	.47
679A	5/8 & 3/4	8 1/4	1 3/8	.29	.43	.58
679	5/8 & 3/4	8 1/4	1 3/8	.29	.43	.58
681	3/4 & 7/8	9 1/4	1 3/8	.38	.55	.71
681B	3/4 & 7/8	9 1/4	1 3/8	.38	.55	.71
681A	3/4 & 7/8	9 1/4	1 3/8	.38	.55	.71
683	3/4 & 7/8	10 3/8	1 3/8	.50	.70	.90
683B	3/4 & 7/8	10 3/8	1 3/8	.50	.70	.90
683A	3/4 & 7/8	10 3/8	1 3/8	.50	.70	.90
685	1 & 1 1/8	12	1 3/8	.70	1.00	1.30
685A	1 & 1 1/8	12	1 3/8	.70	1.00	1.30
685C	1 1/8 & 1 1/4	12	1 3/8	.70	1.00	1.30
685B	1 1/8 & 1 1/4	12	1 3/8	.70	1.00	1.30

Hexagon Box Wrenches

15 Degree Angle, Single Head



No.	For U. S. Standard Nut; Size Bolt	Short Diam. Opening Bred'd.	Ex-treme Lgth.	Head Thick-ness	Outside Diam.	Price, Each		
						Un-finished	Semi-finished	Fin-ished
800	5/8	3/2	3 1/2	3/8	3/4	\$0.13	\$0.18	\$0.24
801	3/4	4	4 1/2	1/2	1 1/4	.15	.21	.28
802	5/8	4 1/2	5 1/2	3/8	1 1/4	.18	.25	.33
803	3/4	5 1/2	6 1/2	1/2	1 3/4	.21	.29	.40
804	5/8	6 1/2	7 1/2	3/8	1 3/4	.25	.35	.47
805	3/4	7 1/2	8 1/2	1/2	2 1/4	.30	.42	.56
806	5/8	8 1/2	9 1/2	3/8	2 1/4	.35	.50	.66
807	3/4	9 1/2	10 1/2	1/2	2 3/4	.45	.62	.82
808	5/8	10 1/2	11 1/2	3/8	2 3/4	.58	.78	1.08
809	3/4	11 1/2	12 1/2	1/2	3 1/4	.78	1.04	1.40
810	1	12 1/2	13 1/2	3/8	3 1/4	1.05	1.40	1.88
811	1 1/8	13 1/2	14 1/2	1/2	3 3/4	1.40	1.85	2.40
812	1 1/4	14 1/2	15 1/2	3/8	3 3/4	1.85	2.40	3.05
813	1 1/2	15 1/2	16 1/2	1/2	4 1/4	2.35	3.00	3.80
814	1 3/4	16 1/2	17 1/2	3/8	4 1/4	3.00	3.75	4.75
815	1 3/8	17 1/2	18 1/2	1/2	4 1/4	3.75	4.60	5.75
816	1 3/4	18 1/2	19 1/2	3/8	4 1/4	4.50	5.65	6.90
817	2	19 1/2	20 1/2	1/2	4 3/4	6.00	8.50	11.00

Williams Drop Forged Steel Wrenches

Set Screw Wrenches

22½ Degree Angle, Single Head



No.	For Set Screw; Size	Ex-treme Length	Thick-ness Head	Price		
				Un-finished	Semi-finished	Fin-ished
500	5/16	3	3/8	\$0.10	\$0.14	\$0.23
501	3/8	3 1/2	3/8	.12	.17	.27
502	7/16	4 1/4	3/8	.14	.21	.31
503	5/8	5	3/8	.17	.25	.37
504	3/4	5 3/4	3/8	.21	.31	.45
505	7/8	6 3/8	3/8	.26	.38	.54
506	1 1/8	7 1/2	3/8	.31	.46	.65
507	1 1/4	8 1/8	3/8	.38	.55	.80
508	1 3/8	9 1/2	3/8	.48	.68	.98
509	1 1/2	10 1/2	3/8	.60	.84	1.20
510	1 3/4	11 1/2	3/8	.80	1.10	1.48
511	2	12 1/2	3/8	1.10	1.40	1.80

Set Screw Wrenches

22½ Degree Angle, Double Head



No.	For Set Screw; Size	Ex-treme Length	Thick-ness Head	Price, Each		
				Un-finished	Semi-finished	Fin-ished
523	5/16 & 3/8	3 1/2	3/8	\$0.14	\$0.20	\$0.30
524	3/8 & 7/16	4 1/4	3/8	.16	.24	.35
525	7/16 & 5/8	5	3/8	.19	.29	.42
526	5/8 & 3/4	5 3/4	3/8	.24	.35	.52
527	3/4 & 7/8	6 3/8	3/8	.29	.42	.62
528	7/8 & 1	7 1/2	3/8	.35	.52	.75
529	1 & 1 1/8	8 1/8	3/8	.42	.62	.90
530	1 1/8 & 1 1/4	9 1/2	3/8	.52	.75	1.10
531	1 1/4 & 1 3/8	10 1/2	3/8	.62	.90	1.30
532	1 3/8 & 1 1/2	11 1/2	3/8	.75	1.10	1.50
533	1 1/2 & 1 3/4	12 1/2	3/8	.90	1.30	1.75
534	1 3/4 & 2	13 1/2	3/8	1.10	1.50	2.10
535	2 & 2 1/8	14 1/2	3/8	1.30	1.75	2.25
536	2 1/8 & 2 1/4	15 1/2	3/8	1.50	2.10	2.70
537	2 1/4 & 2 3/8	16 1/2	3/8	1.75	2.40	3.10
538	2 3/8 & 2 1/2	17 1/2	3/8	2.10	2.80	3.60
539	2 1/2 & 2 5/8	18 1/2	3/8	2.40	3.10	4.10
540	2 5/8 & 3	19 1/2	3/8	2.70	3.60	4.60
541	3 & 3 1/8	20 1/2	3/8	3.10	4.10	5.10
542	3 1/8 & 3 1/4	21 1/2	3/8	3.60	4.60	5.60
543	3 1/4 & 3 3/8	22 1/2	3/8	4.10	5.10	6.10

Double Head Tool Post Wrenches

For U. S. Standard Nuts and Set Screws



No.	Open End for U. S. Std. Nut		Closed End for Set Screw Size	Ex-treme Lgth.	Thick-ness Heads	Price, Each		
	Size Bolt	Open Milled				Un-finished	Semi-finished	Fin-ished
562	5/16	5/16	5/16	6 1/2	5/16 & 3/8	\$0.48	\$0.66	\$0.96
563	3/8	3/8	3/8	7	3/8 & 7/16	.52	.72	1.04
563B	7/16	7/16	7/16	7 1/2	7/16 & 5/8	.52	.72	1.04
563C	5/8	5/8	5/8	8	5/8 & 3/4	.52	.72	1.04
563D	3/4	3/4	3/4	9 1/2	3/4 & 7/8	.52	.72	1.04
564	7/8	7/8	7/8	10	7/8 & 1	.60	.82	1.16
565	1	1	1	10 1/2	1 & 1 1/8	.72	.97	1.34
566	1 1/8	1 1/8	1 1/8	11 1/2	1 1/8 & 1 1/4	.90	1.20	1.60
566B	1 1/4	1 1/4	1 1/4	12 1/2	1 1/4 & 1 3/8	.90	1.20	1.60
567	1 3/8	1 3/8	1 3/8	13 1/2	1 3/8 & 1 7/8	1.25	1.60	2.00
567B	1 7/8	1 7/8	1 7/8	14 1/2	1 7/8 & 2	1.25	1.60	2.00
567C	2	2	2	15 1/2	2 & 2 1/8	1.25	1.60	2.00
568	2 1/8	2 1/8	2 1/8	16 1/2	2 1/8 & 2 3/8	1.80	2.20	2.70
568B	2 1/4	2 1/4	2 1/4	17 1/2	2 1/4 & 2 5/8	1.80	2.20	2.70
568C	2 3/8	2 3/8	2 3/8	18 1/2	2 3/8 & 2 7/8	1.80	2.20	2.70
568D	2 7/8	2 7/8	2 7/8	19 1/2	2 7/8 & 3	1.80	2.20	2.70

Double Head Tool Post Wrenches

For Set Screws



These wrenches are equally adaptable for use on cap screws.

No.	Open End for Set Screw; Size	Closed End for Set Screw; Size	Ex-treme Lgth.	Thick-ness Heads	Price, Each		
					Un-finished	Semi-finished	Fin-ished
554	5/16	5/16	5 1/2	5/16 & 3/8	\$0.40	\$0.56	\$0.80
555	3/8	3/8	6	3/8 & 7/16	.44	.62	.88
555B	7/16	7/16	6 1/2	7/16 & 5/8	.44	.62	.88
555C	5/8	5/8	7	5/8 & 3/4	.44	.62	.88
556	3/4	3/4	7 1/2	3/4 & 7/8	.52	.72	1.00
556B	7/8	7/8	8 1/2	7/8 & 1	.52	.72	1.00
556C	1	1	9 1/2	1 & 1 1/8	.52	.72	1.00
557	1 1/8	1 1/8	10 1/2	1 1/8 & 1 1/4	.60	.82	1.16

Williams Drop Forged Steel Wrenches

"S" Wrenches with Flat Handle

22½ Degree Angle, Double Head
For U. S. Standard Nuts

No.	For U. S. Standard Nut; Size Bolt	Openings Milled	Extreme Length	Thick-ness Head	Price, Each		
					Un-finished	Semi-finished	Finished
661A	1/4 x 3/8	3/8	4	3/8	\$0.15	\$0.22	\$0.32
661B	3/8 x 1/2	1/2	4	3/8	.15	.22	.32
661C	1/2 x 3/4	3/4	4	3/8	.15	.22	.32
662A	3/8 x 1/2	1/2	5	3/8	.20	.29	.42
662B	1/2 x 3/4	3/4	5	3/8	.20	.29	.42
662C	3/4 x 1	1	5	3/8	.20	.29	.42
663A	1/2 x 3/4	3/4	6 1/4	3/8	.27	.39	.56
663B	3/4 x 1	1	6 1/4	3/8	.27	.39	.56
663C	1 x 1 1/4	1 1/4	7 1/2	3/8	.37	.53	.75
664A	3/4 x 1	1	7 1/2	3/8	.37	.53	.75
664B	1 x 1 1/4	1 1/4	7 1/2	3/8	.37	.53	.75
664C	1 1/4 x 2	2	9	1 1/2	.50	.72	1.00
665A	1/2 x 3/4	3/4	9	1 1/2	.50	.72	1.00
665B	3/4 x 1	1	9	1 1/2	.50	.72	1.00
665C	1 x 1 1/4	1 1/4	10 1/2	1 1/2	.74	1.00	1.35
666A	3/4 x 1	1	10 1/2	1 1/2	.74	1.00	1.35
666B	1 x 1 1/4	1 1/4	10 1/2	1 1/2	.74	1.00	1.35
667A	1/2 x 3/4	3/4	12	1 1/2	1.10	1.45	1.90
667B	3/4 x 1	1	12	1 1/2	1.10	1.45	1.90
667C	1 x 1 1/4	1 1/4	14	1 1/2	1.90	2.50	3.20
668A	3/4 x 1	1	14	1 1/2	1.90	2.50	3.20
668B	1 x 1 1/4	1 1/4	14	1 1/2	1.90	2.50	3.20
668C	1 1/4 x 2	2	14	1 1/2	1.90	2.50	3.20

"S" Wrenches with Flat Handle

22½ Degree Angle, Double Head
For Hexagon Head Cap Screws

No.	For U. S. Standard Nut; Size Bolts	Openings Milled	Extreme Length	Thick-ness Head	Price, Each		
					Un-finished	Semi-finished	Finished
661D	1/4 x 3/8	3/8	4	3/8	\$0.05	\$.22	\$0.32
661E	3/8 x 1/2	1/2	4	3/8	.15	.22	.32
661F	1/2 x 3/4	3/4	4	3/8	.15	.22	.32
661G	3/4 x 1	1	4	3/8	.15	.22	.32
662D	3/8 x 1/2	1/2	5	3/8	.20	.29	.42
662E	1/2 x 3/4	3/4	5	3/8	.20	.29	.42
662F	3/4 x 1	1	5	3/8	.20	.29	.42
662G	1 x 1 1/4	1 1/4	5	3/8	.20	.29	.42
663D	3/4 x 1	1	6 1/4	3/8	.27	.35	.56
663E	1 x 1 1/4	1 1/4	6 1/4	3/8	.27	.35	.56
663F	1 1/4 x 2	2	6 1/4	3/8	.27	.35	.56
663G	1 1/2 x 2 1/4	2 1/4	6 1/4	3/8	.27	.35	.56
664D	3/4 x 1	1	7 1/2	3/8	.37	.53	.75
664E	1 x 1 1/4	1 1/4	7 1/2	3/8	.37	.53	.75
664F	1 1/4 x 2	2	9	1 1/2	.50	.72	1.00
665D	3/4 x 1	1	9	1 1/2	.50	.72	1.00
665E	1 x 1 1/4	1 1/4	9	1 1/2	.50	.72	1.00
665F	1 1/4 x 2	2	9	1 1/2	.50	.72	1.00
665G	1 1/2 x 2 1/4	2 1/4	9	1 1/2	.50	.72	1.00
666D	3/4 x 1	1	10 1/2	1 1/2	.74	1.00	1.35
666E	1 x 1 1/4	1 1/4	10 1/2	1 1/2	.74	1.00	1.35
666F	1 1/4 x 2	2	10 1/2	1 1/2	.74	1.00	1.35
667D	3/4 x 1	1	12	1 1/2	1.10	1.45	1.90
667E	1 x 1 1/4	1 1/4	12	1 1/2	1.10	1.45	1.90
667F	1 1/4 x 2	2	12	1 1/2	1.10	1.45	1.90

Alligator or Bull Dog Wrenches

Made in Three Styles
Style "A" Back Finish Heavy Pointed Jaws

No.	Price per Doz.	Price Each	Length, Inches	Holds Pipe Size, Ins.	Holds Rd. Iron, Ins.
2	\$12.00	\$1.20	9	3/4 to 1	1/2 to 1
2 1/2	18.00	1.80	12 1/2	1 to 1 1/2	1 to 1 1/2
3	24.00	2.40	16	1 1/2 to 2	1 1/2 to 2
3 1/2	30.00	3.00	18 1/2	2 to 2 1/2	2 to 2 1/2
4	36.00	3.60	22	2 1/2 to 3	2 1/2 to 3
4 1/2	50.00	5.00	24	3 to 3 1/2	3 to 3 1/2
5	60.00	6.00	27	3 1/2 to 4	3 1/2 to 4

Style "B"



Nos. 0 and 1 are full polished. Nos. 1 1/2 and 1 3/4 black finish heavy polished jaw.

No.	Price per Doz.	Price Each	Length, Inches	Holds Pipe, Inches	Holds Rd. Iron, Ins.
0	\$3.00	\$0.30	4	1/4 to 1/2	1/4 to 1/2
1	4.00	.40	5 1/4	1/2 to 3/4	1/2 to 3/4
1 1/2	4.50	.45	5 3/4	3/4 to 1	3/4 to 1
1 3/4	8.00	.80	7 1/2	1 to 1 1/2	1 to 1 1/2

Style "C" (Twin)



No.	Price per Doz.	Price Each	Length, Inches	Holds Pipe, Inches	Holds Rd. Iron, Ins.
"C"	\$18.00	\$1.80	10	1/2 to 3/4	1/2 to 1

"Always Ready" Wrench



Manufactured from special steel, forged and tempered in oil.

No.	Length, Inches	Holds Round Iron	Nickel Plated		Black	
			Price per Doz.	Price Each	Price per Doz.	Price Each
1	5	1/4 to 3/4	\$5.00	\$0.50	\$4.60	\$0.46
2	7	3/4 to 1 1/2	6.75	.68	6.30	.63
2 1/2	9 1/4	1 1/2 to 2 1/2	10.50	1.05	10.00	1.00
3	11 1/2	2 1/2 to 3 1/2	16.00	1.60	15.25	1.53

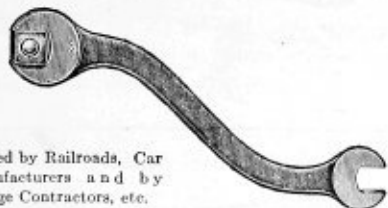
Cut shows nickel plated wrench which is always sent unless otherwise ordered.

Black finish wrenches have heavy polished jaws.

Williams Drop Forged Steel Wrenches

Car Wrenches

22½ Degree Angle, Double Head Long Leverage

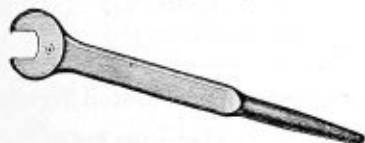


Used by Railroads, Car Manufacturers and by Dredge Contractors, etc.

No.	For U. S. Standard Nut; Size Bolt	Openings	Ex-treme Length	Thick-ness Heads	Un-finished	Semi-finished
367	3/8 & 1/2	3/8 & 1/2	12	7/8 & 1 1/2	\$0.55	\$0.75
370	1/2 & 3/4	1/2 & 3/4	19	1 1/2 & 1 3/4	.95	1.25
371	3/4 & 1	3/4 & 1	19	1 3/4 & 2	1.15	1.55
373	5/8 & 3/4	1 1/8 & 1 1/2	20	1 1/2 & 1 3/4	1.15	1.55
374	5/8 & 3/4	1 1/8 & 1 1/2	21	1 3/4 & 2	1.35	1.85
376	3/4 & 1	1 1/2 & 1 3/4	21	1 3/4 & 2	1.35	1.85
377	3/4 & 1	1 1/2 & 1 3/4	22	1 3/4 & 2	1.65	2.25
379	7/8 & 1 1/8	1 3/4 & 2	22	1 3/4 & 2	1.65	2.25
380	7/8 & 1 1/8	1 3/4 & 2	23	1 3/4 & 2	1.95	2.65
382	1 & 1 1/8	2 & 2 1/4	23	1 3/4 & 2	1.95	2.65
383	1 & 1 1/8	2 & 2 1/4	24	1 3/4 & 2	2.25	3.15
385	1 1/8 & 1 1/4	2 1/4 & 2 3/4	24	1 3/4 & 2	2.25	3.15
387	1 1/8 & 1 1/4	2 1/4 & 2 3/4	25	1 3/4 & 2	3.40	4.50
389	1 1/8 & 1 1/4	2 1/4 & 2 3/4	25	1 3/4 & 2	3.40	4.50

Construction Wrenches

15 Degree Angle



No.	For U. S. Standard Nut; Size Bolt	Open-ing Milled	Ex-treme Length	Thick-ness Heads	Price	
					Un-finished	Semi-finished
201	1/4	1/2	8	3/8	\$0.28	\$0.35
202	3/8	1/2	8	3/8	.28	.35
203	3/8	1/2	9 1/2	3/8	.35	.45
204	3/8	1/2	9 1/2	3/8	.35	.45
205	3/8	1/2	11	3/8	.45	.58
206	3/8	1/2	11	3/8	.45	.58
207	3/8	1/2	13	3/8	.62	.80
208	3/8	1/2	15	3/8	.85	1.10
209	3/8	1/2	17	3/8	1.18	1.50
210	1	1 1/8	19	3/8	1.60	2.10
211	1 1/8	1 3/8	21	3/8	2.20	3.00
212	1 1/8	1 3/8	21	3/8	2.20	3.00

Telegraph Lineman's Wrench



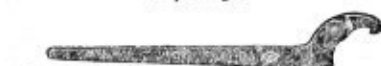
For Lag Screws, Rough Nuts, Etc.

Especially designed for dependable service in the erection of cross-arms on telegraph, etc., poles, but equally adaptable for use about agricultural and other machinery.

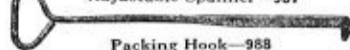
No.	Forged Openings For	Ex-treme Length	Thick-ness Heads	Price Un-finished
999	3/8, 1/2, 3/4, 1, Lag Screws. 3/8, 1/2, 3/4, 1, Sq. Nuts 3/8, 1/2, 3/4, Hex. Nuts	13 3/4	1/2 & 3/4	\$1.50

Locomotive Tools

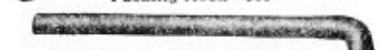
Drop-Forged



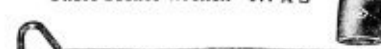
Adjustable Spanner—987



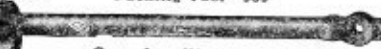
Packing Hook—988



Offset Socket Wrench—977 A S



Packing Tool—989



Crow-foot Wrench—986

No.	1/4 Openings	Flat End Size	Handle Size	Ex-treme Height	Price	
					Un-finished	Semi-finished
977 A S	1 3/8	1 1/2	1 1/2	18 1/4	\$1.60	\$2.40
986	2 to 4	1 1/2	1 1/2	22	2.85	.....
987	2 to 4	1 1/2	1 1/2	17 1/4	2.00	.....
988	1 3/8	1 1/2	1 1/2	17 1/4	.65	.....
989	1 3/8	1 1/2	1 1/2	19 1/4	.65	.....

Structural Wrenches

Straight Opening



The offset in handle provides for clearance of obstructions and safety for the hands of operator.

The tang is for bringing bolt holes into line.

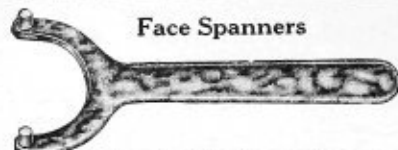
No.	For U. S. Standard Nut; Size Bolt	Open-ing	Ex-treme Length	Thick-ness Heads	Handle Offset	Price	
						Un-finished	Semi-finished
901	1/4	1/2	8	3/8	3/8	\$0.33	\$0.40
902	3/8	1/2	8	3/8	3/8	.33	.40
903	3/8	1/2	9 1/2	3/8	3/8	.40	.52
904	3/8	1/2	9 1/2	3/8	3/8	.40	.52
905	1/2	1 1/8	11	3/8	1	.52	.70
906	1/2	1 1/8	11	3/8	1	.52	.70
907	3/4	1 1/2	13	3/8	1 1/8	.74	.98
908	3/4	1 1/2	15	3/8	1 1/8	1.02	1.34
909	1	1 3/4	17	3/8	1 3/4	1.40	1.80
910	1	1 3/4	19	3/8	1 3/4	1.90	2.50

Long Round Handle Wrenches

Straight Opening



No.	For U. S. Standard Nut; Size Bolt	Openings	Ex-treme Length	Price	
				Un-finished	Semi-finished
193	5/8	1 1/2	24	\$1.10	1.60
194	3/4	1 1/2	24	1.10	1.60
195	1	1 1/2	24	1.10	1.60
196A	3/4	1 1/2	27	1.50	2.10
196	1	1 1/2	27	1.50	2.10
197	1	1 1/2	27	1.50	2.10
198	1 1/8	1 1/2	30	3.00	3.80
199A	1 1/8	1 1/2	30	3.00	3.80
199	1 1/8	1 1/2	30	3.00	3.80



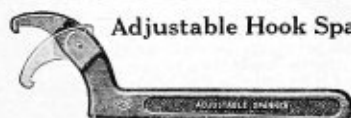
Face Spanners

No.	Pins			Span of Jaws in Clear	Lgth. from C. of Pins	Thk. ness	Price		
	Dist. C. to C.	Dia. Mild	Lgth.				Un-finished	Semi-finished	Finished
418	1	3/8	3/8	1 1/8	4 1/2	3/16	\$0.24	\$0.30	\$0.40
420	1 1/4	3/8	3/8	1 1/8	5 1/2	3/16	.26	.32	.40
422	1 1/2	3/8	3/8	1 1/8	6 1/2	3/16	.29	.37	.50
424	1 3/4	3/8	3/8	1 1/8	7 1/2	3/16	.33	.42	.56
426	2	3/8	3/8	1 1/8	8 1/2	3/16	.38	.48	.63
428	2 1/4	3/8	3/8	1 1/8	9 1/2	3/16	.44	.55	.72
430	2 1/2	3/8	3/8	2 1/8	7 1/2	3/16	.51	.64	.82
432	2 3/4	3/8	3/8	2 1/8	8 1/2	3/16	.59	.74	.94
434	3	3/8	3/8	2 1/8	8 1/2	3/16	.68	.85	1.08
436	3 1/4	3/8	3/8	2 1/8	9 1/2	3/16	.78	.97	1.24
438	3 1/2	3/8	3/8	3	9 1/2	3/16	.88	1.10	1.40
440	3 3/4	3/8	3/8	3 1/8	10 1/2	3/16	1.00	1.25	1.60
442	4	3/8	3/8	3 1/8	11	3/16	1.15	1.45	1.85

Adjustable Face Spanners



No.	Extreme Capacity	Extreme Length	Un-finished	Semi-finished	Finished
482	2	6 1/8	\$0.60	\$0.75	\$1.00
483	3	8 1/8	.90	1.10	1.40
484	4	10 1/8	1.30	1.60	2.00



Adjustable Hook Spanners

No.	Capacity for Circles, Diameter	Ext. Lgth., Approx.	Thickness		Depth Hook	Price	
			Hand	Hook		Un-finished	Special Finish
471	3/4 to 2	6 3/8	1/4	3/8	3/8	\$0.85	\$1.20
472	1 1/4 to 3	8 3/8	3/8	3/8	3/8	1.00	1.40
474	2 to 4 1/4	11 3/8	3/8	3/8	3/8	1.40	2.00

Pin Spanners



No.	For Circle, Diam.	Extreme Length	Finished Diameter Pin	Price		
				Un-finished	Semi-finished	Finished
452	1	4	3/16	\$0.18	\$0.27	\$0.36
453	1 1/4	4 1/2	3/16	.19	.29	.38
454	1 1/2	5	3/16	.20	.30	.40
455	1 3/4	5 1/2	3/16	.21	.31	.42
456	2	6	3/16	.22	.33	.44
457	2 1/4	6 1/2	3/16	.23	.35	.46
458	2 1/2	7	3/16	.24	.36	.48
459	2 3/4	7 1/2	3/16	.26	.39	.52
460	3	8	3/16	.28	.42	.56
461	3 1/4	8 1/2	3/16	.30	.45	.60
462	3 1/2	9	3/16	.32	.48	.64
463	3 3/4	9 1/2	3/16	.34	.51	.68
464	4	10	3/16	.36	.54	.72
466	5	12	3/16	.48	.72	.96
468	6	14	3/16	.65	.98	1.30

Mossberg Ratchet Socket Wrench Handle



No. 350

All steel, reversible ratchet, the lightest and strongest wrench made. Finest quality of steel, full nickel plated. Length 10 inches over all.

Price.....\$2.00

Mossberg Ratchet Socket Handle



No. 355

Socket shank fits the square opening and is firmly held by a tension spring.

The wrench is reversible by turning over, of steel construction. Finished dead black. Eight inches long.

Price.....\$1.00

Mossberg Ratchet Wrench

For Reverse and Brake Pedal Tension Springs for Ford Automobile.



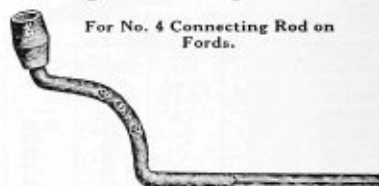
No. 645

A clever and efficient tool at a low price.

Price each.....\$0.50

Mossberg Connecting Rod Wrench

For No. 4 Connecting Rod on Fords.



No. 623

The fourth connecting rod on a Ford is so situated that its adjustment requires a special wrench as here shown. Thoroughly hardened, with mottled finish.

Price each.....\$0.30

Mossberg Triple End Cylinder Head and Rear Axle Housing Wrench



No. 630

Large socket on double end. Provides great leverage to start or tighten cylinder head nuts. Single end twists the nuts rapidly after being loosened.

Small socket on double end is tapered to fit nuts on rear axle housing. No other wrench will carry these nuts.

Price each.....\$0.35

Socket Wrenches

William's Drop Forged Single Head Socket Wrenches With or Without Pin-Handle For Hexagon Nuts and Cap Screws



Straight
Pattern
with
Pin-
Handle

Offset Pattern
A full line of
this Offset
form of Socket
Wrench adapted
for Hexagon
Nuts and
Cap Screws
can be fur-
nished from
stock. See
price columns
1, 2 and 3.

In stock with openings
broached for U. S. stand-
ard dimensions; also for
Whitworth standard and
metric measure. Special
broaching to order in rea-
sonable quantities.

Hexagon end of shank is
designed for use in combi-
nation with another

wrench or with Pin-Handle.

Wrenches of shorter or longer lengths than stated in table can
be furnished to order in quantities.

State class of wrench desired.

Unless otherwise specified, wrenches with Pin-Handles will be
sent. See extra prices for handles.

Hexagon Openings				Diameter of Head	Extreme Length and Diameter Shank or Handle		Price			Extra for Pin-Handle
No.	For U.S. Std. Nut, Size Bolt	For Cap S'w. Screw	Behd. Opening		Straight Pattern	Offset Pattern	Offset Handle, or Straight, without Pin-Handle			
							Unfin-ished	Semi-finished	Fin-ished	
							(1) Either Offset or Stra't, no Pin-H'dle	(2) Either Offset or Stra't, H'dle	(3) Either Offset or Stra't, H'dle	
961 A	3/8		1 1/2	3/8	3/8		\$0.20	\$0.30	\$0.40	\$.10
962 D		3/8		3/8	3/8	4	.22	.33	.44	.11
963 A	3/8		1 1/2	3/8	3/8	4	.24	.36	.48	.13
963 D		3/8		3/8	3/8	4	.24	.36	.48	.13
964 A	3/8		1 1/2	3/8	3/8	4	.26	.39	.52	.13
965 D		3/8		3/8	3/8	4	.29	.44	.58	.14
966 A	3/8		1 1/2	3/8	3/8	5	.29	.44	.58	.14
966 D		3/8		3/8	3/8	5	.32	.48	.64	.15
967 A	3/8		1 1/2	3/8	3/8	6	.36	.54	.72	.17
967 D		3/8		3/8	3/8	6	.36	.54	.72	.17
968 A	3/8		1 1/2	3/8	3/8	7	.40	.60	.80	.17
968 D		3/8		3/8	3/8	7	.46	.69	.92	.18
969 A	3/8		1 1/2	3/8	3/8	7	.52	.78	1.04	.20
970 D		3/8		3/8	3/8	7	.52	.78	1.04	.20
971 A	3/8		1 1/2	3/8	3/8	8	.60	.90	1.20	.20
971 D		3/8		3/8	3/8	8	.60	.90	1.20	.20
973 A	3/8		1 1/2	3/8	3/8	9	.80	1.20	1.60	.26
974 D		3/8		3/8	3/8	9	.90	1.35	1.80	.35
975 A	3/8		1 1/2	3/8	3/8	10	1.00	1.50	2.00	.35
975 D		3/8		3/8	3/8	10	1.00	1.50	2.00	.35
976 A	1		2 1/2	1	1	10	1.15	1.72	2.30	.40
977 A	1 1/8		2 3/4	1 1/8	1 1/8	10	1.30	1.95	2.60	.45
978 A	1 1/4		2 3/4	1 1/4	1 1/4	10	1.60	2.40	3.20	.45
979 A	1 1/2		2 3/4	1 1/2	1 1/2	10	2.10	3.15	4.20	.50
980 A	1 3/4		2 3/4	1 3/4	1 3/4	10	2.80	4.20	5.60	.65

Hercules Socket Nut Wrench Set No. CM7 For Finished Nuts with No. 3 Handle

For Automobile Repairing



Includes one No.
3 Hercules handle:
one each socket
wrenches for 3/4,
7/8, 1, 1 1/8, 1 1/4,
1 1/2 and 1 3/4 inch
finished
nuts.

These tools are
handsomely mot-
tled and are put up
in a neat canvas
roll which meas-
ures when rolled
up about 7 inches
long by 3 inches
diameter. Weight,
2 3/4 pounds.

Wrench sockets
fit either square or
hexagon nuts.
Price per set, \$2.50

Socket Wrenches



Malleable Iron

For Square Head Bolts

No.				Each
A	$\frac{1}{4}$ -inch hole for	$\frac{1}{2}$ -inch set screw,	5 ins. long . . .	\$0.20
B	$\frac{3}{8}$ -inch hole for	$\frac{3}{8}$ -inch set screw,	5 ins. long . . .	.20
C	$\frac{3}{8}$ -inch hole for	$\frac{1}{2}$ -inch set screw,	5 ins. long . . .	.20
D	$\frac{3}{8}$ -inch hole for	$\frac{1}{2}$ -inch set screw, Nut for $\frac{3}{8}$ -in. bolt,	5 ins. long . . .	.20
1	$\frac{1}{2}$ -inch hole for	$\frac{3}{8}$ -in. set screw, Nut for $\frac{1}{2}$ -in. bolt,	8 ins. long . . .	.20
2	$\frac{5}{8}$ -inch hole for	$\frac{3}{8}$ -in. set screw, $\frac{1}{2}$ -in. square cap, Nut for $\frac{3}{8}$ -in. bolt,	9 ins. long . . .	.25
3	$\frac{3}{4}$ -inch hole for	$\frac{3}{8}$ -in. set screw, $\frac{3}{8}$ -in. square cap, Nut for $\frac{3}{8}$ -in. bolt,	9½ ins. long . . .	.30
4	$\frac{7}{8}$ -inch hole for	$\frac{3}{8}$ -in. set screw, $\frac{1}{2}$ -in. square cap, Nut for $\frac{1}{2}$ -in. bolt,	10½ ins. long . . .	.40
5	1 -inch hole for	1-in. set screw, 12 ins.	long . . . . .	.50
6	1½-inch hole for	nut for $\frac{3}{8}$ -in. bolt, 12 ins.	long . . . . .	.50
7	1¾-inch hole for	nut for $\frac{3}{8}$ -in. bolt, 12 ins.	long . . . . .	.60

For Hexagon Cap Screws and Nuts

10	1/2-inch hole for	3/8-in. hexagon cap, 1/2-in. hexagon nut,	6 ins. long	.20
11	3/8-inch hole for	3/8-in. hexagon cap, 3/8-in. hexagon nut,	6 ins. long	.20
12	3/8-inch hole for	3/8-in. hexagon cap, 3/8-in. hexagon nut,	8 ins. long	.25
13	1/2-inch hole for	3/8-in. hexagon cap, 3/8-in. hexagon nut,	9 1/2 ins. long	.30
14	3/8-inch hole for	3/8-in. hexagon cap, 3/8-in. hexagon nut,	10 ins. long	.35
15	3/8-inch hole for	3/8-in. hexagon cap, 3/8-in. hexagon nut,	12 ins. long	.40
16	3/8-inch hole for	3/8-in. hexagon cap, 3/8-in. hexagon nut,	12 ins. long	.50
17	1 1/8-inch hole for	3/8-in. hexagon cap, 3/8-in. hexagon nut,	12 ins. long	.55
18	1 1/4-inch hole for	3/8-in. hexagon cap, 3/8-in. hexagon nut,	12 ins. long	.60
19	1 1/2-inch hole for	1-in. hexagon cap, 1-in. hexagon nut,	12 ins. long	.65

Standard Brace Wrenches



These wrenches are made of the best malleable iron, japanned
and polished. Round base permits turning in smallest possible
space.

Will Fit Either Square or Hexagon Opening

No.	Diameter Across Flats or Opening, Inches	Price per Dozen	Price Each
1	3/8	\$5.00	\$0.50
2	3/8	5.00	.50
3	3/8	5.00	.50
4	3/8	5.00	.50
5	3/8	5.00	.50
6	3/8	5.00	.50
7	3/8	5.00	.50
8	1	5.00	.50
9	1 1/8	6.00	.50

Channon Ratchet Wrench



Made from the best malleable iron with all parts broached to accurately fit together. Set consists of 8 each square and hexagon sockets for nuts from $\frac{1}{4}$ to $\frac{3}{4}$ inch. Will fit all standard size nuts, cap set and lag screws. Extension is of cold rolled steel tubing. The ratchet handle is very durable and reversible. The drill attachment, when used with ratchet handle, makes a perfect working ratchet. The socket of the drill attachment is bored for $\frac{1}{2}$ -inch diameter shank blacksmiths' drills.

Price per set,\$5.00

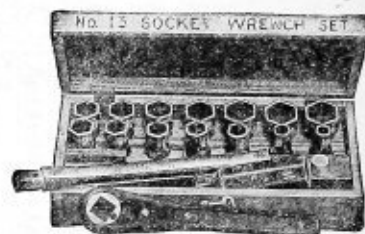
No. 10 Socket Wrench Set



The No. 10 is an ideal set of moderate size for automotive work. We particularly recommend this for a modest set, as one which covers a wide range. Consists of 21 sockets.

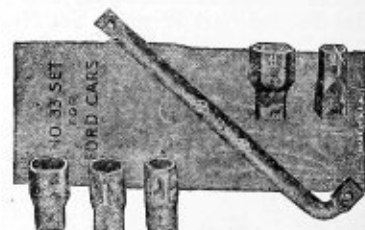
Hex. $\frac{1}{2}$, $\frac{3}{4}$, 1 , $1\frac{1}{4}$, $1\frac{1}{2}$, $1\frac{3}{4}$, 2 , $2\frac{1}{4}$, $2\frac{1}{2}$, $2\frac{3}{4}$, 3 , $3\frac{1}{4}$, $3\frac{1}{2}$, $3\frac{3}{4}$, 4 , $4\frac{1}{4}$, $4\frac{1}{2}$, $4\frac{3}{4}$, 5 , $5\frac{1}{4}$, $5\frac{1}{2}$, $5\frac{3}{4}$, 6 .
Spark Plug Sockets, $3\frac{1}{4}$ x 4 inches long. 1 $3\frac{1}{4}$ x 4 inches long.
No. 350. Reversible Ratchet Handle. Universal Joint.
Long Extension Tube. 2 Sizes Screw Driver Bits. Packed in Wooden Box.
Price of Set complete,\$9.00

No. 13 Socket Wrench Set



Contains all important hexagon sockets. Furnished in wooden case containing Ratchet Socket, Wrench Handle No. 355, Extension Tube No. 351, 9 $\frac{1}{2}$ inches long, fifteen modified, thoroughly hardened, pressed steel sockets as follows: $\frac{1}{2}$, $\frac{3}{4}$, 1 , $1\frac{1}{4}$, $1\frac{1}{2}$, $1\frac{3}{4}$, 2 , $2\frac{1}{4}$, $2\frac{1}{2}$, $2\frac{3}{4}$, 3 , $3\frac{1}{4}$, $3\frac{1}{2}$, $3\frac{3}{4}$, 4 , $4\frac{1}{4}$, $4\frac{1}{2}$, $4\frac{3}{4}$, 5 , $5\frac{1}{4}$, $5\frac{1}{2}$, $5\frac{3}{4}$, 6 .
Spark Plug Socket, 4 inches long.
Price per Set,\$3.50

Ford Socket Wrench Set No. 33



Five sizes of sockets that fit the nuts that need most adjustments, as follows: $\frac{1}{2}$ inch tapered, $\frac{3}{4}$ inch tapered, $\frac{1}{2}$ inch (cylinder head nuts), $\frac{3}{4}$ inch oval for main bearing nuts and bolts, $\frac{1}{2}$ inch hexagon socket is tapered for rear axle housing nut, and $\frac{3}{4}$ inch hexagon socket is ground to properly fit engine base bolts. Has double-end vertical or offset handle. Enamelled duck case.
Price per Set,\$1.10

No. 14 Complete Socket Wrench Set



This is probably the most complete wrench set made and is intended for every sort of work. It has 51 wrenches with 55 openings, and with the clever reversible handle, the splendid range of sockets, the full set of offset ends—all make this set a wonderful box of tools.

The set consists of the following pieces:

37 Hexagon and Square Sockets.
Hex. $\frac{1}{2}$, $\frac{3}{4}$, 1 , $1\frac{1}{4}$, $1\frac{1}{2}$, $1\frac{3}{4}$, 2 , $2\frac{1}{4}$, $2\frac{1}{2}$, $2\frac{3}{4}$, 3 , $3\frac{1}{4}$, $3\frac{1}{2}$, $3\frac{3}{4}$, 4 , $4\frac{1}{4}$, $4\frac{1}{2}$, $4\frac{3}{4}$, 5 , $5\frac{1}{4}$, $5\frac{1}{2}$, $5\frac{3}{4}$, 6 .
Square. $\frac{1}{2}$, $\frac{3}{4}$, 1 , $1\frac{1}{4}$, $1\frac{1}{2}$, $1\frac{3}{4}$, 2 , $2\frac{1}{4}$, $2\frac{1}{2}$, $2\frac{3}{4}$, 3 , $3\frac{1}{4}$, $3\frac{1}{2}$, $3\frac{3}{4}$, 4 , $4\frac{1}{4}$, $4\frac{1}{2}$, $4\frac{3}{4}$, 5 , $5\frac{1}{4}$, $5\frac{1}{2}$, $5\frac{3}{4}$, 6 .
Spark Plug Sockets, $\frac{3}{4}$, $1\frac{1}{2}$, $1\frac{3}{4}$, each 4 inches long
No. 350. Handle (Reversible Ratchet).
No. 340. Take Down "T" Handle.
No. 320. Offset Handle.
No. 1. General Service Set Open-end Wrenches—5 Wrenches, 10 Openings.
Universal Joint.
3 Sizes Screw Driver Bits.
No. 1 Cutter Pin Tool.
No. 470. Gripsall Pipe Wrench.
Put up in Wooden Box.
Price of Set Complete,\$12.00

For a more complete line of fine ratchet wrenches, refer to index.

Spark Plug Socket Wrenches



These wrenches can be applied instantly to the spark plug despite any construction of cylinder head and save burning the fingers and breaking the porcelain. Made of heavy pressed steel.

Single end spark plug wrench with wire handle:
No. 401. Length, 4 in.; opening, $\frac{3}{8}$. Price each \$0.40
No. 411. Length, 4 in.; opening, $1\frac{1}{2}$. Price each,40

Double end spark plug wrench with wire handle:
No. 461. Length, 4 in.; openings, $\frac{3}{8}$ and $1\frac{1}{2}$. Price each \$0.50

Pressed Steel Sockets

These sockets fit the nut or bolt head instantly and exactly and require but little space to operate. Made of heavy pressed steel. Order by stating size of socket wanted.



Hexagon Sockets

Sizes of Sockets	U. S. Std. Hex. Nuts and Bolts Size	S. A. E. Std. Hex. Nuts and Bolts Size	Mfrs. Std. Hex. Hd. Bolts Size	Hex. Hd. Cap Screws Size	Hex. Hd. Coach Screws Size
$\frac{1}{16}$		$\frac{1}{16}$	$\frac{1}{16}$	$\frac{1}{16}$	$\frac{1}{16}$
$\frac{1}{8}$		$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$
$\frac{3}{16}$	$\frac{3}{16}$	$\frac{3}{16}$	$\frac{3}{16}$	$\frac{3}{16}$	$\frac{3}{16}$
$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$
$\frac{5}{16}$	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{5}{16}$
$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$
$\frac{7}{16}$	$\frac{7}{16}$	$\frac{7}{16}$	$\frac{7}{16}$	$\frac{7}{16}$	$\frac{7}{16}$
$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
$\frac{9}{16}$	$\frac{9}{16}$	$\frac{9}{16}$	$\frac{9}{16}$	$\frac{9}{16}$	$\frac{9}{16}$
$\frac{5}{8}$	$\frac{5}{8}$	$\frac{5}{8}$	$\frac{5}{8}$	$\frac{5}{8}$	$\frac{5}{8}$
$\frac{11}{16}$	$\frac{11}{16}$	$\frac{11}{16}$	$\frac{11}{16}$	$\frac{11}{16}$	$\frac{11}{16}$
$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$
$\frac{7}{8}$	$\frac{7}{8}$	$\frac{7}{8}$	$\frac{7}{8}$	$\frac{7}{8}$	$\frac{7}{8}$
1	1	1	1	1	1
$1\frac{1}{8}$	$1\frac{1}{8}$	$1\frac{1}{8}$	$1\frac{1}{8}$	$1\frac{1}{8}$	$1\frac{1}{8}$
$1\frac{1}{4}$	$1\frac{1}{4}$	$1\frac{1}{4}$	$1\frac{1}{4}$	$1\frac{1}{4}$	$1\frac{1}{4}$
$1\frac{3}{8}$	$1\frac{3}{8}$	$1\frac{3}{8}$	$1\frac{3}{8}$	$1\frac{3}{8}$	$1\frac{3}{8}$
$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$

Price each, any size \$0.40

Square Sockets

Sizes of Sockets Square	Square Hd. Cap Screws Size	Square Hd. Set Screws Size	Square Hd. Coach Screws Size	U. S. Std. Square Nuts Screw Size
$\frac{1}{16}$	$\frac{1}{16}$	$\frac{1}{16}$	$\frac{1}{16}$	$\frac{1}{16}$
$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$
$\frac{3}{16}$	$\frac{3}{16}$	$\frac{3}{16}$	$\frac{3}{16}$	$\frac{3}{16}$
$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$
$\frac{5}{16}$	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{5}{16}$
$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$
$\frac{7}{16}$	$\frac{7}{16}$	$\frac{7}{16}$	$\frac{7}{16}$	$\frac{7}{16}$
$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
$\frac{9}{16}$	$\frac{9}{16}$	$\frac{9}{16}$	$\frac{9}{16}$	$\frac{9}{16}$
$\frac{5}{8}$	$\frac{5}{8}$	$\frac{5}{8}$	$\frac{5}{8}$	$\frac{5}{8}$
$\frac{11}{16}$	$\frac{11}{16}$	$\frac{11}{16}$	$\frac{11}{16}$	$\frac{11}{16}$
$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$
$\frac{7}{8}$	$\frac{7}{8}$	$\frac{7}{8}$	$\frac{7}{8}$	$\frac{7}{8}$
1	1	1	1	1

Price each, any size \$0.40

Bit Brace Extensions



For operating sockets by means of an ordinary bit brace. Made in 3-inch, 6-inch and 9-inch lengths. For work difficult of access.

370A, 9 inches long; 370B, 6 inches long; 370C, 3 inches long. Price per set \$1.20

Any size separately60

All three extensions fit all sizes standard sockets.

Offset Socket Handle



No. 320. Offset handle, mottled finish; length, 10 inches. Price each \$0.40

This wrench will fit the pressed steel sockets shown on this page.

Williams' Demountable-Rim Tool



Patented in the United States.

Drop-forged from a strong, tough grade of specially selected steel, each working part is tempered specially for its intended use. The hammer and face of wrench are polished bright; otherwise the tool is black-finished.

It thoroughly replaces and reliably cares for the work of individual screw driver, special wrench, hammer and tire tool, for the rapid execution of demountable rim and new tire work—all tools for these purposes in one.

Hexagon Socket Opening Across Flats, Inches	Length Overall, Inches	Weight	Price Each
$\frac{3}{8}$	$9\frac{1}{2}$	1 lb. 6 oz.	\$1.00
$\frac{1}{2}$	$9\frac{3}{4}$	1 lb. 6 oz.	1.00
$\frac{5}{8}$	$9\frac{1}{2}$	1 lb. 6 oz.	1.00

List showing sizes of nuts on rims which are usually fitted to the cars mentioned:

$\frac{3}{8}$ -inch: Cadillac, Hudson, Hupmobile, Studebaker.
 $\frac{1}{2}$ -inch: Apperson, Cole, Locomobile, Marion, National, Packard, Pathfinder, Pierce Arrow, White, Winton.

$\frac{5}{8}$ -inch: Buick, Chalmers, Dodge, King, Oakland, Oldsmobile.

Specify size when ordering.

Spark Plug Wrenches



Drop-forged from steel and designed for convenient service about automobiles, motor boats, gas engines, etc., and equally adaptable for use upon flush or depressed plugs.

No.	Box End, Opening Broached	Open End, Opening Milled	Length	Price Each		
				Un-finished	Semi-finished	Finished
993	$\frac{3}{8}$	$\frac{1}{2}$	8	\$0.40	\$0.58	\$0.85
993A	$\frac{1}{2}$	$\frac{3}{4}$	8	.40	.68	.85
994	1	$\frac{3}{4}$	$8\frac{1}{2}$	.50	.70	1.00

H.Channon Company Chicago

Ratchet Wrenches

Lowell Reversible Ratchet Wrenches



Changeable to right or left hand motion at pleasure. Can be changed to a ratchet drill by removing cap and replacing gear by drill socket.

Price—Including One Socket Only

No.	Lever, Inches	Price Each
1	10	\$ 6.00
2	12	8.00
3	15	10.00
*3½	18	12.00
4	18	14.00

*This handle takes a No. 3 gear.

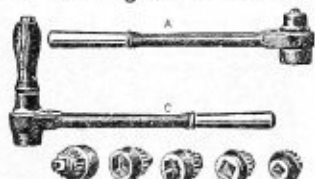
Price Wrench Sockets

No.	Square Opening	Hexagon Opening	Each
1	¾, 1, 1½	¾, 1	\$1.00
2	1, 1½, 2	1, 1½, 2	1.20
3	1½, 2, 2½, 3	2, 2½, 3, 3½	1.50
4	2, 2½, 3, 3½, 4	3, 3½, 4, 4½, 5	2.00

When ordering state size and shape (sq. or hex.) hole wanted.

Give actual opening or outside diameter of nut. See special note below.

Lowell Lag Screw Wrench



Easily changeable for various sizes by means of the different sockets. Will turn screws, nuts or bolts either way without taking off the wrench.

Price—Including One Socket Only

No.	Lgth. Handle, Inches	Style Handle	Capacity, Inches	Price Each	Extra Sockets Each
1	12	A	¾, 1, 1½, 2, 2½, 3, 3½, 4, 4½, 5, 1½ square, 1½, 2, 2½, 3, 3½, 4, 4½, 5, 1½ hexagon	\$3.50	\$0.80
1	12	C	¾, 1, 1½, 2, 2½, 3, 3½, 4, 4½, 5, 1½ hex.	4.00	.80
*2	16	A or C	1, 1½, 2, 2½, 3, 3½, 4, 4½, 5, 1½ hex.	6.00	1.50
*3	20	A or C	1½, 2, 2½, 3, 3½, 4, 4½, 5, 1½ hex.	9.00	2.00

*For either square or hex. nuts. See note below.

Bridge Builders' Ratchet Wrench



No.	Size Lever Ins.	Size Square Openings, Inches	Size Hexagon Openings, Inches	Price Incl'g One Gear Only	Extra Gears Each
1	36	1½, 2, 2½	1½, 2, 2½, 3	\$16.00	\$2.00
2	36	1½, 2, 2½, 3	2, 2½, 3, 3½	28.00	4.00
3	39	2, 2½, 3, 3½	2½, 3, 3½, 4	32.00	6.00

Steel Socket Bridge Ratchet Wrench



Will turn nut either way without removing wrench. Made from carefully selected steel castings and warranted to give satisfaction.

Price—Including One Socket Only

No.	Lgth. Hndl. Ins.	Will Take Sockets Having Openings Size, Inches	Wt. Lbs.	Price Each	Extra Sockets Each
1	24	1½, 2, 2½, 3, 3½, 4, 4½, 5	10	\$12.00	\$2.00
2	36	2, 2½, 3, 3½, 4, 4½, 5	23	28.00	4.00
3	36	3, 3½, 4, 4½, 5	50	40.00	9.00

Capacities listed are either square or hex. nuts. Odd sizes made to order. See note below.

Silo Ratchet Wrench

Simple in construction and works quickly, easily and safely. Made especially for erecting silos where rods are used. A rod or bolt will pass through the hole of the socket, making it possible to turn the nut any distance desired. It is furnished with any two of the following removable and reversible sockets, made for square or hexagon U. S. standard nuts, ¼, ½, ¾, 1, 1½, 2, 2½, 3, 3½, 4, 4½, 5, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58, 60, 62, 64, 66, 68, 70, 72, 74, 76, 78, 80, 82, 84, 86, 88, 90, 92, 94, 96, 98, 100, 102, 104, 106, 108, 110, 112, 114, 116, 118, 120, 122, 124, 126, 128, 130, 132, 134, 136, 138, 140, 142, 144, 146, 148, 150, 152, 154, 156, 158, 160, 162, 164, 166, 168, 170, 172, 174, 176, 178, 180, 182, 184, 186, 188, 190, 192, 194, 196, 198, 200, 202, 204, 206, 208, 210, 212, 214, 216, 218, 220, 222, 224, 226, 228, 230, 232, 234, 236, 238, 240, 242, 244, 246, 248, 250, 252, 254, 256, 258, 260, 262, 264, 266, 268, 270, 272, 274, 276, 278, 280, 282, 284, 286, 288, 290, 292, 294, 296, 298, 300, 302, 304, 306, 308, 310, 312, 314, 316, 318, 320, 322, 324, 326, 328, 330, 332, 334, 336, 338, 340, 342, 344, 346, 348, 350, 352, 354, 356, 358, 360, 362, 364, 366, 368, 370, 372, 374, 376, 378, 380, 382, 384, 386, 388, 390, 392, 394, 396, 398, 400, 402, 404, 406, 408, 410, 412, 414, 416, 418, 420, 422, 424, 426, 428, 430, 432, 434, 436, 438, 440, 442, 444, 446, 448, 450, 452, 454, 456, 458, 460, 462, 464, 466, 468, 470, 472, 474, 476, 478, 480, 482, 484, 486, 488, 490, 492, 494, 496, 498, 500, 502, 504, 506, 508, 510, 512, 514, 516, 518, 520, 522, 524, 526, 528, 530, 532, 534, 536, 538, 540, 542, 544, 546, 548, 550, 552, 554, 556, 558, 560, 562, 564, 566, 568, 570, 572, 574, 576, 578, 580, 582, 584, 586, 588, 590, 592, 594, 596, 598, 600, 602, 604, 606, 608, 610, 612, 614, 616, 618, 620, 622, 624, 626, 628, 630, 632, 634, 636, 638, 640, 642, 644, 646, 648, 650, 652, 654, 656, 658, 660, 662, 664, 666, 668, 670, 672, 674, 676, 678, 680, 682, 684, 686, 688, 690, 692, 694, 696, 698, 700, 702, 704, 706, 708, 710, 712, 714, 716, 718, 720, 722, 724, 726, 728, 730, 732, 734, 736, 738, 740, 742, 744, 746, 748, 750, 752, 754, 756, 758, 760, 762, 764, 766, 768, 770, 772, 774, 776, 778, 780, 782, 784, 786, 788, 790, 792, 794, 796, 798, 800, 802, 804, 806, 808, 810, 812, 814, 816, 818, 820, 822, 824, 826, 828, 830, 832, 834, 836, 838, 840, 842, 844, 846, 848, 850, 852, 854, 856, 858, 860, 862, 864, 866, 868, 870, 872, 874, 876, 878, 880, 882, 884, 886, 888, 890, 892, 894, 896, 898, 900, 902, 904, 906, 908, 910, 912, 914, 916, 918, 920, 922, 924, 926, 928, 930, 932, 934, 936, 938, 940, 942, 944, 946, 948, 950, 952, 954, 956, 958, 960, 962, 964, 966, 968, 970, 972, 974, 976, 978, 980, 982, 984, 986, 988, 990, 992, 994, 996, 998, 1000, 1002, 1004, 1006, 1008, 1010, 1012, 1014, 1016, 1018, 1020, 1022, 1024, 1026, 1028, 1030, 1032, 1034, 1036, 1038, 1040, 1042, 1044, 1046, 1048, 1050, 1052, 1054, 1056, 1058, 1060, 1062, 1064, 1066, 1068, 1070, 1072, 1074, 1076, 1078, 1080, 1082, 1084, 1086, 1088, 1090, 1092, 1094, 1096, 1098, 1100, 1102, 1104, 1106, 1108, 1110, 1112, 1114, 1116, 1118, 1120, 1122, 1124, 1126, 1128, 1130, 1132, 1134, 1136, 1138, 1140, 1142, 1144, 1146, 1148, 1150, 1152, 1154, 1156, 1158, 1160, 1162, 1164, 1166, 1168, 1170, 1172, 1174, 1176, 1178, 1180, 1182, 1184, 1186, 1188, 1190, 1192, 1194, 1196, 1198, 1200, 1202, 1204, 1206, 1208, 1210, 1212, 1214, 1216, 1218, 1220, 1222, 1224, 1226, 1228, 1230, 1232, 1234, 1236, 1238, 1240, 1242, 1244, 1246, 1248, 1250, 1252, 1254, 1256, 1258, 1260, 1262, 1264, 1266, 1268, 1270, 1272, 1274, 1276, 1278, 1280, 1282, 1284, 1286, 1288, 1290, 1292, 1294, 1296, 1298, 1300, 1302, 1304, 1306, 1308, 1310, 1312, 1314, 1316, 1318, 1320, 1322, 1324, 1326, 1328, 1330, 1332, 1334, 1336, 1338, 1340, 1342, 1344, 1346, 1348, 1350, 1352, 1354, 1356, 1358, 1360, 1362, 1364, 1366, 1368, 1370, 1372, 1374, 1376, 1378, 1380, 1382, 1384, 1386, 1388, 1390, 1392, 1394, 1396, 1398, 1400, 1402, 1404, 1406, 1408, 1410, 1412, 1414, 1416, 1418, 1420, 1422, 1424, 1426, 1428, 1430, 1432, 1434, 1436, 1438, 1440, 1442, 1444, 1446, 1448, 1450, 1452, 1454, 1456, 1458, 1460, 1462, 1464, 1466, 1468, 1470, 1472, 1474, 1476, 1478, 1480, 1482, 1484, 1486, 1488, 1490, 1492, 1494, 1496, 1498, 1500, 1502, 1504, 1506, 1508, 1510, 1512, 1514, 1516, 1518, 1520, 1522, 1524, 1526, 1528, 1530, 1532, 1534, 1536, 1538, 1540, 1542, 1544, 1546, 1548, 1550, 1552, 1554, 1556, 1558, 1560, 1562, 1564, 1566, 1568, 1570, 1572, 1574, 1576, 1578, 1580, 1582, 1584, 1586, 1588, 1590, 1592, 1594, 1596, 1598, 1600, 1602, 1604, 1606, 1608, 1610, 1612, 1614, 1616, 1618, 1620, 1622, 1624, 1626, 1628, 1630, 1632, 1634, 1636, 1638, 1640, 1642, 1644, 1646, 1648, 1650, 1652, 1654, 1656, 1658, 1660, 1662, 1664, 1666, 1668, 1670, 1672, 1674, 1676, 1678, 1680, 1682, 1684, 1686, 1688, 1690, 1692, 1694, 1696, 1698, 1700, 1702, 1704, 1706, 1708, 1710, 1712, 1714, 1716, 1718, 1720, 1722, 1724, 1726, 1728, 1730, 1732, 1734, 1736, 1738, 1740, 1742, 1744, 1746, 1748, 1750, 1752, 1754, 1756, 1758, 1760, 1762, 1764, 1766, 1768, 1770, 1772, 1774, 1776, 1778, 1780, 1782, 1784, 1786, 1788, 1790, 1792, 1794, 1796, 1798, 1800, 1802, 1804, 1806, 1808, 1810, 1812, 1814, 1816, 1818, 1820, 1822, 1824, 1826, 1828, 1830, 1832, 1834, 1836, 1838, 1840, 1842, 1844, 1846, 1848, 1850, 1852, 1854, 1856, 1858, 1860, 1862, 1864, 1866, 1868, 1870, 1872, 1874, 1876, 1878, 1880, 1882, 1884, 1886, 1888, 1890, 1892, 1894, 1896, 1898, 1900, 1902, 1904, 1906, 1908, 1910, 1912, 1914, 1916, 1918, 1920, 1922, 1924, 1926, 1928, 1930, 1932, 1934, 1936, 1938, 1940, 1942, 1944, 1946, 1948, 1950, 1952, 1954, 1956, 1958, 1960, 1962, 1964, 1966, 1968, 1970, 1972, 1974, 1976, 1978, 1980, 1982, 1984, 1986, 1988, 1990, 1992, 1994, 1996, 1998, 2000, 2002, 2004, 2006, 2008, 2010, 2012, 2014, 2016, 2018, 2020, 2022, 2024, 2026, 2028, 2030, 2032, 2034, 2036, 2038, 2040, 2042, 2044, 2046, 2048, 2050, 2052, 2054, 2056, 2058, 2060, 2062, 2064, 2066, 2068, 2070, 2072, 2074, 2076, 2078, 2080, 2082, 2084, 2086, 2088, 2090, 2092, 2094, 2096, 2098, 2100, 2102, 2104, 2106, 2108, 2110, 2112, 2114, 2116, 2118, 2120, 2122, 2124, 2126, 2128, 2130, 2132, 2134, 2136, 2138, 2140, 2142, 2144, 2146, 2148, 2150, 2152, 2154, 2156, 2158, 2160, 2162, 2164, 2166, 2168, 2170, 2172, 2174, 2176, 2178, 2180, 2182, 2184, 2186, 2188, 2190, 2192, 2194, 2196, 2198, 2200, 2202, 2204, 2206, 2208, 2210, 2212, 2214, 2216, 2218, 2220, 2222, 2224, 2226, 2228, 2230, 2232, 2234, 2236, 2238, 2240, 2242, 2244, 2246, 2248, 2250, 2252, 2254, 2256, 2258, 2260, 2262, 2264, 2266, 2268, 2270, 2272, 2274, 2276, 2278, 2280, 2282, 2284, 2286, 2288, 2290, 2292, 2294, 2296, 2298, 2300, 2302, 2304, 2306, 2308, 2310, 2312, 2314, 2316, 2318, 2320, 2322, 2324, 2326, 2328, 2330, 2332, 2334, 2336, 2338, 2340, 2342, 2344, 2346, 2348, 2350, 2352, 2354, 2356, 2358, 2360, 2362, 2364, 2366, 2368, 2370, 2372, 2374, 2376, 2378, 2380, 2382, 2384, 2386, 2388, 2390, 2392, 2394, 2396, 2398, 2400, 2402, 2404, 2406, 2408, 2410, 2412, 2414, 2416, 2418, 2420, 2422, 2424, 2426, 2428, 2430, 2432, 2434, 2436, 2438, 2440, 2442, 2444, 2446, 2448, 2450, 2452, 2454, 2456, 2458, 2460, 2462, 2464, 2466, 2468, 2470, 2472, 2474, 2476, 2478, 2480, 2482, 2484, 2486, 2488, 2490, 2492, 2494, 2496, 2498, 2500, 2502, 2504, 2506, 2508, 2510, 2512, 2514, 2516, 2518, 2520, 2522, 2524, 2526, 2528, 2530, 2532, 2534, 2536, 2538, 2540, 2542, 2544, 2546, 2548, 2550, 2552, 2554, 2556, 2558, 2560, 2562, 2564, 2566, 2568, 2570, 2572, 2574, 2576, 2578, 2580, 2582, 2584, 2586, 2588, 2590, 2592, 2594, 2596, 2598, 2600, 2602, 2604, 2606, 2608, 2610, 2612, 2614, 2616, 2618, 2620, 2622, 2624, 2626, 2628, 2630, 2632, 2634, 2636, 2638, 2640, 2642, 2644, 2646, 2648, 2650, 2652, 2654, 2656, 2658, 2660, 2662, 2664, 2666, 2668, 2670, 2672, 2674, 2676, 2678, 2680, 2682, 2684, 2686, 2688, 2690, 2692, 2694, 2696, 2698, 2700, 2702, 2704, 2706, 2708, 2710, 2712, 2714, 2716, 2718, 2720, 2722, 2724, 2726, 2728, 2730, 2732, 2734, 2736, 2738, 2740, 2742, 2744, 2746, 2748, 2750, 2752, 2754, 2756, 2758, 2760, 2762, 2764, 2766, 2768, 2770, 2772, 2774, 2776, 2778, 2780, 2782, 2784, 2786, 2788, 2790, 2792, 2794, 2796, 2798, 2800, 2802, 2804, 2806, 2808, 2810, 2812, 2814, 2816, 2818, 2820, 2822, 2824, 2826, 2828, 2830, 2832, 2834, 2836, 2838, 2840, 2842, 2844, 2846, 2848, 2850, 2852, 2854, 2856, 2858, 2860, 2862, 2864, 2866, 2868, 2870, 2872, 2874, 2876, 2878, 2880, 2882, 2884, 2886, 2888, 2890, 2892, 2894, 2896, 2898, 2900, 2902, 2904, 2906, 2908, 2910, 2912, 2914, 2916, 2918, 2920, 2922, 2924, 2926, 2928, 2930, 2932, 2934, 2936, 2938, 2940, 2942, 2944, 2946, 2948, 2950, 2952, 2954, 2956, 2958, 2960, 2962, 2964, 2966, 2968, 2970, 2972, 2974, 2976, 2978, 2980, 2982, 2984, 2986, 2988, 2990, 2992, 2994, 2996, 2998, 3000, 3002, 3004, 3006, 3008, 3010, 3012, 3014, 3016, 3018, 3020, 3022, 3024, 3026, 3028, 3030, 3032, 3034, 3036, 3038, 3040, 3042, 3044, 3046, 3048, 3050, 3052, 3054, 3056, 3058, 3060, 3062, 3064, 3066, 3068, 3070, 3072, 3074, 3076, 3078, 3080, 3082, 3084, 3086, 3088, 3090, 3092, 3094, 3096, 3098, 3100, 3102, 3104, 3106, 3108, 3110, 3112, 3114, 3116, 3118, 3120, 3122, 3124, 3126, 3128, 3130, 3132, 3134, 3136, 3138, 3140, 3142, 3144, 3146, 3148, 3150, 3152, 3154, 3156, 3158, 3160, 3162, 3164, 3166, 3168, 3170, 3172, 3174, 3176, 3178, 3180, 3182, 3184, 3186, 3188, 3190, 3192, 3194, 3196, 3198, 3200, 3202, 3204, 3206, 3208, 3210, 3212, 3214, 3216, 3218, 3220, 3222, 3224, 3226, 3228, 3230, 3232, 3234, 3236, 3238, 3240, 3242, 3244, 3246, 3248, 3250, 3252, 3254, 3256, 3258, 3260, 3262, 3264, 3266, 3268, 3270, 3272, 3274, 3276, 3278, 3280, 3282, 3284, 3286, 3288, 3290, 3292, 3294, 3296, 3298, 3300, 3302, 3304, 3306, 3308, 3310, 3312, 3314, 3316, 3318, 3320, 3322, 3324, 3326, 3328, 3330, 3332, 3334, 3336, 3338, 3340, 3342, 3344, 3346, 3348, 3350, 3352, 3354, 3356,

Thin Double End Wrenches in Sets



These double-end wrenches, are made from pressed steel, and being hardened and tempered, are strong as drop forged wrenches. All have mottled finish. The semi-finish have square edges; the finished, round edges; and the extra finish have round edges with heads, bright and lacquered. One advantageous feature of this wrench is that they are thin and can be used in places where the ordinary wrench is not accessible. They have a straight bar, but the openings are offset at an angle of 20 degrees. The openings are milled to size. Packed in canvas case or cardboard box.

Set No. 1—General Service Set

Sizes of Openings, Inches	Length, Inches	Thickness, Inches	Price per Set		
			Semi-Finished	Finished	Extra Finish
1/4 & 3/8	3 3/4	5/16	In Canvas Case		
1/2 & 1/2	4	3/8	\$1.48	\$1.77	\$2.18
3/4 & 3/4	4 1/4	1/2	In Cardboard Box		
1 & 1	6 3/4	3/4	\$0.98	\$1.27	\$1.68
1 1/4 & 1 1/4	8 3/4	1			

Set No. 3—For Automobiles (S. A. E. Standard)

Sizes of Openings, Inches	Std. Nuts and Cap Screws, Bolt Size	Lgth., Ins.	Thickness, Ins.	Price per Set		
				Semi-finished	Finished	Extra Finish
1/4 & 1/4	1/4 & 1/4	4	5/16	In Canvas Case		
1/2 & 1/2	1/2 & 1/2	5 1/4	3/8	\$2.12	\$2.49	\$3.07
3/4 & 3/4	3/4 & 3/4	8	1/2	In Cardboard Box		
1 & 1	1 & 1	8 3/4	3/4	\$1.52	\$1.89	\$2.47
1 1/4 & 1 1/4	1 1/4 & 1 1/4	11	1			

Set No. 4—For Garages

Sizes of Openings, Inches	Std. Bolts and Nuts, Bolt Sizes, Inches	S. A. E. Std. Screw Size, Ins.	Lgth., Ins.	Thickness, Ins.	Prices		
					Semi-Finished	Finished	Full Finished
1/4 & 1/4	1/4 & 1/4	4	4 1/4	5/16	\$0.13	\$0.17	\$0.22
1/2 & 1/2	1/2 & 1/2	5 1/4	4 3/4	3/8	.17	.22	.28
3/4 & 3/4	3/4 & 3/4	8	4 3/4	1/2	.17	.22	.28
1 & 1	1 & 1	8 3/4	5 1/4	3/4	.21	.27	.35
1 1/4 & 1 1/4	1 1/4 & 1 1/4	11	6 3/4	1	.25	.32	.42
			8	1 1/4	.29	.36	.49
			8 3/4	1 1/2	.33	.42	.58
			8 3/4	1 3/4	.33	.42	.58
			11	2	.52	.62	.77

Packed in natural wood box with sliding cover.



"Marvel"

Socket Wrench Adjustable

Gives a positive grip on either square or hexagon nuts, 1/4 to 1 1/4 inches. Will also work to advantage on an offset. Takes the place of a great number of socket wrenches and will not mutilate or jam the nuts in any way. With the extension it can be used in places not accessible to the ordinary wrench. Handle works with ratchet. Made of drop forged tool steel. Price each.....\$3.50

The W. & B. Auto Wrench



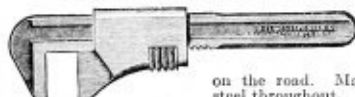
A strong wrench with head and bar drop forged in one piece from open hearth steel. Adapted for automobile and other work where a wrench with thin jaws is required. Thickness of head 5/8-inch. Jaws open 1 1/2 inches. Length, 10 inches. Price each.....\$1.50

Channon Adjustable Auto Wrench



Drop forged from high grade steel; malleable jaw; case hardened. A most substantial wrench for automobile, motor boat, bicycle or general use. Length, 9 inches. Opens 2 1/2 inches. Price each.....\$0.50

Billings Adjustable Auto Wrench

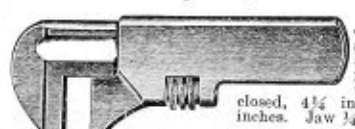


A very strong and serviceable wrench for use on the road. Made of drop forged steel throughout.

Price Each

Number	2	3	4	5
Length, inches	8	10 1/4	12 1/4	14 1/4
Opens, inches	1 1/2	2 1/2	3 1/2	4 1/2
Finished	\$1.00	\$1.20	\$1.80	\$2.40
Semi-finished	.90	1.00	1.50	2.00

Billings Bicycle Wrench



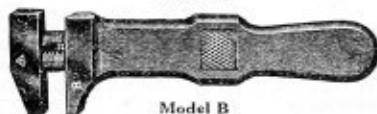
One of the highest grade and most satisfactory adjustable bicycle and pocket wrenches on the market. Length closed, 4 1/2 inches. Opens 1 1/2 inches. Jaw 3/4-inch thick.

Price each, nicked.....\$0.50
Price each, black......65

Billings Pocket Wrenches



Model A



Model B

Drop forged from bar steel and finished in black and full nickel plated. Sliding bar graduated to 32nds of an inch with oval edges.

Model C has a round knurled handle.
Models D and E are similar to Model B in form.

Price Each

Model	A	B	C	D	E
Length closed, inches	4 1/4	5	5	6	7
Opens, inches	1	1	1	1 1/4	1 1/2
Thickness, inches	1/8	3/8	3/8	1/2	5/8
Weight, ounces	7 1/2	7 1/2	7	11 1/4	16
Nickel	\$1.00	\$1.00	\$1.10	\$1.20	\$1.50
Black	.90	.90	1.00	1.00	1.20

W. & B. Wrenches

Machinist's Knife Handle



Railroad Special



Machinist's Steel Handle



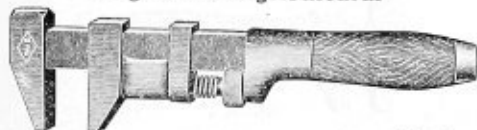
Machinist's Knife Handle Wrench. The head and bar drop forged in one piece, from special steel. Bar is extra heavy, fitted with hickory hand grip and entire wrench is practically indestructible. Jaws are case hardened and all metal parts finished in black.

Machinist's Steel Handle Wrench. A semi-finished wrench, strictly first quality and designed for hard service. Head and jaws are drop forged in one piece. Jaws are hardened and handle is of steel. Equal to the best wrenches in every way except finish.

The Railroad Special Wrench. An exceedingly strong, exceptionally well made tool, intended for heavy duty. Very similar to the Machinist's Knife Handle Wrench, except that it has a steel handle. Warranted against defect in material or workmanship.

Length Over All, Inches	Machinist's Knife Handle				Railroad Special				Machinist's Steel Handle			
	Price per Dozen	Price Each	Jaws Open Inches	Weight per Doz., Pounds	Price per Dozen	Price Each	Jaws Open Inches	Weight per Doz., Pounds	Price per Dozen	Price Each	Jaws Open Inches	Weight per Doz., Pounds
6	\$10.00	\$1.00	1	10	\$10.00	\$1.00	1	10	\$10.00	\$1.00	1	10
8	12.00	1.20	1 1/2	19	12.00	1.20	1 1/2	20	12.00	1.20	1 1/2	17
10	14.00	1.40	1 3/4	32	14.00	1.40	1 3/4	32	14.00	1.40	1 3/4	28
12	18.00	1.80	2 1/4	40	18.00	1.80	2 1/4	40	18.00	1.80	2 1/4	41
15	24.00	2.40	2 3/8	63	24.00	2.40	2 3/8	62	24.00	2.40	2 3/8	60
18	32.00	3.20	3	96	32.00	3.20	3	98	32.00	3.20	3	94
21	39.00	3.90	3 5/8	137	39.00	3.90	3 5/8	140	39.00	3.90	3 5/8	122

Regular or Agricultural



This wrench is similar in construction and finish to the Machinist's Knife Handle Wrench described and illustrated above, except that it has a lighter bar, and has a regular, instead of a knife handle. Fitted with easy acting screw.

Combination



This wrench combines all the desirable features of both pipe and nut wrenches, adapting it to a wide range of work. Head and bar forged in one piece from best crucible steel. Provided with knife handle and seasoned wood grip.

Length Over All, Inches	Price per Dozen	Price Each	Will Open, Inches	Weight Each, Pounds	Length Over All, Inches	Price per Doz.	Price Each	Holds, Pipe Size, Inches	Jaws Open, Inches	Approx. Weight Dozen, Pounds
6	\$10.00	\$1.00	1	2 3/8	10	\$23.00	\$2.30	1/4 to 1	2 3/8	28
8	12.00	1.20	1 1/4	1 3/4	12	26.00	2.60	1/2 to 1 3/4	2 3/4	43
10	14.00	1.40	1 3/8	1 7/8	15	37.00	3.70	1/2 to 2 1/4	3 1/4	68
12	18.00	1.80	2	2 1/8	18	66.00	6.60	1/2 to 3	4 1/2	100
15	24.00	2.40	2 3/8	3 1/2						

Adjustable Wrenches

Crescent Pattern—Adjustable Wrench

This wrench follows in outline the solid 22½° engineer's wrench, the most serviceable of all solid wrenches. The 10-inch size takes the place of 9 sizes of solid wrenches. It is quickly adjustable to all nuts within its range. Made of drop forged steel except the movable jaw, which is made of a special alloy having four times the strength of ordinary steel.

Length, inches.....	4	6	8	10	12
Capacity, inches.....	½	¾	1	1½	2
Weight, ounces.....	2	5	10	18	32
Price, per dozen.....	\$7.80	\$7.80	\$9.60	\$12.00	\$15.00
Price, each.....	0.78	0.78	0.96	1.20	1.50

Can be used in corners and close quarters inaccessible with an ordinary wrench. Handle is made of malleable iron and jaw is drop forged steel. Nicely finished and strongly made to withstand the severest strains.

Number.....	76	78	80	82	84
Length, inches.....	6	8	10	12	14
Capacity, inches.....	¾	1	1½	2	2½
Price, each.....	\$0.72	\$0.90	\$1.20	\$1.50	\$2.10
Price, per dozen.....	7.20	9.00	12.00	15.00	21.00

Adjustable S. Pipe Wrench

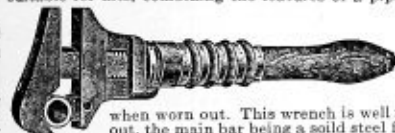
The handiest and most convenient tool of its kind made, and a vast improvement over the old style adjustable wrench, having the pipe gripping teeth in the movable jaw instead of the solid jaw. Handle is made of malleable iron with forged tool steel jaws.

Number.....	86	88	90	92	94
Length, inches.....	6	8	10	12	14
Capacity, inches.....	¾	1	1½	2	2½
Price, per dozen.....	\$7.20	\$9.00	\$12.00	\$15.00	\$21.00
Price, each.....	0.72	0.90	1.20	1.50	2.10



Long Nut Combination Wrench

This is a very convenient wrench for mechanics and especially suitable for kits, combining the features of a pipe and monkey wrench.



The small dog with the pipe teeth can be replaced when worn out. This wrench is well made throughout, the main bar being a solid steel forging.

Length, inches.....	8	10	12	15	18
Pipe, inches.....	¾	1	1½	2	2½
Weight, pounds.....	1½	2	3½	4½	7½
Price, per dozen.....	\$23.00	\$25.25	\$28.50	\$40.50	\$72.00
Price, each.....	2.30	2.53	2.85	4.05	7.20

Perfect Handle Monkey Wrench



This wrench is constructed in the same manner as the well known Perfect Handle Screw Driver and made from one piece of drop forged steel. It will be noticed from the illustration that a yoke joins the upper and lower straps of the sliding jaw, an exclusive feature.

Length, Inches	Price Dozen	Price Each	Opens, Inches
6	\$10.00	\$1.00	1½
8	12.00	1.20	1¾
10	14.00	1.40	2
12	18.00	1.80	2½
15	24.00	2.40	3
18	32.00	3.20	3½
21	39.00	3.90	4

Coe's Knife and Steel Handle Wrenches

Handle has cast semi-steel frame, hardwood sides. Screw is of hardened steel in one piece. Jaw is a semi-steel casting, hardened. Bar is of hardened steel. All parts are interchangeable.

Prices on Knife and Steel Handle

Size, Inches	Opens, Inches	Weight, Pounds	Price, Dozen	Price, Each	Size, Inches	Opens, Inches	Weight, Pounds	Price, Dozen	Price, Each
6	¾	¾	\$10.00	\$1.00	15	2½	6	\$24.00	\$2.40
8	1½	1½	12.00	1.20	18	3	8	32.00	3.20
10	2	2½	14.00	1.40	21	4	10	39.00	3.90
12	2½	3½	18.00	1.80					

Speed Nut Auto Wrench



The quickest nut wrench made. Gives a lightning grip on any nut from ¼ to ¾ inch. It is unnecessary to turn any thumb-screw or make any adjustments. The harder the pull the tighter it grips. Will not wear the corners of the nuts. Only three parts and will not get out of order. Made of drop forged steel.

Price each.....\$1.70

Coe's Key Model Wrench



This wrench is made from the best forged steel and is intended for extra heavy service and for use on large work. Each size has a wide range, because of the key feature. The movable jaw can be moved up and down the bar, and wedged by the key as shown in illustration. This does not, however, interfere with the adjustment of the thumb-screw.

The 28-inch size will take a 3-inch; the 36-inch, a 4-inch, and the 48-inch, a 6-inch regular pipe union.

Length, Inches	Opens, Inches	Weight, Pounds	Price, Each
28	5½	17	\$10.50
36	6½	27	22.00
48	9½	62	58.00



Ideal Chain Wrench



The Ideal chain wrench has a double set of jaws, the outer set for pipe, the inner set for fittings, valves, etc. The V shaped jaws take hold of the beaded fitting or irregular shaped article at two points, one jaw on each side, giving a positive hold.

The automatic chain lock, an exclusive feature, obviates the necessity of lifting or inserting the chain by hand. The operator, by simply pulling the chain, causes it to drop into the lock with all slack taken up. The chain while locked, is held with absolute security, even if held in an inverted position.

The jaws are drop forged tool steel. The handle is made of spring steel, combining strength and efficiency with lightness.

List Prices

	\$6.00	\$8.00	\$11.00	\$16.00	\$18.00	\$20.00
Wrench with cable chain.....	3.50	5.00	6.50	8.25	8.25	8.25
Jaws complete with bolts and pins.....	1.63	2.25	2.93	3.75	3.75	3.75
Jaws right or left.....	.95	1.20	1.70	3.00	5.00	7.00
Cable chain (Norway iron).....	6.90	9.20	12.65	18.40		
Wrench with flat link chain.....	2.00	3.00	4.00	6.00		
Flat link chain.....						

Dimensions and Weights

Number of wrench.....	2	3	4	5	No. 5 Wrench With Extra Long Chain	
					5A	5B
Capacity size pipe.....	1½ to 3½	1 to 5	2 to 8	2½ to 12	2½ to 16	2½ to 20
Capacity size fittings.....	1½ to 3	1 to 4	2 to 6	2½ to 10	2½ to 12	2½ to 14
Length of wrench, inches.....	27	38	49	61	61	61
Weight of wrench.....	10	18	28	50	53	57
Size and length cable chain.....	¾x20	¾x30	¾x35	¾x50	¾x62	¾x74
Size and length flat link chain.....	¾x23	¾x30	¾x37	¾x53		

Gripwell Chain Pipe Wrenches



These chain wrenches are drop forged from crucible steel. Jaws are interchangeable and so fitted to the handle that very little strain falls on the bolt, which merely holds the jaws in place. Chain swings from an eye forged in end of handle, making it reversible. Jaws are perfectly tempered and can be sharpened by filing only. Chains are hand-made from special steel.

Size No.	10	11	12	13	13½	14	15	16
Price each, with flat link chain.....	\$2.50	\$3.50	\$5.00	\$7.00	\$9.00	\$11.00	\$18.00	\$40.00
Capacity—Size pipe, inches.....	¾ to ¾	¾ to 1½	¾ to 2½	¾ to 4	1 to 6	1½ to 8	2 to 12	4 to 18
Length overall, inches.....	13½	20	27	37	44½	50½	64½	87
Extra flat link chains, each.....	\$0.75	\$1.00	\$1.50	\$2.50	\$3.50	\$4.50	\$7.50	\$20.00
Extra jaws, per pair.....	1.00	1.75	2.75	4.00	4.75	5.50	7.50	16.00
Average breaking strain, lbs., flat chain.....	3600	6700	9800	12500	14300	15700	21800	40000
Weight, pounds.....	1¾	5¾	10	16	24	31	50	137

Perfect Handle Adjustable Straight Handle Wrench No. 642



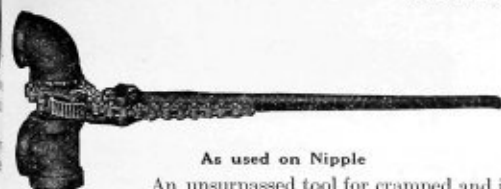
A powerful thin-head wrench especially adapted for motorists and machinists, and for places where the ordinary wrench will not enter.

A powerful press, capable of exerting a hundred tons pressure, closes in the ends or lips of the steel over the wooden handles and locks them in securely.

Length, inches.....	6	8	10
Opening, inches.....	¾	1¼	1¾
Price per dozen.....	\$10.00	\$12.50	\$15.00
Price each.....	1.00	1.25	1.50

Williams' "Agrippa" Drop Forged Chain Pipe and Fittings Wrench

With Single Jaw and Flat Link Chain only, for Turning or Holding both Pipe and Fittings from $\frac{1}{8}$ to 12 Inches Diameter



As used on Nipple



As used on Tee

An unsurpassed tool for cramped and irregular fittings which cannot be effectively handled with broader wrenches. It is particularly serviceable on flanges, short nipples and R. & L. hand fittings. The Wrench is made entirely from wrought steel; the single jaw is tempered for file-sharpening; all parts are interchangeable and replacements are carried in stock.

The Chains are hand made from steel manufactured expressly for them. To insure proper service each is "proof-tested" in a standard tension machine up to two-thirds of its "breaking strain" as listed in table. Each Chain so tested is stamped O on the drop-forged swinging link, thus absolutely establishing the safety-factor and reliability of every Wrench.

Number	20	21	22	23	23½	24	25
Capacity—Fittings.....	$\frac{1}{8}$ to $\frac{3}{4}$	$\frac{1}{8}$ to $1\frac{1}{2}$	$\frac{1}{4}$ to $2\frac{1}{2}$	$\frac{3}{4}$ to 4	1 to 6	$1\frac{1}{2}$ to 8	2 to 12
Extreme Length, inches.....	13½	20	27	37	44½	50½	64½
Weight, lbs.....	2½	5½	9½	17	24	32	50
Chain—Length, inches.....	10	15	19½	26	34	45	61
Breaking strain, lbs.....	3,600	6,700	9,800	12,500	14,300	15,700	21,800
Price—Complete Wrench.....	\$2.50	\$3.50	\$5.00	\$7.00	\$9.00	\$11.00	\$18.00
Extra Chains, each.....	1.00	1.25	1.75	2.75	4.00	5.00	8.00
Extra Jaws, each.....	1.00	1.75	2.75	4.00	4.75	5.50	7.50

Vulcan "Bijaw"

With Double-Ended Reversible Jaws for Pipe, Pipe Fittings, Bolts, Bars, Shafts, etc., from $\frac{1}{8}$ -inch to 12 inches



The "Vulcan Bijaw" Pipe Wrench is practically a four-in-one tool. All parts made of Drop Forged steel, are interchangeable and absolutely guaranteed. Flat, hand-made chain is of great strength and the jaws are tempered for file sharpening. The utility of tools is doubled and abundant strength and safety are preserved without encumbering design or adding extra weight.

Central Swing of Chain—Tool is always "right side up."

Guaranteed Strength—Will exceed printed tests.

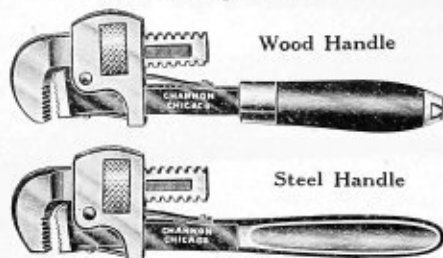
Reversible Jaws—Insure double life and an "always ready" tool. You get service of two or four tools at the cost of one.

No Spreading of Jaws When at Work—Jaws are fastened with two bolts and nuts, which, if injured, may be easily replaced. Nuts are readily released when reversing jaws.

Number	30	31	32	33	33½	34	35	*16
*Capacity—Size Pipe.....	$\frac{1}{8}$ to $\frac{3}{4}$	$\frac{1}{8}$ to $1\frac{1}{2}$	$\frac{1}{4}$ to $2\frac{1}{2}$	$\frac{3}{4}$ to 4	1 to 6	$1\frac{1}{2}$ to 8	2 to 12	4 to 18
Extreme Length, inches.....	13½	20	27	37	44½	50½	64½	87
Weight, lbs.....	2½	5½	10	16	24	31	50	137
Flat Link Chain—Length.....	9½	13½	17½	22½	31	39	54½	74½
Breaking strain, lbs.....	2,600	6,700	9,800	12,500	14,300	15,700	21,600	40,000
Cable Chain—Length.....	9½	14½	19	27	33½	42	57	76
Size Iron.....	½	¾	1	1½	2	2½	3	4
Breaking strain, lbs.....	1,300	4,000	6,000	10,500	12,500	15,000	19,000	40,000
Price—Complete Wrench.....	\$2.50	\$3.50	\$5.00	\$7.00	\$9.00	\$11.00	\$18.00	\$40.00
Extra Chains, each.....	.75	1.00	1.50	2.50	3.50	4.50	7.50	20.00
Extra Jaws, pair.....	1.00	1.75	2.75	4.00	4.75	5.50	7.50	16.00

H.Channon Company Chicago

Stillson Pipe Wrench



The Stillson pipe wrench is so well known, that a detailed description is unnecessary. Made with wooden handle in the 6 to 14-inch sizes, steel handle in the 8 to 48-inch sizes. The 8 and 10 inch, steel handle wrenches have enlarged grip, same as the wooden handle, and are also made with narrow jaws for automobile use. Prices same as regular wrenches.

Lgth., Ins.	Takes Pipe Up to	Price Each Complete	Jaw	Frame	Extra Steel Handle	Nut	Wood Handle Grip
6	1½	\$2.00	\$0.75	\$0.38	\$0.95	\$0.12	16
8	3¼	2.25	.80	.42	1.00	.15	16
10	1	2.50	.85	.50	1.10	.20	18
14	1½	3.50	1.15	.60	1.50	.30	25
18	2	5.00	1.75	.75	2.25	.35	28
24	2½	7.25	2.25	.95	3.50	.55	
36	3½	13.50	4.35	1.70	7.00	1.10	
48	1 to 5	20.00	7.50	2.20	10.50	1.50	

All sizes up to 24-inch, inclusive, are packed in wooden boxes of 1½ dozen each. 36 and 48-inch, packed in 1-6 dozen boxes.

Walco Adjustable Hex Wrench



The Walco adjustable hex wrench is the only monkey wrench made with jaws which grip on four sides of hexagonals. The jaws fit so nicely that they will not mar polished surfaces such as nickel plated fittings, etc. Plumbers and steam fitters will find it a perfect wrench for making up valves, bibbs, cocks and unions. Made from high grade tool steel with malleable iron frame.

No.	Size of Hexagon Across Flats	Length Open, Inches	Length Closed, Inches	Price Each
*0	1½ to 1	8¼	7½	\$ 1.75
1	1¼ to 1½	14	13	5.00
2	1½ to 2½	25	23	10.00

*This size especially adapted for automobiles, and has tire puller handle.

Parmelee Pipe Wrenches

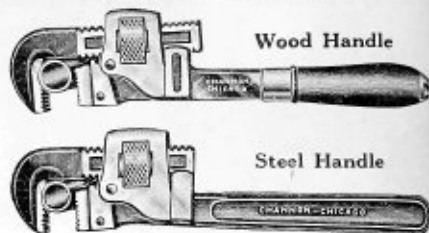


Grips with equal pressure all around pipe and will not crush the weakest pipe. Will make or break the tightest joints without injury to the pipe, because it has no teeth, making it especially suitable for galvanized pipe. Will handle pipes closely spaced as in coil work. Has ratchet-like action. Successive grips can be taken without having to hold the wrench on the pipe.

Set No.	Length Handle, Ins.	Size of Pipe Handled, Inches	Price Complete	Extra Handle	Extra Girths
1	10	¾, 1, 1½, 2	\$ 5.00	\$2.25	\$0.75
2½	20	1, 1½, 2, 2½, 3	7.50	3.00	1.00—1.25
4	25	2, 2½, 3	9.50	5.00	1.50
5	35	3½—4	13.00	7.50	2.50—3.00

Can furnish girths for rod or special tubing of any diameter from ¾-inch to 4½ inches for use with our regular handles.

Trimo Pipe Wrench



Drop forged from bar steel and interchangeable in all parts. Does not lock upon pipe but releases readily. Grips pipe firmly without lost motion; does not slip or crush pipe. Movable jaw and nut made with round top and bottom thread. Inserted jaw in handle can be replaced at small expense when worn, making wrench good as new. Made also with wooden handle in the 6 to 14-inch sizes.

Lgth., Open	Takes Pipe Up to	Price Each	Weight Each, Lbs.	Lgth., Open	Takes Pipe Up to	Price Each	Weight Each, Lbs.
6	1½	\$2.00	½	18	2	\$ 5.00	5
8	3¼	2.25	¾	24	2½	7.25	7½
10	1	2.50	1½	36	3½	13.50	16
14	1½	3.50	3¼	48	1 to 5	20.00	24

Extra Parts

Inches	6	8	10	14	18	24	36	48
Movable jaw, each	\$0.75	\$0.80	\$0.85	\$1.15	\$1.75	\$2.25	\$4.25	\$7.00
Nuts, each	.12	.15	.20	.30	.35	.55	1.10	1.80
Inserted jaws, each	.35	.40	.50	.60	.70	.80	1.10	2.00
Frames, each	.38	.42	.50	.60	.75	.95	1.70	2.50
Springs and Pins, each	.03	.03	.03	.03	.04	.04	.04	.04
Frame pins, each	.03	.03	.04	.04	.04	.04	.06	.06
Jaw pins, each	.03	.03	.04	.04	.04	.04	.06	.06
Steel handles, each	.95	1.00	1.10	1.50	2.25	3.50	7.00	10.00

All sizes to 24-inch, inclusive, packed in wooden boxes of 1½ dozen. 36 and 48-inch in 1-6 dozen boxes.

Furnished, unless otherwise ordered, as noted under Stillson wrenches.

Perfect Handle Pipe Wrench



The Perfect handle pipe wrench is undoubtedly the strongest made. The bar is one solid piece of drop forged bar steel, reinforced and having uniform strength from end to end. The handle is symmetrical in design and therefore not clumsy to handle. The wood in the handle is waterproofed and solid.

Length, inches	8	10	14	18	24
Inches of pipe	¾	1	1½	2	2½
Price each	\$2.25	\$2.50	\$3.50	\$5.00	\$7.50

Inches	8	10	14	18	24
Movable hook jaw	\$0.80	\$0.85	\$1.15	\$1.75	\$2.25
Knurled nut	.15	.20	.30	.35	.50
Frame or rocker	.42	.50	.60	.75	.80
Spring	.03	.03	.03	.04	.04
Frame pin	.03	.04	.04	.04	.04
Spring pin	.03	.04	.04	.04	.04

Sterling Power Hack Saw Blades



The Sterling power hack saw blades are drawn to a temper that makes them tough enough for soft steel and hard enough for tool steel, a degree most desirable in a hack saw blade. A blade that is a few gauges too heavy is far better than one too light for it will not break so easily and is therefore more economical. The heavy gauge power blades are made especially for use in high speed machines. The length, width and number of teeth of blades herewith shown are adjustable for practically every requirement.

Prices

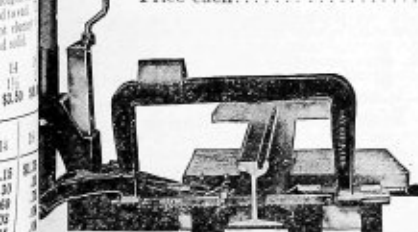
Lgth., Ins.	Width, Ins.	Thick- ness, Ins.	Gauge	Teeth	Price per Gross	Price per Dozen
10	5/8	.028	22	14	\$10.20	\$1.05
12	5/8	.028	22	14	12.60	1.25
12	3/4	.033	21	14	16.20	1.60
12	3/4	.049	18	10	23.40	2.35
12	1	.049	18	10	29.40	2.95
14	3/4	.033	21	14	18.90	1.90
14	3/4	.049	18	10	27.30	2.75
14	1	.049	18	10	34.30	3.45
16	3/4	.033	21	14	21.60	2.15
17	3/4	.033	21	14	22.95	2.30
17	3/4	.049	18	10	33.15	3.30
17	1	.049	18	10	41.65	4.15
17	1	.056	17	10	47.60	4.75
17	1	.065	16	10	53.55	5.35
18	1	.056	17	10	50.40	5.05
20	1	.056	17	10	56.00	5.60
24	1	.056	17	10	67.20	6.70
24	1	.065	16	10	75.60	7.55

Rail Hack Saw Machine

Will cut any kind of steel rail, beam or girder; is easily operated and cuts clean and quickly. The blade is governed by a guide which together with the frame and the blade can be raised or lowered at will, according to the depth of the work.

There is a great saving in blades when used in a device of this kind, as the action of the stroke is positive, and there being no side motion of any kind, breakage is almost impossible. Jaws grip rail firmly and can be adjusted to any size. Can be disengaged to allow passage of car and re-engaged losing practically no time at all. Takes 14-inch hack-saw blade.

Price each.....\$100.00



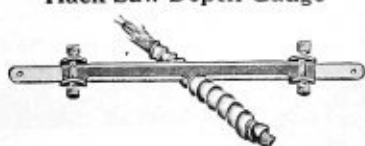
Sterling Blades for Hand Rail Hack Saw Frames and Light Power Machines



We recommend these blades for cutting rails, I beams and channels. They have a special set to the teeth which permits of a straight and rapid cut.

Lgth. Ins.	Width, Ins.	Thick- ness, Ins.	Gauge	No. of Teeth per Inch	Price per Gross	Price per Dozen
12	5/8	.028	22	14	\$10.20	\$1.05
14	5/8	.033	21	14	18.90	1.90
16	5/8	.033	21	14	21.60	2.15
17	5/8	.033	21	14	22.95	2.30
18	5/8	.033	21	14	24.30	2.40
20	5/8	.033	21	14	27.00	2.70

Hack Saw Depth Gauge



Especially adapted for cutting the walls of flexible conduits for electrical wiring without cutting into or injuring the interior insulation. Made of No. 14 gauge heavy pressed steel. The blade is held in place by the lower set of thumb screws which have their points shaped as tenons and hold the blade firmly to the gauge. Adjustable for blades 1/2-inch or narrower. Length 7 1/2 inches. Weight per dozen, 2 pounds.

Price per dozen.....\$5.00
Price each......50

We have a frame and a power saw suitable for every shop.

H. Channon Company Chicago

Sterling Hack Saw Blades



Sterling Hack Saw Blades are manufactured from a specially analyzed, high quality steel, imported. The steel is a high tungsten alloy, and is rolled by a mill with a world wide reputation for the quality of their product.

The heat treatment of the blade is applied by the most up-to-date methods. The teeth are all milled (not punched), and are set so as to cut straight and give proper clearance. When the proper pitches and gauges are used, Sterling Hack Saw Blades will be found to be the most efficient and economical to use.

To secure the maximum results, care should be taken to use the proper blades for the different classes of work. (See list below.) The speed and application of pressure are also important features in securing the best results.

When using blades in a hand frame they should be operated at 40 to 50 strokes per minute on hard metals and from 50 to 60 strokes per minute on soft metals. Pressure should be applied gently on the forward stroke, so that the teeth will cut, and not slip over the metal, as slipping quickly ruins the teeth. On the return stroke, the pressure should be released.

For cutting machinery and other soft steel with power machines, a speed of 90 to 120 strokes per minute should be employed, using water or a cutting compound. A good lubricant can be made by dissolving a handful of common soap in a gallon of water. On annealed tool steel, 60 to 70 strokes per minute should be the maximum and no compound or water used.

IMPORTANT. In ordering, be sure to specify length, width, thickness and tooth wanted, otherwise blades most commonly used will be furnished.

Sterling All-Hard Blades

Prices—Hand Frame Sizes

For Cutting				Soft Steel, Cast Iron, Bronze, Heavy Angle Iron, Etc.	Tool Steel, Hard Metals, Light Structural Shapes	Solid Brass Tubing (over 18 in.), Iron Pipe, Drill Rod Electrical Conduit, Copper	Thin Steel and Brass Tubing, Bicycle Tubing, Thin Sheet Metals	Prices	
Length	Width	Gauge	Thickness	Regular Teeth	Medium Teeth	Fine Teeth	Tubing Teeth	Gross	Net
8 in.	1 1/2 in.	23	.026	18	..	24	32	\$ 8.00	\$6.80
9 in.	1 1/2 in.	23	.026	18	..	24	32	9.00	.90
10 in.	1 1/2 in.	23	.026	14	18	24	32	10.00	1.00
12 in.	1 1/2 in.	23	.026	14	18	24	32	12.00	1.20
12 in.	1 1/2 in.	23	.026	14	18	24	32	12.30	1.23

Sterling Flexible Blades



We highly recommend the Sterling Flexible Double Hard Edge Blades for use among plumbers, steam fitters, electrical workers and for all outside structural work. These blades are unbreakable when used in a hand frame. Both the back and cutting edges of the blade are tempered, while the center is left soft and pliable. This allows sufficient flexibility and at the same time gives proper rigidity. This feature prevents in a large measure the gluing, sticking or binding of the blade in the cut, which is the fault with blades with all-soft backs.

Prices—Hand Frame Sizes

For Cutting				Soft Steel, Cast Iron, Bronze, Heavy Angle Iron, Etc.	Tool Steel, Hard Metals, Light Structural Shapes	Solid Brass Tubing (over 18 in.), Iron Pipe, Drill Rod Electrical Conduit, Copper	Thin Steel and Brass Tubing, Bicycle Tubing, Thin Sheet Metals B. X. Conductor	Prices	
Length	Width	Gauge	Thickness	Regular Teeth	Medium Teeth	Fine Teeth	Tubing Teeth	Gross	Net
8 in.	1 1/2 in.	23	.026	18	..	24	32	\$ 8.00	\$6.80
9 in.	1 1/2 in.	23	.026	18	..	24	32	9.00	.90
10 in.	1 1/2 in.	23	.026	18	18	24	32	10.00	1.00
12 in.	1 1/2 in.	23	.026	18	18	24	32	12.00	1.20
12 in.	1 1/2 in.	23	.026	18	18	24	32	12.30	1.23

Screw Slotting Hack Saw Blades



All blades are 8 inches long and 1 1/2-inch wide. Made in four different thicknesses, covering a wide range of work. Invaluable in any machine shop.

No. 249A.	.049-inch thick.	Dozen	\$3.50
No. 249B.	.063-inch thick.	Dozen	2.55
No. 249C.	.083-inch thick.	Dozen	3.20
No. 249D.	.109-inch thick.	Dozen	3.60
No. 249E.	Set of four blades, one of each thickness.		
Price per set			1.00

Made for cutting slots in screw heads and can be used in any adjustable hack saw frame. Hardened throughout. Have 14 teeth to the inch and taper in thickness from teeth to back, thus providing good clearance, preventing binding and allowing the blades to cut easily and quickly.

Star Hack Saw Blades



Length, inches	8	9	10	12
Price per gross	\$8.00	\$9.00	\$10.00	\$12.00
Price per dozen	.80	.90	1.00	1.20

Send us your specifications for large quantities of Hack Saw Blades.

Channon Extension Hack Saw Frame



This hack saw frame is easily and instantly adjustable for hack saw blades from 8 to 12 inches. It is well made throughout, being stiff and strong, nickel plated and full polished. Depth of cut $2\frac{1}{2}$ inches. Blades may be faced in four directions.

Price per dozen \$7.00
Price each \$7.00

Channon Extension Hack Saw Frame

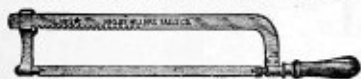
With D Handle



This frame is exactly the same as the one described above, except in being provided with a D or saw handle, which will be appreciated by mechanics. It can be used with one hand far more easily than the regular handle, giving much greater leverage. Depth of cut, $3\frac{1}{2}$ inches.

Price each \$1.80

No. 6 Star Hack Saw Frame



Adjustable to hold blades from 6 to 12 inches, inclusive; will face blades in four directions. Highly polished and heavily nickel plated. Cocobolo handle. Depth of cut, $2\frac{3}{4}$ inches.

Price each \$2.40

No. 10 Star Hack Saw Frame



Made of tempered steel, nickel plated and polished. Handles are cocobolo, highly finished. Carries blades 6 to 12 inches long and is marked for different lengths. Depth of cut, $2\frac{3}{4}$ inches.

Price each \$2.40

Pistol Grip Hack Saw Frame



The handle affords a perfect fit for any size of hand. Handle is secured to frame by a steel rib extending nearly the full length of the handle, and shaped to make the tool correctly balanced. Extensible for blades from 8 to 12 inches, with scale for the different lengths. Blades may be faced in four directions. Depth of cut, $3\frac{1}{2}$ inches.

Price each \$2.85

No. 29 Magazine Star Hack Saw Frame



The back of this frame is rectangular tubing, affording lightness and strength and a receptacle for six hack saw blades closed with a hinged cap. Sliding clamp is instantly adjustable to different lengths of blades. Blades are strained by turning the handle and may be faced in four directions. Depth of cut, $3\frac{1}{2}$ inches. Holds blades 8 to 12 inches.

Price each \$5.30

Heavy Adjustable Hack Saw Frames



Adjustable for blades from 8 to 12 inches, inclusive. A heavy rigid frame made from $\frac{1}{4}$ to $\frac{3}{4}$ -inch stock. Blades can be faced in four directions. Depth of cut, $3\frac{1}{2}$ inches.

No. 69. Polished and nickel plated. Price each \$1.70
No. 69B. Black finish. Price each 1.40

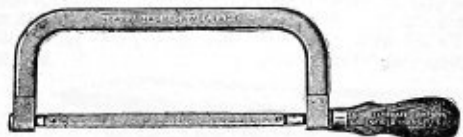
No. 20 Steel Hack Saw Frames



Full polished and nickel plated. Not adjustable for different lengths of blades, each size frame holding one size blade. Blades can be faced in four directions. Depth of cut, $2\frac{1}{2}$ inches.

For blades, inches long 8 9 10 12
Price each \$0.70 \$0.80 \$0.90 \$1.00

Heavy Hack Saw Frames



Non-adjustable for different lengths of blades. Very heavy and rigid. Blade is strained by turning handle.

No. 14. For 12-inch blades only. Steel frame $\frac{1}{4}$ xl-inch, $5\frac{1}{4}$ -inch cut. Polished and nickel plated. Each \$1.90

No. 14B. Same, except black finish. Each 1.60

No. 68. Same as No. 14, except for 14-inch blades only.

Price each \$2.10

Rail Hack Saw



This saw is especially adapted for cutting off rails, large beams and other structural shapes.

Nos. 4, 5 and 6 have handle on each end.

Number	1 1/2	2	3	4	5	6
Depth cut, inches	7	10	10	10	10	10
Length blades, inches	12	12	14	17	18	20
Price each	\$1.60	\$1.30	\$1.90	\$2.30	\$2.80	\$3.30

Manual Training Benches

No. 142. Made of hard maple. Dimensions, 42 inches long, 22 inches wide, 32 inches high; top, 2 1/4 inches thick; drawer, 22x19 x6 inches, fitted with good drawer pulls. Bench is fitted with No. 70D Roller Nut Rapid Acting Vise, steel dog and bench stops. Top of bench shellaced; stand oiled.



Shipping weight, 130 pounds.

Price each.....\$14.65

No. 152. Same as No. 142, with top 52 inches long.

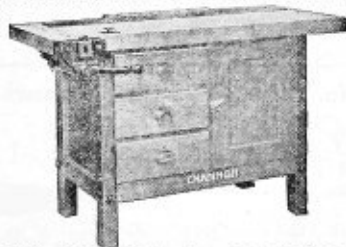
Price each.....\$15.65

No. 42. Same as No. 142, except without drawer.

Price each.....\$13.16

No. 52. Same as No. 152 without drawer.

Price each.....\$14.15



No. 1352. Made of hard maple; finished in white shellac; top is 52 inches long, 22 inches wide, 2 1/4 inches thick. Working top is 14 1/2 inches wide. Bench stands 32 inches high. Drawers, 18 1/2 x 17 x 5 inches; cupboard, 18 x 17 x 13 inches. Shipping weight, 175 pounds. Fitted with No. 19A Massey lightning grip vise.

Each.....\$24.30

Fitted with No. 70D Abernathy roller nut rapid action vise. Price each.....\$25.30



No. 552. Made of maple. Finished in white shellac; top is same as No. 1352; general drawer, 32x17x5 1/2 inches; individual drawers, 15 1/2 x 17 x 5 1/2 inches; bench stands 32 inches high. Shipping weight, 180 pounds. Fitted with No. 19-A Massey lightning grip vise.

Price each.....\$24.30

Fitted with No. 70D Abernathy roller nut rapid action vise. Price each.....\$25.30

No. 552X2. Same as No. 552, made double, 36 inches wide, for two students.

Price each, with No. 19A vises.....\$38.50

Price each, with No. 70D vises.....\$39.50

No. 042.

Made of hard maple, top 42 inches long, 20 inches wide, 1 3/4 inches thick; bench stands 32 inches high; working top, 13 inches wide. Shipping weight, 110 pounds. Fitted with two maple wood screw vises.

Price each.....\$9.90

Fitted with one maple wood screw vise on end and one No. 70D roller nut rapid acting vise on front.

Price each.....\$14.50



No. 1348.

Made of hard maple; top, 48 inches long, 22 inches wide, 1 3/4 inches thick; working top 13 1/2 inches wide; drawers, 18 x 16 x 5 inches; cupboard, 18 1/2 x 18 1/4 x

10 inches, 32 inches high; entire bench finished in white shellac. Shipping weight, 160 pounds. Fitted with two maple wood screw vises.

Price each.....\$17.00

Fitted with one maple wood screw vise on end and one No. 70D roller nut rapid acting vise on front.

Price each.....\$21.25

No. 048. Same top as No. 1348, with stand like No. 042. Fitted with two maple wood screw vises

Price each.....\$10.60

Fitted with one maple wood screw vise on end and one No. 70D roller nut rapid action vise on front.

Price each.....\$15.20

Shipping weight, 115 pounds.



No. 752.

Made of maple. Finished in white shellac; top is 52 inches long, 22 inches wide, 2 1/4 inches thick; general drawer is 32 x 17 x 5 1/2 inches; individual drawers, 17 x 15 1/4

x 5 1/4 inches; bench stands 32 inches high. Shipping weight, 200 pounds.

Fitted with No. 19A Massey lightning grip vise.

Price each.....\$27.35

Fitted with No. 70D Abernathy roller nut rapid acting vise.

Price each.....\$28.35

Technical School Bench



No. 760. Made of maple, finished in white shellac, top is 60 inches long, 22 inches wide, 2 1/4 inches thick; general drawer 36x18x5 inches; individual drawer 18x17 1/2x5 inches; bench stands 32 inches high. Shipping weight 200 pounds. Fitted with maple wood screw vise on end and No. 70 Abernathy roller nut vise on front.

Price each.....\$30.50

No. 760X2. For two students as shown in above illustration, with wood end vises and No. 70 front vises.

Price each.....\$44.60

Two Student Bench



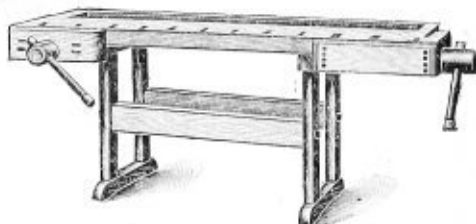
No. 1360X2. Made of maple, finished in white shellac; top is 60 inches long, 36 inches wide, 2 inches thick; drawers 21 x 17 1/4 x 6 1/4 inches; cupboards 21 x 17 1/4 x 7 inches. Height 32 inches. Shipping weight 280 pounds. Fitted with maple wood screw end vises and No. 70 Abernathy roller nut rapid action vises.

Price each.....\$40.50

Fitted with No. 70 vise on front and No. 70D vise on end.

Price each.....\$49.70

Cabinet Maker's Bench



Our No. 078 bench is substantially built throughout. It has a 2 3/8-inch thick, glued and finished top, back of which is a well 10 inches wide, used as a recess for tools; the legs are solid maple and measure 2 x 3 inches.

Equipped with our No. 19 Bench Screws, 2 1/2 inches in diameter; these screws have saw cut threads.

No. 078. 61 1/2 feet long, 24 inches wide; 16-inch maple top, 34 inches high; weight, 180 pounds.

Price each.....\$15.60

Two Student Bench



No. 048X2. Made of maple; finished in white shellac; height 32 inches; top is 48 inches long, 36 inches wide, 1 3/4 inches thick.

Shipping weight 200 pounds. Fitted with 4 maple wood screw vises.

Price each.....\$16.00

Fitted with maple wood screw vises on ends and No. 70 Abernathy vises on front.

Price each.....\$24.30

For 2 drawers, one on each side, 22 x 10 1/2 x 6 inches, add to each bench.....\$3.10

Special Benches and Domestic Science Tables

We are prepared to furnish any type of bench desired. If you do not see what you want on these pages write to us giving description of type of bench desired, or send drawing or sketch. We can make any bench you want. We can also furnish domestic science tables of any style. Write for prices.

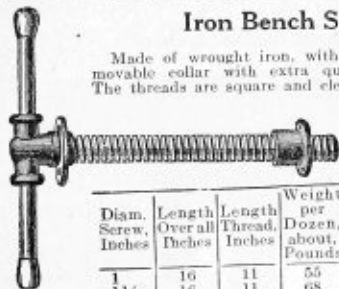
Channon Clincher Tops Excel!

We make all of our benches from well seasoned kiln dried hard maple. All glued joints are made with dovetailed tongue and groove forming the Channon clincher joint, as shown by accompanying illustration. These joints can not pull apart, nor is it possible to force one of these glued joints apart. It is needless to say that Channon clincher joined tops make the best benches. Send us your orders.



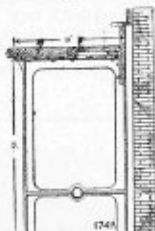
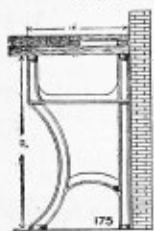
Iron Bench Screws

Made of wrought iron, with double thread and movable collar with extra quality wood handle. The threads are square and clean cut.



Diam. Screw, Inches	Length Overall, Inches	Length Thread, Inches	Weight per Dozen, about, Pounds	Price per Dozen	Price Each
1	16	11	55	\$5.00	\$0.50
1 1/4	16	11	68	5.80	.55
1 3/4	17	12	80	7.25	.70
1 1/2	21	14	125	12.00	1.20

Iron Work Bench Legs

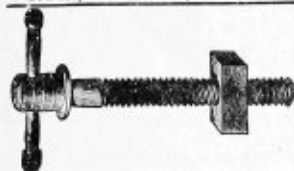


By using these iron bench legs, benches of any length can be given, the purchaser providing the necessary planks. Prices built below are for iron legs only.

No.	Width, Inches	Height, Inches	Weight, Pounds	Price Each
174	18	33	35	\$6.00
174-A	26 1/2	36	42	8.00
175	18	33	27	4.60
175-A	18	29	23	3.80

Wood Bench Screws

Made of thoroughly seasoned white maple. Threads are saw cut and accurate.



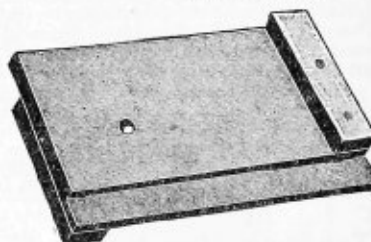
No.	Size	Price, Dozen	Price, Each
No. 18.	V. thread, 2 x 24 inches	\$7.50	\$0.75
No. 19.	V. thread, 2 1/2 x 24 inches	8.00	.80



Bench Stop No. 196

This little bench stop can be readily inserted in any bench by boring the proper size round hole. It is adjustable for height, easily changed, and can be faced in different directions as desired; any of the four faces can be used at will. Packed one in a box. Price each.....\$0.70

Bench Hook



Made from seasoned hard white maple and is nicely finished in shellac. The end cleats are firmly doweled and glued and will not pull apart. Size, 6x6 inches. Price, Dozen \$5.00, Each \$0.50.

Steel Bench Stop



Solid steel, spring tempered springs, oil tempered faces, body 7 1/2-inch square, length under-head 7 1/2 inches. Length over all, 8 1/2 inches. Weight per dozen pair, about 43 1/2 pounds.

No.	Finish	Price, Dozen	Price Each
No. 1.	Full polished	\$15.00	\$1.25
No. 2.	Painted black	13.00	1.08

Wood Spring Stop



Size, 4x7 1/2x7 1/2 inches. Made of maple. Price, dozen....\$1.80. Price each......15

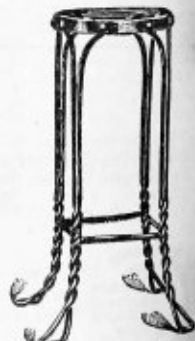
Steel Factory Stools

Wooden stools for factory use are rapidly becoming obsolete, and are being supplanted by the angle iron No. 1010 and the Bessemer steel No. 1060 stools shown here-with. Furnished with either wood or metal seats, 12-inches in diameter. Wood seats supplied unless otherwise specified. Very substantially built, and will last a life time. Handsomely finished in black enamel. Rubber feet, extra, 40c per set.



No. 1010

No. 1010			No. 1060		
Height, Inches	Price per Dozen	Price Each	Height, Inches	Price per Dozen	Price Each
20	\$39.50	\$3.95	20	\$31.35	\$3.10
22	41.25	4.10	22	33.00	3.30
24	43.00	4.30	24	34.65	3.45
26	44.50	4.45	26	36.30	3.60
28	46.25	4.60	28	38.00	3.80



No. 1060

Saws

Sterling Brand



Sterling brand saws are made exclusively for us from special hand saw steel. They are hand smithed, oil tempered and intended for skilled mechanics' use, for contractors, etc., who require reliable saws for hard and constant service. The blades are taper ground, thinner on the back than on the cutting edge, which reduces friction when sawing and prevents saw binding. Blades are highly polished and have full skew back. Handles are made of beechwood, polished, secured to blade with brass screws. Where a first quality saw is wanted, we recommend and warrant our Sterling brand.

This saw has the same type of handle as the No. 53 Perfection, described in opposite column.

Hand

Length, inches.	18	20	22	24	26
No. pts. to in.	10	9-10-11-12	9-10-11-12	8-9-10-11	7-8-9-10
Price per doz.	\$16.00	\$17.00	\$18.00	\$19.00	\$20.00
Price each	1.60	1.70	1.80	1.90	2.00

Rip

Length, inches.	20	22	26	28
No. points to inch	8	8	5-5 1/2-6	5-5 1/2-6
Price per dozen	\$17.00	\$18.00	\$20.00	\$23.00
Price each	1.70	1.80	2.00	2.30

Numbers of teeth shown in bold type are usually preferred. We also carry special manual training saws in sizes 20-inch 8-point and 22-inch 8-point at the prices shown above for these sizes.

Helmer Brand



Where an inexpensive saw for occasional use is required, we recommend our Helmer brand. They have polished blades, skew back and carved handles secured to blade by brass screws, four in the saws 26 inches long and three in smaller sizes.

Hand

Length, inches.	18	20	22	24	26
Price per dozen	\$11.50	\$12.00	\$13.00	\$13.50	\$14.50
Price each	1.15	1.20	1.30	1.35	1.45

Rip

Length, inches.	26	28
Price per dozen	\$14.50	\$16.50
Price each	1.45	1.65

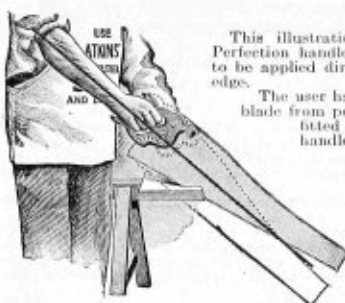
No. 3 Back Saw



Blade is made of a high grade crucible steel and is flat, straight and true. Handle is beechwood, secured to blade with three screws. Backs are made from tempered steel, insuring holding blade rigid and true, and preventing it from springing out of shape.

Length, inches.	8	10	12	14	16	18
Price per dozen	\$10.00	\$11.50	\$13.50	\$15.50	\$18.00	\$20.00
Price each	1.00	1.15	1.35	1.55	1.80	2.00

Atkins No. 53 Perfection



This illustration shows how the Perfection handle enables the power to be applied directly to the cutting edge.

The user has full control of the blade from point to heel. A saw fitted with this style of handle will run easier than with the old style straight across or square handle.

This saw has all the latest improvements it is possible to put into a hand saw. Blade is made of silver steel, with skew back. It is ground tapered; that is, the cutting edge is left an even thickness from point to heel, and ground to a true taper from tooth edge to back four gauges. This style of grinding is appreciated by mechanics. The saw will run in green or wet lumber with less set than a saw ground the ordinary way. The cutting edge, being of an even thickness, is very rigid and prevents kinking or bucking.



Skew-Back, Carved and Polished Apple Handle

Hand

Length, inches.	18	20	22	24	26
Price per dozen	\$18.50	\$20.50	\$22.50	\$24.50	\$25.50
Price each	1.85	2.05	2.25	2.45	2.55

Rip

Length, inches.	20	22	26	28
Price per dozen	\$20.50	\$22.50	\$25.50	\$28.50
Price each	2.05	2.25	2.55	2.85

Handy or Flooring Saw



Made from silver steel, taper ground, 18 inches long, 8 or 10 points to the inch, 5 inches wide at the butt and 5 1/2 inches wide in the center, tapered to a point. Toothed on the back at point. Handle is applewood and fastened with three screws. This saw can be used for sawing through floors and into flat surfaces without boring or using a keyhole saw or chisel. Made in one size only.

Price per dozen	\$23.00
Price each	2.30

Nests of Saws



No. 3 with Metal Cutting Blade

The handle is of applewood, carved and fitted with a lever nut for tightening blade. The 18-inch blade is for cutting metal, has a filing temper and is made from hack saw steel. Temper is drawn so that it may be filed. Will cut nails, spikes, bolts, lag screws or any untempered metal.

Set consists of metal cutting blade, 12-inch keyhole and 14-inch compass blade. Very serviceable for plumbers' and steamfitters' use.

Price of No. 3 nest of saws, complete.....\$2.00

No. 1

The No. 1 nest of saws has a beech handle, 18-inch blade with graduated teeth for both ripping and cross-cutting, 12-inch keyhole and 14-inch compass saw blade. For wood cutting only.

Price of No. 1 nest of saws, complete.....\$1.25

Interchangeable Compass Saw No. 10



This saw has beech handle of an improved pattern with nut for tightening blade. The grip being dropped below line of cut, allows the operator to reverse blade and saw without handle being in line of cut. Is very useful for sawing close to ceilings or in narrow places.

Length, inches.....	10	12	14	16	18
Price, each.....	\$0.45	\$0.47	\$0.50	\$0.52	\$0.57
Blades, per dozen.....	2.50	2.75	3.00	3.25	3.50
Blades, each.....	.25	.27	.30	.32	.35

Interchangeable Compass Saw No. 10S.

Has a heavy rigid steel blade. Especially adapted for steamfitters, plumbers, electricians, etc.

Cutting edge is tempered to last indefinitely without re-sharpening.

Size, Inches	Price, Each, Complete	Price, Extra Blades	
		Per Doz	Each
12	\$0.50	\$3.00	\$0.30
14	.52	3.25	.32

No. 4 Compass Saw



A low-priced compass saw made to meet the demand for an inexpensive tool. Beech handle, varnished edge.

Made in 10, 12, 14 and 16-inch lengths.
Price, per dozen.....\$3.00
Price, each......30

Metal Cutting Hand Saws

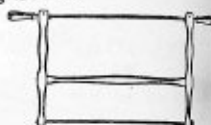


Blade is of highest grade silver steel and will cut all ordinary metal with ease. The 18-inch size is 1 1/2 inches wide at point and 4 1/2 inches at butt. Is 18 gauge on toothed edge, 20 gauge on back, gradually tapering to 23 gauge at point. Teeth are milled straight across, being specially tempered for straight filing. The handle, which is adjustable, is made of applewood, carved and polished and fastened to plate by nickel plated lever and bolt and a nickel plated screw.

Size, inches.....	18	20	22	24	26
Price each.....	\$2.25	\$2.45	\$2.70	\$2.95	\$3.20

Turning Saws

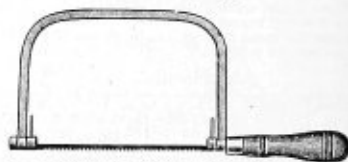
Made of birchwood, has carbonized handle and steel tension rod. Index on each handle to show how far to turn. Friction regulated by screws.



Saw blades regularly furnished are 3/8-inch wide.

Size, inches.....	12	14	18	20	22	24
Wt. per doz., lbs.....	13	17	18	20	21	22
Price, per doz.	\$14.40	\$15.00	\$15.60	\$16.40	\$17.00	\$17.60
Extra Blades, per doz.....	1.90	2.10	2.60	3.00	3.25	3.61

No. 50 Coping Saw



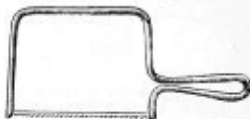
Strong, Durable, Perfect Acting

The back is 3/8-inch wide and 3/8-inch thick. Frame, 7 1/2 inches by 4 1/2 inches deep. All parts are handsomely nickel plated and buffed. The handle is of hardwood, easy grip pattern, carved and varnished. The blade may be instantly adjusted to cut sharp or unusual angles with perfect ease and without strain.

Price, per dozen with blade.....	\$10.00
Each.....	1.00
Price blades only, dozen.....	.85
Each.....	.10

Weight, per dozen, 7 lbs.

No. 100 Coping Saw



All wire, heavily nickel plated, polished and buffed. Adjustable frame. 6-inch bent end blades. Depth from blade to back, 4 inches.

Price complete with 12 extra blades, per dozen.....	\$3.35
Price with one extra blade, each.....	.32
Price extra blades, per gross.....	1.60
Dozen.....	.15

Weight, per dozen, 4 1/2 lbs.

Jewelers' Piercing or Hack Saw No. 382



Made of stiff burnished spring steel, with stained and polished hardwood handle. Twist in forward end of frame to give the desired spring. Depth under back, 6 inches.

Price, per dozen.....	\$15.00
Each.....	1.50

Weight, per dozen, 6 1/2 lbs.

Jewelers' Saw Blades

Nos. 000 to 6.	
Price, per gross.....	\$4.00
Dozen.....	.40

Cedar King Skew Back One Man Saw



Made from a special fine crucible steel. Ground similarly to high grade hand saws. Tooth edge is an even thickness.

Blade tapers gradually from point to back, giving blade clearance and permits saw to run easily with very little effort. Especially adaptable for heavy cutting.

Price Each with Handles

Length, feet.....	3	3½	4	4½	5	5½	6
Price each.....	\$2.65	\$3.10	\$3.50	\$4.00	\$4.45	\$4.85	\$5.25

One Man Tuttle and Common Tooth Saws



Made from a high grade crucible steel. One man common tooth saws made from the same grade of steel take same price. Specify what style tooth when ordering.

Price Each with Handles

Length, feet.....	3	3½	4	4½	5	5½	6
Price each.....	\$2.25	\$2.60	\$3.00	\$3.35	\$3.70	\$4.10	\$4.45

One Man Saw Handles For One Man Saws



Made of carefully selected hardwood, thoroughly seasoned and dried. Varnished edge, well finished. Easy Grip pattern.

Price each.....\$0.30

Supplementary Handles For One Man Saws



Made of air dried hardwood stock. Malleable iron bolt with locked rivet to prevent it from being detached.

Price each.....\$0.18



Loop Pattern Cross Cut Saw Handles

Made of specially selected, thoroughly seasoned hardwood stock. Socket and washer of extra high grade cast steel. Loop of extra heavy, high tensile strength steel, spot electric welded.

Price per dozen pairs.....\$2.50

Price per pair......25

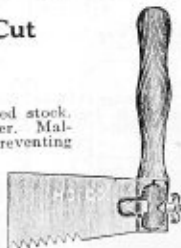
Climax Pattern Cross Cut Saw Handles

Reversible

Made of thoroughly seasoned selected stock. Extra heavy cast steel clasp and washer. Malleable iron bolt, with lock rivet feature, preventing rivet from being detached.

Price per dozen pairs.....\$3.00

Price per pair......30



Two Man Cross Cut Saws

Silver Steel Perfection



This saw is made from a special steel which takes a very high temper and will hold its cutting edge longer than any other saw made. It is ground 14-gauge on tooth edge and 19-gauge in the center on back and 16-gauge on ends of back. In fitting, it is only necessary to set the tooth to clear tooth at gullet. It will run in green or dry lumber with less set and greater ease than any other saw. It has four sets of cutting teeth set between a set of swaged shaped rakers and is perforated. The perforations strengthen the tooth and when teeth have been filed down to the perforations it is only necessary to file through them to regum the saw. The Perfection is especially adapted for sawing hardwood and frozen timber.

Length, feet.....	4½	5	5½	6
Price each.....	\$3.60	\$4.10	\$4.60	\$5.60

Tuttle or Champion Tooth



Made from high grade crucible steel, ground 14x16 and 14x18 gauge. This saw has two sets of cutting teeth between a set of rakers, and is a good medium-price tool.

Common or Tenon Tooth



When ordering specify style of tooth required.

Tuttle and Common Tooth Cross Cut Saws

Length, feet.....	4½	5	5½
14x16 gauge.....	\$2.70	\$3.00	\$3.30
14x18 gauge.....	2.92	3.25	3.57
Length, feet.....	6	6½	6¾
14x16 gauge.....	\$3.60	\$3.90	\$4.22
14x18 gauge.....	3.90	4.22	

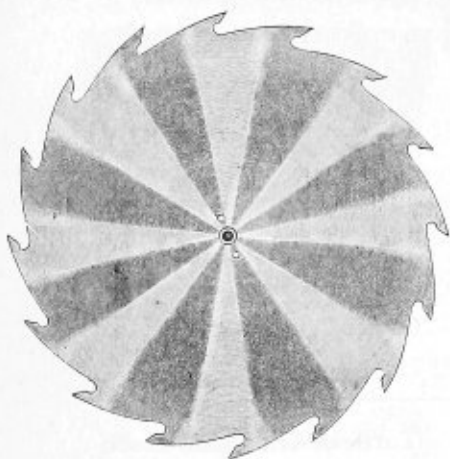
Great American Tooth



Ground 14x16 and 14x18 gauge. The saw has no rakers and has three sets of cutting teeth between the gullets, the back of the teeth at the gullets acting as a raker.

Length, feet.....	4½	5	5½
14x16 gauge.....	\$3.15	\$3.50	\$3.85
14x18 gauge.....	3.37	3.75	4.12
Length, feet.....	6	6½	6¾
14x16 gauge.....	\$4.20	\$4.55	\$4.87
14x18 gauge.....	4.50		

Circular Saws



Solid tooth. Patent ground and tempered. Extra quality and unequalled workmanship. We carry in stock for immediate shipment solid tooth circular saws from 8 to 36 inches in diameter of standard gauge and tooth space, both rip and cut off. The standard number of teeth in both rip and cut off saws is given in list below. Saws varying from standard are special and made to order only.

When ordering, always state whether rip or cut off is required, diameter, size of mandrel hole and whether right or left hand. When ordering saws other than standard we require in addition to the above, the following information: Gauge of saw at center and rim, number of teeth, style or pattern of teeth, diameter of pin holes and distance center to center of pin holes, R. P. M. of saw while in cut, kind of timber sawed, whether spring or swage set, H. P. available.

Standard No. of Teeth

Diameter	8	9	10	12	14	16	18	20
Rip Saw	44	36	30	30	*30	x30	30	30
Cut Off	100	100	90	90	84	c	60	60
Diameter	22	24	26	28	30	32	34	36
Rip Saw	30	32	34	36	38	40	42	44
Cut Off	60	64	66	68	70	72	74	76

*Also 34.

xAlso 36.

c60 and 4 points 1 inch and 1/4 inch point to point.

Price Each Not Filed or Set

Diameter, inches	6	7	8	9	10	11	12	14	16	18	20	22	24
Thickness, gauge	18	18	18	17	16	16	15	14	14	13	13	12	11
Size of hole, inches	3/8	4/8	7/8	7/8	1	1	1	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4
Price each	\$1.80	\$2.10	\$2.40	\$2.80	\$3.30	\$3.90	\$4.40	\$5.30	\$6.50	\$8.00	\$9.50	\$11.50	\$13.50
Extra for each gauge heavier	.10	.12	.16	.20	.24	.32	.40	.60	.60	.80	1.00	1.20	1.40
Setting and sharpening, extra	.20	.22	.26	.28	.32	.36	.40	.46	.50	.56	.64	.70	.80

Diameter, inches	26	28	30	32	34	36	38	40	42	44	46	48	50
Thickness, gauge	11	10	10	10	9	9	9	9	8	8	8	8	7
Size of hole, inches	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	2	2	2	2	2	2
Price each	\$16.00	\$18.50	\$21.00	\$24.00	\$27.00	\$31.00	\$35.00	\$41.00	\$47.00	\$55.00	\$65.00	\$75.00	\$85.00
Extra for each gauge heavier	1.70	2.00	2.30	2.60	3.00	3.60	4.00	4.60	5.20	6.00	7.00	8.00	9.00
Setting and sharpening, extra	.90	1.00	1.10	1.20	1.30	1.40	1.50	1.60	1.70	1.80	2.00	2.30	2.40

Circular saws for bone, horn and ivory, add 50 per cent to above price.

Circular Mitre Saws

These saws are ground to run without set and are adapted for smooth cutting, such as cigar box and cabinet work. The Mitre Saw with cleaner teeth will work successfully for ripping, cross cutting or mitreing. In ordering always give the size of collars as well as the size of mandrel hole.

Price is for saws with teeth filed ready to use.



Size, Inches	Gauge at Holes	Gauge at Edge of Collar	Gauge of Teeth	Extra for Each Gauge Heavier	Extra for Each Additional Gauge Beveling	Price Each	Size, Inches	Gauge at Holes	Gauge at Edge of Collar	Gauge of Teeth	Extra for Each Gauge Heavier	Extra for Each Additional Gauge Beveling	Price Each
8	16	19	16	\$0.16	\$0.44	\$5.40	14	13	16	13	\$0.50	\$0.80	\$ 9.30
9	15	18	15	.20	.50	6.00	16	13	16	13	.60	1.00	11.40
10	15	18	15	.24	.56	6.70	18	12	15	12	.80	1.20	13.70
11	14	17	14	.32	.60	7.50	20	12	15	12	1.00	1.40	16.20
12	14	17	14	.40	.70	8.30	22	11	14	11	1.20	1.60	19.40

Saw mandrels fully illustrated on another page. See index.

Narrow Band Saws For Re-Sawing and Scroll Sawing



NOTE.—These saws are joined, set and filed, ready for use.

Width Inches	Standard Gauge	Standard Teeth Points	Price Per Foot
$\frac{3}{8}$	22-23	6-7	\$0.14
$\frac{3}{8}$	21-22	6	.16
$\frac{3}{8}$	21-22	5-6	.16
$\frac{3}{8}$	21-22	4-5	.17
$\frac{3}{8}$	21-22	$3\frac{1}{2}$ -4	.18
$\frac{3}{8}$	20-21	$3\frac{1}{2}$ -4	.20
$\frac{3}{8}$	20-21	$2\frac{1}{2}$ -3	.22
$\frac{3}{8}$	20-21	$2\frac{1}{2}$ -3	.25
$\frac{3}{8}$	20-21	$3\frac{1}{2}$	.27
$\frac{3}{8}$	19-20	$3\frac{1}{2}$	.29
$\frac{3}{8}$	19-20	$3\frac{1}{2}$	.31
$\frac{3}{8}$	19-20	3	.35
$\frac{3}{8}$	19-20	3	.38
$\frac{3}{8}$	19-20	3	.50

FOR JOINING, SETTING AND FILING

Up to 1 inch, each.....	\$1.20
Up to 2 inches, each.....	1.60

Wide Band Saws

All band saws 6 inches and wider are made from special aluminum steel, and are hardened and tempered by special process. Every saw is joined, filed, set and fitted, ready to go on the mill without further hammering.



Width, Inches	Usual Gauge	Price per Foot	Width, Inches	Usual Gauge	Price per Foot
2	18 to 20	\$0.80	5	17 to 19	\$2.00
$2\frac{1}{2}$	18 to 20	1.00	6	17 to 19	2.40
3	18 to 20	1.20	8	14 to 16	3.20
$3\frac{1}{2}$	18 to 20	1.40	10	14 to 16	4.00
4	17 to 19	1.60	12	13 to 15	5.00

Morrill's Sawsets



No. "Special" for hand panel and rip saws from widest made down to $\frac{1}{2}$ -inch wide.

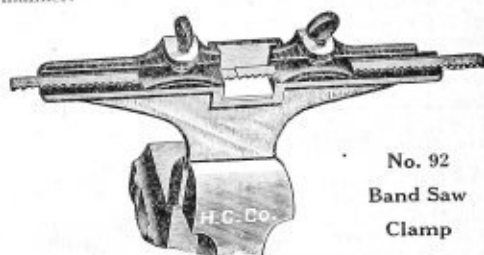
Nos. 3 and 4 for cross cut and circular saws, single tooth from 14 to 20 gauge.

No. 10 for hand saws down to $\frac{3}{8}$ inch wide not over 6 gauge.

No.	Length, Inches	Price, Each
Special	$6\frac{3}{8}$	\$1.55
No. 3	9	2.00
No. 4	9	2.00
No. 10	$6\frac{3}{4}$	1.55

Gasoline Band Saw Brazing Outfit

The holder for clamping saws may be placed in a vise or screwed to a bench. The brazing torch is exactly suited for brazing band saws, as the flame is a small concentrated pointed flame of intense heat, which makes the braze in a few seconds. The brazing mixture is specially prepared for band saw work and will be found of superior quality. Saws up to $1\frac{1}{4}$ inches are easily and quickly brazed in a permanent manner.



No. 92
Band Saw
Clamp



Outfit consists of:

- 1-No. 93 Double jet torch.
- 1-No. 92 Band saw clamp.
- 1-Brazing spoon.
- 1-lb. brazing compound.

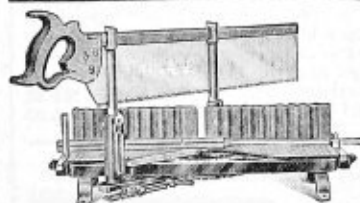
Packed one complete outfit in a box; net weight 10 lbs. Price, complete outfit, with full instructions... **\$20.50**

No. 93. Torch.

Silver Solder

This solder has proven to be the best adapted for brazing tempered steel.

Put up in tin boxes of 1 oz. each $\frac{3}{4}$ inch wide x .003 thick, per oz. **\$1.80**



Steel
Mitre Box

This mitre box has a steel truss frame, making it extremely rigid and practically indestructible. Special improvements include automatic dentents for holding the saw elevated, allowing the placing of work with both hands. The lever carrying the saw swings from 45 degrees to 90 degrees either right or left and locks automatically. Capacity of all sizes: $10\frac{1}{2}$ inches at right angles and $7\frac{1}{4}$ inches at mitre.

No.	Size of Saw	Shipping Wt., Lbs.	Price, Each
1244	With 24x4 Saw and Attachments	31	\$14.50
1264	With 26x4 Saw and Attachments	31	15.00
1285	With 28x5 Saw and Attachments	35	16.50
1305	With 30x5 Saw and Attachments	35	17.00
1306	With 30x6 Saw and Attachments	38	19.00

Swage Jumper or Upset, for Saws



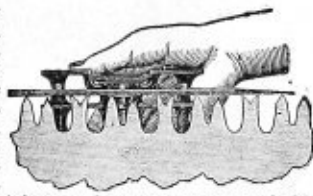
No. 0 for large circular saws, from 5 to 10 gauge;
No. 1 for large circular saws, from 8 to 12 gauge;
No. 2 for small circular and mill saws of thinner
gauge; No. 3 for small circular saws.

Number	0	1	2	3
Price each	\$3.00	\$2.75	\$2.25	\$1.75

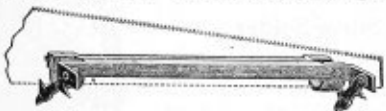
Excelsior Saw Tools

To successfully fit one and two man saws, the use of a set of Excelsior saw tools is an absolute necessity. Cross cut saws fitted with them will cut fast with but little effort. The set consists of a combined jointer, raker tooth gauge and side file, also a set block and set gauge. Packed one set complete in a pasteboard box with full directions for use.

Price of set, complete \$1.00



The "A A A" Hand Saw Clamp



May be used for either jointing, setting or filing, and the saw, being seated close to its work, does not quiver and needs no wooden prop. Can be attached to any square edge and it is ready for immediate use. Clamp weighs a little over a pound and occupies about as much room as a chisel, so that it may be conveniently carried in a kit. Made of wrought steel.

Price each, japanned \$1.35

Price each, nicked but not polished 1.80

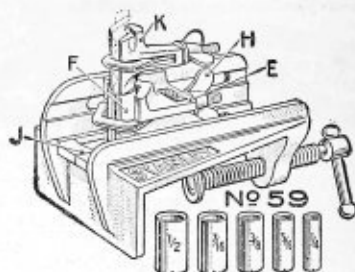
No. 1AA Noiseless Saw Vise

In this vise the jaws are opened and closed by simply pushing a lever forward and backward. Jaws have rubber cushions to prevent the disagreeable noise usually attendant when filing saws. Has malleable iron screw clamp for attaching to bench. Width of jaw 11 inches.



Price each \$1.60

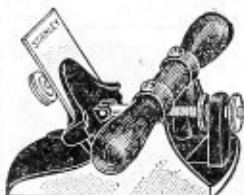
Stanley Doweling Jig



For boring dowel holes in the edge, end or surface of work with ease and accuracy. Will take material up to three inches thick. Is also an excellent bit guide for mortising. Five steel guides 1 1/4 inches long furnished with each jig.

No. 59. Nickel plated. Price each \$3.50

Stanley Scraper Plane



No. 12

Rosewood handles with double grip across center of tool, giving it a good balance. The blades are adjustable endwise or for an angle and are firmly locked in any position.

It can be used as a toothing plane and does excellent work in scraping off old paint or glue, also in roughing off the surface of wood before veneering.

Tooth cutting cutters if desired, 22, 28 or 32 teeth to the inch, 35 cents each.

No. 12 scraper, 6 1/4 inches long, 3-inch blade. Japanned iron face. Weight, 3 3/4 pounds.

Price, each \$5.00

Atkins Perfection Floor and Cabinet Scraper



Weight each, 13 1/4 ounces.

Price per dozen \$10.00

Price each 1.00

Extra blades made from 16 gauge silver steel, beveled. Size, 3x3 inches.

Price per dozen \$2.20

Price each20

Size 3x6 inches.

Price per dozen \$3.00

Price each30

Stanley's "Bailey" Adjustable Iron Planes



No. 3



No. 5



No. 6

The highest type of planes manufactured. They have the most improved form of adjustment, enabling the user to accurately adjust the cutter either side of plane.

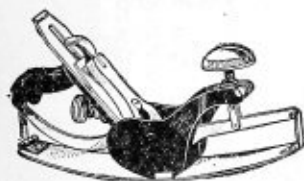
Generally known as bench planes and divided into four classes: Smooth, Jack, Fore and Jointer.

Smooth: For finishing or smoothing rough surfaces. Jack: For truing up the edges of a board in the rough. Fore: A short jointer plane. Jointer: For finishing large surfaces and truing up edges of boards that they may be fitted closely together.

In the Bailey adjustable planes the cutter is thin and of uniform thickness. Its advantages are ease in grinding, less grinding required and is adjustable endwise by means of a wheel at back of frog. Planes are furnished with either flat or corrugated bottoms. The number with the letter C designates corrugated bottom.

Number Flat Bottom	Number Corrugated Bottom	Price Each	Length, Inches	Width of Cutter, Inches	Class	Weight Each, Pounds
2	2C	\$4.00	7	1 1/2	Smooth	2 1/2
3	3C	4.15	8	1 3/4	Smooth	3 1/4
4	4C	4.55	9	2	Smooth	3 3/4
5	5C	5.20	14	2 1/2	Jack	4 1/4
6	6C	6.66	18	3 3/8	Fore	7 3/4
7	7C	7.60	22	3 3/8	Jointer	8 1/4
8	8C	9.00	24	2 3/8	Jointer	9 3/4

Stanley Circular Planes

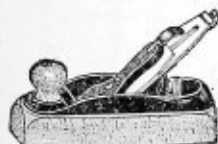


No. 113

The face is fastened at its center to plane body, and adjusted at the ends by means of a screw and levers. A valuable feature is the graduated scale for setting the face. Japanned finish. Ten inches long, 1 3/4-inch cutter; weight, 3 1/2 pounds.

Price each...\$6.20

Stanley Wood Planes



No. 24. As illustrated. Smoothing plane, 8 inches long, 2-inch cutter. Weight, 2 7/8 pounds. Price each...\$2.85



No. 27. As illustrated. Jack plane, 15 inches long, 2 1/4-inch cutter. Weight 4 pounds. Price each...\$3.50

No. 29. Fore plane, 20 inches long. 2 1/4-inch cutter. Weight 6 1/4 pounds. Price each...\$4.00

No. 32. Jointer plane, 26 inches long, 2 3/4-inch cutter. Weight 7 3/4 pounds. Price each...\$4.50

Stanley Adjustable Block Planes



No. 9 1/2



No. 18

These planes have the adjustable throat feature which permits of cutting a heavy or light chip. Cutter can also be adjusted for side cutting.

In No. 18 the knuckle joint in cap makes it also a lever, and placing cap in position clamps the cutter securely to its seat.

No. 9 1/2. 6 inches long, 1 3/8-inch cutter, Japan trimmings. Weight 1 1/2 pounds.

Price each...\$2.10

No. 18. 6 inches long, 1 3/8-inch cutter, nickel trimmings. Knuckle joint. Weight 1 1/2 pounds.

Price each...\$2.60

Stanley Adjustable Block Planes

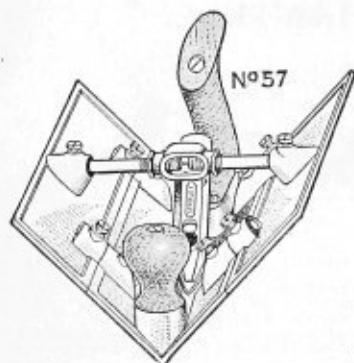
No. 203. A new plane designed especially for manual training use. Bottoms and sides are ground and fitted with the "Handy" Grip feature, which gives a firm grip for the hand of the user. Length, 5 1/2 inches. Cutter, 1 3/8-inch. Screw adjustment. Weight, 1 1/2 pounds.

Price each...\$1.40



No. 220. The cutter in this plane is high grade steel, fastened by a lever and cam, and adjustable endwise by a screw adjustment operated from the rear of the plane. Length, 7 1/2 inches. Cutter, 1 3/8-inch. Weight, 1 1/2 pounds.

Price each...\$1.45



Stanley
Core Box
Plane



For making circular core boxes, as only a right angle may be inscribed in a half circle. The sides of the plane are at right angles, consequently the point of the plane will always cut on the circumference of the circle when the sides rest on the edges of the cut.

No. 56 is especially adapted to small core boxes, working semi-circles from $\frac{3}{8}$ -inch to 2 inches in diameter. The handle is made of rosewood.

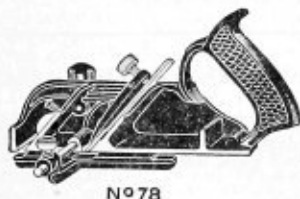
No. 57 is adapted for larger core boxes and is furnished with one pair of extra sides, or "additional sections," as they are called.

Without sections plane works semi-circles from 1 to $2\frac{1}{2}$ inches in diameter. With one pair sections, up to 5 inches in diameter. Additional sections can be supplied, each pair adding $2\frac{1}{2}$ inches to the diameter of the circle.

No. 56. Price each.....\$4.65

No. 57. Price each.....8.25

Stanley Duplex, Fillister and Rabbet Plane



Has two seats for the cutter, one for regular work and the other where a bull-nose is required. Has spur and removable depth gauge. The adjustable fence can be used on either side and slides under the bottom, regulating the width of cut. To work as a rabbet plane, remove fence and arms.

No. 78. $8\frac{1}{2}$ inches long, $1\frac{1}{2}$ -inch cutter. Japaned. Weight, 3 pounds. Price each.....\$3.30



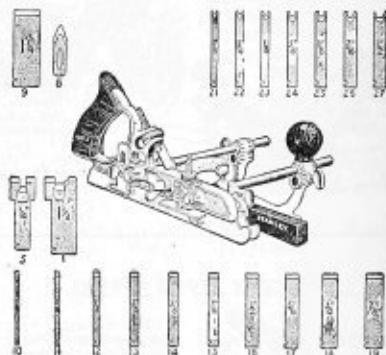
Stanley
Low Angle
Block Plane

Designed to meet the demand for Block Planes having the cutters lying at an angle lower than 20 degrees. In the low angle planes the cutter rests on its seat at an angle of only 12 degrees. This permits greater ease in working across the grain on hardwood. They have adjustable throats, which allow the opening or closing of the mouth, as coarse or fine work may require. All cutters are made of high grade steel and are adjustable endwise by means of the adjusting wheel at the rear of plane.

No. 65. 7 inches long, $1\frac{1}{4}$ -inch cutter. Nickel trimmings. Weight $1\frac{3}{8}$ pounds. Price each.....\$2.90

No. 60. 6 inches long, $1\frac{1}{8}$ -inch cutter. Nickel trimmings. Weight $1\frac{1}{4}$ pounds. Price each.....\$2.45

Stanley Combination Plane



A seven in one tool, both compact and practical.
1. Beading and center beading plane. 2. Plow. 3. Dado. 4. Rabbet and Fillister. 5. Match Plane. 6. Sash Plane. 7. Slitting Plane.

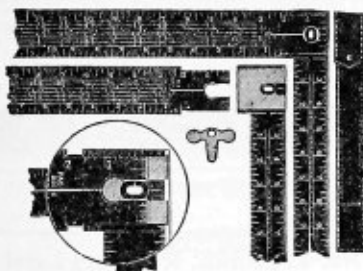
The plane has two principal parts, a main stock and a sliding section which together form a bottom giving bearing for different widths of cutters.

The following cutters are furnished with each plane: Seven beading tools, $\frac{1}{8}$, $\frac{3}{16}$, $\frac{1}{4}$, $\frac{5}{16}$, $\frac{3}{8}$, $\frac{7}{16}$ and $\frac{1}{2}$ -inch; ten plow and dado bits, $\frac{1}{8}$, $\frac{3}{16}$, $\frac{1}{4}$, $\frac{5}{16}$, $\frac{3}{8}$, $\frac{7}{16}$, $\frac{1}{2}$, $\frac{5}{8}$ and $\frac{3}{4}$ -inch; a tonguing tool, a sash tool and a slitting cutter.

Each plane has an adjustable fence, a depth gauge, spurs for use across the grain, etc., a cam leveling or steadying rest, and may be used either right or left hand.

No. 45. Nickel plated. With 21 cutters. Weight $9\frac{1}{2}$ lbs. Price each.....\$5.90

Take-Down Steel Squares

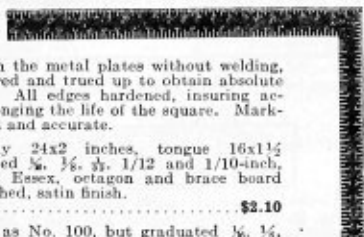


This square is easily set up and taken down and will always remain accurate. The main feature about it is that although intended to be operated by a key, a screw driver or nail will answer the purpose just as effectively. All edges hardened, insuring accuracy and prolonging the life of the square.

No. 500R. Framing Square, body 24x2 inches, tongue 16x1½ inches. Graduated ¼, ⅓ and ⅔, 1/12 and 1/10 inches. Regular roof framing rule, brace measure, octagon and 1/100 scale. Oxidized copper finish with white figures.

Price each, with rust proof case.....\$5.30

Steel Squares



Cut solid from the metal plates without welding, and then tempered and trued up to obtain absolute angle accuracy. All edges hardened, insuring accuracy and prolonging the life of the square. Markings are deep cut and accurate.

No. 100. Body 24x2 inches, tongue 16x1½ inches. Graduated ¼, ⅓, ⅔, 1/12 and 1/10-inch, 100th scale and Essex, octagon and brace board measures. Polished, satin finish.

Price each.....\$2.10

No. 1. Same as No. 100, but graduated ¼, ⅓, 1/12, ⅓-inch and 100th scale. Polished, satin finish.

Price each.....\$2.00

No. 3B. Body 24x2 inches, tongue 16x1½ inches. Graduated ¼, ⅓, 1/12, ⅓ inches. Board and brace measure, octagon scale. Oxidized copper on steel markings in white enamel. Our best steel square.

Price each.....\$1.70

No. 14. Same as No. 3, except graduated ¼, ⅓, ⅔ and 1 inch, and polished steel, satin finish.

Price each.....\$1.50

Weight of Nos. 100, 1, 3 and 14, about 2½ pounds.

No. 12. Body 12x1½ inches, tongue 8x1 inches. Graduated ¼, ⅓, ⅔, 1/12-inch. Polished, satin finish.

Price each.....\$1.25

No. 20 Rosewood Handle Try Square

Roller steel blade, blued finish; figures and lines stamped. Blades inserted in handle and secured with three iron rivets and brass bush burrs. Graduated in inches and eighths. Polished rosewood handle with "Handy" groove. Brass inside edge plate attached with blued steel screws. Square inside and out, and edges of blade are machined to insure accuracy.



Length blade, inches.....	4½	6	7½	9	12
Width blade, inches.....	1½	1½	1½	1½	1½
Length handle, inches.....	3½	4½	5½	6	7
Weight each, ounces.....	4	5½	8	9½	13½
Price each.....	\$0.50	\$0.65	\$0.70	\$0.90	\$1.20

No. 17 Mitre Try Square

Can be used equally well as mitre or try square. Used extensively in manual training schools. Graduated in 8th inches. Handles and blade are nickel plated. Size of blade 7½x1½ inches. Handle is 5 inches long. Weight 8 ounces.

Price each.....\$1.10



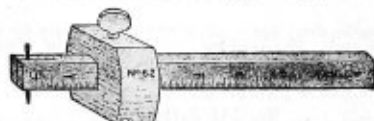
No. 25 Rosewood Handle Bevel

So constructed that bevel blade can be firmly secured by moving the lever with the thumb of the hand which grasps the handle, leaving free the other hand of the workman. Blade is given a handsome blued finish and the edges are machined, insuring accuracy.

Blade, inches.....	6	8	10	12
Length handle, ins.....	4½	5½	7½	8½
Weight each, ounces.....	3½	4	5	8
Price each.....	\$0.55	\$0.60	\$0.65	\$0.70



No. 62 Marking Gauge



Made of selected beechwood, highly polished. Graduated in 16ths for 6 inches from point. Weight about 4½ ounces.

Price each.....\$0.25

No. 65 Marking Gauge



Made of selected boxwood with brass screw, square head and brass face plates. Approximate weight, 5 ounces.

Price each.....\$0.65

No. 72 Mortise Gauge



Double bar. This gauge has two independent bars working in the same head. One pin is affixed to each bar. One side of mortise is marked and gauge turned over for the other mark. Weight about 5 ounces.

Price each.....\$0.45

No. 91 Mortise Gauge



Made of metal throughout. Two bars 6½ inches long graduated in 16ths for 5 inches. Approximate weight, 8 ounces.

Price each.....\$1.10

H. Channon Company Chicago

Stanley Iron Spoke Shaves

Have cutters made from high grade steel, well tempered and sharpened ready for use. Handles are japanned and a hole enables user to hang up tool when not in use.

No. 53 Adjustable Mouth



No. 53

By means of a thumb screw, mouth can be opened or closed as coarse or fine work may require. Raised handle. Length, 10 inches. Cutter, 2½ inches.

Price each.....\$0.65

No. 55 Hollow Face



No. 55

This spoke shave has a cutter with a hollow face for all kinds of round work. Raised handle. Length, 10 inches. Cutter, 2½ inches.

Price each.....\$0.45

No. 151 Adjustable



This improved spoke shave has a lever cap fastening the cutter in such a manner as to bring an even pressure on the cutting edge. The cutter is adjustable endwise and sideways by means of the adjusting screws. Raised handle. Length, 10 inches. Cutter, 2½ inches.

Price each.....\$0.75

Stanley Plumbs and Levels



No. 6. Non-adjustable. Cherry, mahogany stained; one-piece stock; brass top plate; side view. Assorted lengths, 24 to 30 inches. Weight, 3 pounds.

Price each.....\$1.50



No. 3. Adjustable. Cherry, mahogany stained; brass top plate and lips. Side view. Assorted lengths, 24 to 30 inches. Well made and nicely finished. Weight, 3½ pounds.

Price each.....\$2.70



No. 5. Adjustable. Made of selected hardwood, 3-ply, mahogany stained. Brass tips, lips and top plates. Assorted lengths, 24 to 30 inches. Weight, 3½ pounds.

Price each.....\$3.30

Duplex Adjustable Plumbs and Levels

These levels can be read conveniently, even if held at angle, length above the head. Have three glasses; a level glass set in the top, a plumb glass and a second level glass set in the side. These latter two glasses are set close to one surface of the stock so that the angle of vision of the bubble is greatly increased. All three glasses are adjustable. Made from 1½x3½-inch selected stock in assorted lengths, 24 to 30 inches.



No. 30. Hardwood, mahogany stained. Brass tips. Weight about 3½ pounds.

Price each.....\$2.30

No. 45 Plumb, Rule and Level



No. 45. Adjustable level glass, two adjustable plumb and two openings for use of plumb bob and line. Made of soft wood to obtain lightness. Stock 1½x1½x18 inches. Brass tips. Weight about 6 pounds.

Price each.....\$1.50

No. 250 Mason's Plumb and Level



No. 250. Mason's plumb and level. Adjustable glasses. One hole for use of plumb bob and line. Made of soft wood. Size stock, 3½x1x18 inches.

Price each.....\$2.30

Machinist's Iron Level



No. 39½

No. 39½. For mechanics' tool kits. Fitted with proved glasses which are set in solid plaster. Cast iron frame with set top, nickel plated. Length, 6 inches. Weight about ½ pound.

Price each.....\$1.00

Iron Levels



No. 435. Double plumb except the 4-inch, which has level glass only. Base is grooved for cylindrical work, groove being exactly parallel with edge of base. Adjustable glass in level. 5 cents net extra any size.

Length, inches.....	6	9	12	18	24
Price each.....	\$1.50	\$1.65	\$1.75	\$2.00	\$2.30

L. S. Starrett Levels

Listed elsewhere in this catalog are other mechanics' levels, such as iron bench levels, shafting levels, plumbers' levels, cross test levels, etc. See index.

Stanley Proved Level Glasses



PROVED GLASS

Made of extra heavy glass tubing.

Length, inches.....	2	2½	3	3½	4
Price each.....	\$0.12	\$0.14	\$0.16	\$0.20	\$0.30

Edge Tools

Our edge tools are forged from highest grade crucible tool steel, tempered by the most approved methods. Full mirror polished. All socket tools are invisibly welded to sockets of seamless drawn steel tubing, which is much superior to forging the blades with the sockets, machined from a bar or lap welded.

Socket Firmer Chisels



Bevel edges and leather tipped handles. Blades are 6 1/4 inches from cutting bevel to shoulder. Both blades and sockets are highly polished and edge is carefully sharpened.

Socket Butt Chisels



The same quality throughout as the Firmer chisels described above. Preferred by many mechanics where there is no necessity for the longer blades found on Firmer chisels. Blade measures 1/4 inches from edge to shoulder.

Socket Firmer or Butt Chisels

Size, inches.....	1 1/2	1 3/4	2	2 1/2	3
Price per dozen.....	\$14.00	\$14.00	\$14.00	\$14.00	\$16.00
Price each.....	1.40	1.40	1.40	1.40	1.60
Size, inches.....	1 1/2	1 3/4	2	2 1/2	3
Price per dozen.....	\$18.50	\$20.50	\$22.00	\$25.00	
Price each.....	1.85	2.05	2.20	2.50	

Chisels in Sets

These sets are made up of different sizes of Firmer and butt chisels described above.

The boxes are of finished hardwood and each chisel is held firmly in place by a spring in connection with the pocket ramed in the box.



Socket Firmer Chisels

With Beveled Edges and Leather Tipped Handles

No. 2306F. Set of 6 Socket Firmer chisels, one each 1 1/2, 1 3/4, 2 and 2 1/2-inch. Weight, about 4 pounds. Price per set.....	\$12.90
No. 2306FL. Same, except in canvas roll, flannel lined. Weight 3 pounds. Price per set.....	\$13.50
No. 2309F. Set of 9 Socket Firmer chisels, one each 1 1/2, 1 3/4, 2, 2 1/2, 3, 3 1/2, 4, 4 1/2 and 5-inch. Weight about 6 pounds. Price per set.....	\$16.20
No. 23012F. Set of 12 Socket Firmer chisels, one each 1 1/2, 1 3/4, 2, 2 1/2, 3, 3 1/2, 4, 4 1/2, 5, 5 1/2, 6 and 7-inch. Weight 7 1/2 pounds. Price per set.....	\$22.35
No. 23012FL. Same as No. 23012F, except in canvas roll. Weight 5 1/2 pounds. Price per set.....	\$25.00

Socket Butt Chisels

No. 2005B. Set of 5 Socket Butt chisels, one each 1, 1 1/2, 1 3/4 and 2-inch. Weight about 4 pounds. Price per set.....	\$12.00
No. 2006B. Set of 6 Socket Butt chisels, one each 1 1/2, 1 3/4, 2, 2 1/2, 3 and 4-inch. Weight about 4 1/2 pounds. Price per set.....	\$12.70
No. 2006BL. Same as No. 2006B, except in canvas roll. Price per set.....	\$13.25
No. 2009B. Set of 9 Socket Butt chisels, one each 1 1/2, 1 3/4, 2, 2 1/2, 3, 3 1/2, 4, 4 1/2 and 5-inch. Weight about 6 1/2 pounds. Price per set.....	\$18.00

Socket Framing Chisels



With plain back and handle fitted with polished iron ring. Blade measures 8 inches from cutting edge to shoulder. All metal parts highly polished. First quality throughout.

Size, inches.....	1 1/2	1 3/4	2	2 1/2	3
Price per dozen.....	\$10.50	\$11.50	\$13.00	\$14.00	\$15.00
Price each.....	1.05	1.15	1.30	1.40	1.50

All Steel Wood Chisel



A prying and cutting chisel that can be used for all classes of work. The temper of the handle is such that it may be hammered without crystallizing or breaking. The weight of the handle insures quick cutting on heavy work.

Cutting edge, inches.....	1 1/2	2	3	4	5
Length over all, inches.....	9	10	11	11 1/2	12
Weight each, pounds.....	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2
Price per dozen.....	\$9.00	\$10.00	\$11.00	\$11.50	\$12.00
Price each.....	.90	1.00	1.10	1.15	1.20

Carpenters' Socket Slicks



Oval back and long handle. An extra heavy tool made only in large sizes and intended for the very heaviest duty. Polished blade.

Size, inches.....	2 1/2	3	3 1/2	4
Price per dozen.....	\$21.00	\$23.50	\$27.50	\$32.00
Price each.....	2.10	2.35	2.75	3.20

Socket Firmer Gouges



Blades 6 1/2 inches long. Extra quality steel, full polished and fitted to hickory handles.

Size, inches.....	1 1/2	2	2 1/2	3	4
Price per dozen.....	\$9.50	\$10.00	\$11.25	\$12.75	\$14.25
Price each.....	.95	1.00	1.12	1.28	1.42

Tanged Turning Chisels



Blades 8 inches long. Price does not include handle.						
Size, inches.....	1½	3¼	1	1¼	1½	2
Price per dozen.....	\$3.60	\$4.50	\$5.75	\$7.25	\$9.25	\$13.25
Price each.....	.36	.45	.58	.72	.92	1.32

Tanged Turning Gouge



Blades 8 inches long.		Price does not include handle.				
Size, inches.....	1½	2	1	1½	1½	2
Price per dozen.....	\$4.75	\$6.00	\$8.00	\$10.00	\$13.00	\$19.00
Price each.....	.48	.60	.80	1.00	1.30	1.90

Reliance Parting Tools



The blades are thin at edges with a heavy section down the center.

Size, inches.....	1 1/2	2	2 1/2
Price per dozen.....	\$4.50	\$5.00	\$5.50
Price each.....	.45	.50	.55

Sloyd Knife



No. 2. Swedish Sloyd Knife with blade 2 1/4 inches long, 1/2 inch wide.	
Price each.....	\$0.50

H. Channon Company Chicago

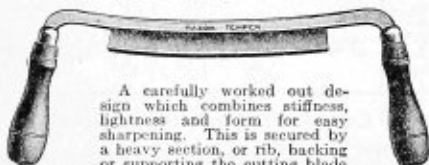
Perfect Handle Draw Knife



This tool is drop forged from solid piece of crucible steel. The "perfect handle" will never pull off. Every tool warranted.

Size, inches	8	10	12
Price per dozen	\$16.00	\$18.00	\$20.00
Price each	1.60	1.80	2.00

Razor Blade Draw Knife



A carefully worked out design which combines stiffness, lightness and form for easy sharpening. This is secured by a heavy section, or rib, backing or supporting the cutting blade proper which is formed to allow a full cutting bevel. Blade is 1 1/2 inches wide. Cutting edge is high grade tool steel welded to mild steel back. Hardwood handle. Nickel plated ferrules.

Length, inches	8	9	10	12
Price per dozen	\$13.50	\$14.40	\$15.60	\$18.00
Price each	1.35	1.40	1.55	1.80

Folding Handle Draw Knife



Same as above, but with folding handles.

Size, inches	8	9	10
Price per dozen	\$18.00	\$19.50	\$21.00
Price each	1.80	1.95	2.10

Heavy Stripping Knife



Used extensively for stripping telegraph poles. Blade is 1 1/2 inches wide. Handles are formed with an enlargement at the end to give a better grip. Steel ferrules.

Size, inches	12	14	16
Price per dozen	\$21.60	\$25.20	\$28.80
Price each	2.15	2.50	2.85

Japanned Iron Plumb Bobs

Number	Weight	Price Each
1	9 1/2 oz.	\$0.12
1 1/4	18 oz.	.22
1 1/2	1 1/2 lbs.	.28
5	2 3/4 lbs.	.30



Brass Plumb Bobs

Made of cast brass, polished. Have hardened steel points and screw tops, enabling cord to be securely fastened.



Number	Weight, Ounces	Price, Each
5700	6	\$1.35
5701	8	1.50
5701A	10	1.65
5702	12	1.80
5703	14	1.95
5704	16	2.10
5706	24	2.70

Brick Trowels



These trowels are made of best quality cast steel. Highly polished and finished.

No. 175. Size, inches	9	10	10 1/4	11	11 1/4
Price per dozen	\$6.75	\$7.25	\$7.50	\$7.75	\$8.00
Price each	.65	.70	.75	.75	.80

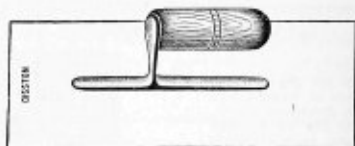
Pointing Trowels



High grade steel, ground and polished.

No. 182. Size, inches	4	5	6
Price per dozen	\$2.95	\$3.10	\$3.24
Price each	.30	.30	.31

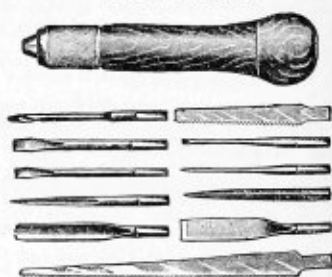
Plastering Trowels



Made of good quality steel, ground and tempered. Well finished.

No. 191. Size, inches	10	10 1/4	11	11 1/4
Price per dozen	\$6.50	\$7.00	\$7.50	\$8.00
Price each	.65	.70	.75	.80

Tool Holders



The illustration represents the general appearance of the Tool Holders listed below. The handles are made of cocobola, highly polished and of beautiful appearance. The ferrule and jaws are heavily nickel plated. The jaws will hold not only the tools as shown, but all other things from a fine awl to a mill file. No other tool handle in the market will do this. It also answers the purpose of a hand vise.

No.	Price Each	Number of Tools	Length of Tools, Inches	Length of Handle, Inches	Weight per Dozen, Pounds
1m	\$2.00	20	1 1/2	6	5
*2w	2.00	11	2 3/4	8	7
*1w	3.00	11	4	7 1/2	11

*Has extra saw 8 inches long.

About Our Hammers

We sell but one grade of hammers, the best obtainable. They are carefully drop forged from crucible hammer steel tempered and hardened to a toughness that enables them to stand severe usage. Handled with selected white hickory handles shaped to give perfect balance. The heads are fastened with a wedge which prevents their flying off. Weights given are without handles.

Machinists' Hammers

Drop Forged Hardened Faces and Peins, Hickory Handles

No.	Price per Dozen	Price Each	Weight Each, Pounds
6-0	\$12.00	\$1.20	7/8
5-0	12.00	1.20	3/4
4-0	12.00	1.20	3/8
3-0	12.00	1.20	1/2
2-0	12.00	1.20	1
0	12.50	1.25	1 1/4
1	13.50	1.35	1 1/2
2	14.50	1.45	1 3/4
3	15.50	1.55	1 3/4
4	16.50	1.65	2
5	17.50	1.75	2 1/4
6	19.00	1.90	2 1/2
7	20.50	2.05	2 3/4
8	22.00	2.20	3



Straight and cross pein hammers take same list as ball pein shown above.



We also carry an extra high grade safety first ball pein hammer, made of special alloy steel. A rigid individual test insures uniform hardness, and the edge of the face is beveled to prevent chipping. Carried in all sizes. Prices same as above.

Blacksmiths' Hand Hammers

No.	Price per Dozen	Price Each	Weight Each
0	\$13.00	\$1.30	1 lb., 10 oz.
1	14.00	1.40	2 lbs.
2	15.00	1.50	2 lbs., 10 oz.
3	16.00	1.60	3 lbs.
4	17.00	1.70	3 lbs., 8 oz.
5	19.00	1.90	4 lbs., 8 oz.

Engineers' Hammers

No.	Price per Dozen	Price Each	Weight Each
0	\$12.00	\$1.20	1 lb., 2 oz.
1	13.00	1.30	1 lb., 10 oz.
2	14.00	1.40	2 lbs.
3	15.00	1.50	2 lbs., 8 oz.
4	16.00	1.60	3 lbs.
5	17.00	1.70	3 lbs., 8 oz.
6	19.00	1.90	4 lbs., 8 oz.

Double Face

No.	Price per Dozen	Price Each	Weight Each
1	\$14.50	\$1.45	1 lb., 8 oz.
2	16.50	1.65	2 lbs., 6 oz.
3	18.00	1.80	3 lbs.
4	19.50	1.95	3 lbs., 10 oz.

Nail Hammers



Plain Face



Bell Face

Made of extra warranted drop forged steel. Hardened face and tempered claws. High polish finish. Furnished with first quality white hickory handles.

Plain face, Nos.	0	1	1 1/4	2	3
Bell face, Nos.	10	11	11 1/2	12	13
Weight, ounces.	24	20	16	12	7
Price per dozen.	\$12.50	\$9.00	\$8.50	\$8.00	\$7.50
Price each.	1.25	.90	.85	.80	.75

"Safety First" Nail Hammer

This type of hammer is strongly recommended by the underwriters and rapidly coming in vogue. The face is checkered to prevent nail from slipping when first struck. In packing rooms where many work close together the danger of injury from flying nails is greatly reduced where hammers of this type are used.



Plain Face				
Number	200	201	201 1/2	
Weight, ounces.	24	20	16	
Price per dozen	\$12.50	\$9.00	\$8.50	
Price each	1.25	.90	.85	
Bell Face				
Number	210	211	211 1/2	
Weight, ounces.	28	20	16	
Price per dozen	\$12.50	\$9.00	\$8.50	
Price each	1.25	.90	.85	

V and B Vanadium Nail Hammer



The strongest nail hammer made. Designed for rough usage and long service. Drop forged from vanadium steel and proof tempered in oil. Each hammer is given an individual test that is rigid in its completeness, and insures an even hardness of material and a perfect hammer. Handles of selected second growth hickory.

No. 41 weighs 20 ounces. No. 41 1/2 weighs 16 ounces. No. 43 weighs 13 ounces.

Price each \$2.00



Riveting Hammers

Plain Eye

No.	Price per Dozen	Price Each	Weight Each
0	\$5.50	\$0.55	4 oz.
1	5.75	.58	7 oz.
2	6.00	.60	9 oz.
3	6.25	.63	12 oz.
4	6.50	.65	15 oz.
5	7.00	.70	1 lb., 2 oz.
6	7.50	.75	1 lb., 6 oz.
7	8.00	.80	1 lb., 10 oz.



Bricklayers' Hammers

Adze Eye

No.	Price per Dozen	Price Each	Weight without Handle
1	\$14.00	\$1.40	1½ lbs.
2	15.00	1.50	2 lbs.



Ripping Hammers

Extra warranted steel with high polished finish. Hardened faces and tempered claws. Used extensively by electricians.

No.	Price Per Dozen	Price Each	Approx. Wt. Per Dozen
11	\$9.00	\$0.90	21½ lbs.
11½	8.50	.85	18½ lbs.
12	8.00	.80	14½ lbs.



No. 10 Farriers' Hammer

Weight, ounces.....	10
Length Overall, inches.....	13
Price Per Dozen.....	\$7.75
Price Each.....	.75



Bill Posters' Hammers

Magnetic
Nickel Plated

Number	45	55	85
Wt. Without Handle, ounces.....	4	5	8
Length, head.....	3½	4	4½
Length Overall.....	11½	11½	11½
Price Dozen.....	\$7.25	\$8.00	\$10.00
Price Each.....	.70	.80	1.00



Brass Hammers

These hammers are intended for use on finished work. They have polished brass heads; steel shank; and polished hard wood handle, except No. 91, which has a polished steel handle with knurled grip.

Number	91	92	93	94
Size Head, inches.....	1½x1½	1½x1½	1½x2½	1x3
Extreme Length, inches.....	5½	7½	8	10
Weight, ounces.....	2	4	8	16
Price, each.....	\$0.50	\$0.70	\$0.90	\$1.50

Keating Hammer



Extensively used for dismounting heavy machinery in municipal light and water plants, press rooms or steamships, etc. Has cast steel body and delivers an exceedingly heavy blow. Copper or lead tips can be inserted in face of hammer to prevent marring materials struck.

Copper tips furnished unless otherwise specified. Tips can be removed by inserting taper pins in drift hole.

No.	Weight Pounds	Price Each
1½	1½	\$2.00
3	3	4.00
5	5	6.00
8	8	8.00



Copper Hammers

With Handles

Weight, Pounds
½-1-1½-2-2½-3-4
Price Per Pound
\$1.00

Combination Mould and Ladle

For Casting Soft Metal Handles



Showing
Mold
Open



Completed
Lead
Hammer

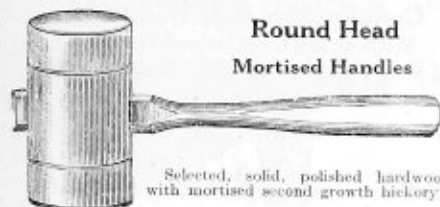
Cut shows mould open with handle in place. Ladle is filled with metal and held over flame. When melted it runs into the mold. The handle is a piece of pipe dented at the end or spread T shape. Head cannot come off and when shapeless can be moulded again.

Prices of Mould and Ladle

Number	107	108	109	110	111	112
Weight, pounds.....	1	2	3	4	5	6
Price Each.....	\$1.70	\$1.90	\$2.00	\$2.20	\$2.40	\$3.00

Mauls and Mallets

Round Head Mortised Handles



Selected, solid, polished hardwood head with mortised second growth hickory handle.

Number	1	2	3
Size of head, inches	3x5	3½x5½	4x6
Length handle, inches	10½	13	13
Weight per dozen, pounds	15½	22	28½
Price per dozen	\$4.25	\$5.55	\$6.95
Price each	.40	.55	.70

Tinners' Mallets



Plain finish hickory head with hardwood mortised handle.

Head 5½ inches long by 2¼ or 2½ inches diameter. Handle 10½ inches long. Weight, 10½ pounds per dozen.
Price per dozen \$3.00
Price each .30

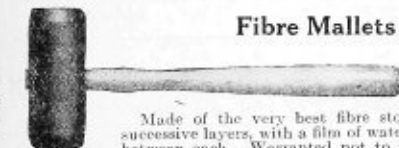
Rubber Mallets



These mallets are especially useful for striking heavy blows without bruising the metal, marring or disfiguring finely finished surfaces. Intended for the use of metal workers, but will be found very useful to woodworkers and other mechanics. Black rubber head.

No.	Price Each	Length of Head, Inches	Diameter at Center, Inches	Diameter at Ends, Inches
1	\$1.00	3¼	2½	2¼
2	1.30	3½	2¾	2½
3	1.50	4	2¾	2¾
4	1.80	4½	3½	2½

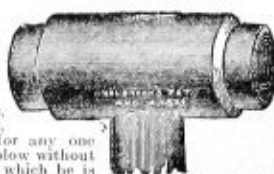
Fibre Mallets



Made of the very best fibre stock, wound in successive layers, with a film of waterproof cement between each. Warranted not to split, and will not jam, by long hard usage.
Mallets have a coating of good shellac.
Handles are of polished white hickory.

No.	Size	Weight Each, Ozs.	Price Dozen	Price Each
1	1½x3½	5	\$4.80	\$0.50
2	2 x1	8	6.60	.65
3	2½x4½	16	7.20	.70
4	2½x5½	22	9.00	.90
5	3 x5	24	9.00	.90

Hide Faced Hammers



Invaluable for mechanics, workers in brass or silver, jewelry manufacturers or for any one who needs to strike a hard blow without bruising the material upon which he is working. When worn out the faces can be renewed at slight cost, the old ones being easily removed.

No.	Price per Dozen	Price Each	Diameter Face Inches	Weight Each, Pounds
0	\$10.80	\$1.05	1	½
1	12.60	1.25	1½	1
2	16.08	1.60	1½	1½
3	19.20	1.90	2	2
4	27.84	2.75	2	4
5	39.96	4.00	2¾	5½

Extra Faces

No.	Price per Dozen Pairs	Price per Pair	No.	Price per Dozen Pairs	Price per Pair
0	\$3.36	\$0.30	3	\$ 5.52	\$0.55
1	3.60	.35	4	7.68	.75
2	4.32	.40	5	10.92	1.05

Rawhide Mallets



These are light mallets, made entirely of hide (except the handle) and suited to a variety of uses.

No.	Price Dozen	Price Each	Diam., Inches	Length, Inches	Weight, Ounces
0	\$ 4.32	\$0.40	1	2¾	2
1	5.52	.55	1½	3½	4
2	6.60	.65	1½	3¾	6
3	7.68	.75	1¾	3¾	8
4	9.72	.95	2	3½	10
5	21.60	2.15	2¾	4¼	22
6	24.36	2.40	2¾	4¾	24

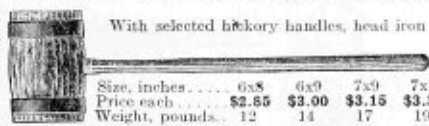
Rawhide Mauls

Used principally for driving punches and cutting leather, cloth, etc. Will not injure the cutting tools. On account of their weight a good heavy blow can be made.



No.	Price Each	Diam. of Head	Lengths Over All, Inches	Weight, Pounds
1	\$2.50	3½	10	3
2	2.75	3¾	10½	4
3	3.25	4	11	6
4	3.50	4½	11	8
5	4.00	4½	13	10
6	4.50	4½	14	12

Mauls for Sewer Builders, Gas Works, Etc.



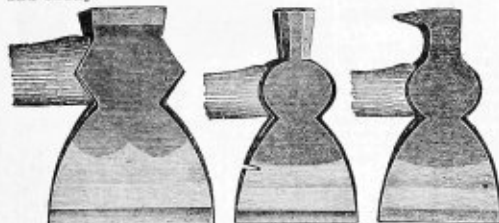
With selected hickory handles, head iron bound.

Size, inches	6x8	6x9	7x9	7x10	8x10
Price each	\$2.55	\$3.00	\$3.15	\$3.30	\$3.50
Weight, pounds	12	14	17	19	22

Axes and Hatchets

Usona Hatchets

Made of finest quality forged steel, with tempered bit and ebony.



Broad or Bench			
Number	Width Cut, Inches	Weight Each	Price per Dozen
2	4 1/2	2 lbs. 10 oz.	\$12.00
3	5 1/2	3 lbs.	13.00
4	5 1/2	3 lbs. 2 oz.	14.50
5	6	4 lbs.	16.50
6	6 1/2	4 lbs. 6 oz.	18.00
Shingling Hatchets			
2	3 1/2	2 lbs. 4 oz.	8.50
3	4 1/2	2 lbs. 9 oz.	9.00
Claw Hatchets			
2	3 1/2	2 lbs. 4 oz.	9.50
3	4 1/2	2 lbs. 12 oz.	10.00

Germantown Half Hatchets
With or Without Scored Heads.

Illustration shows hatchet with scored head.

Standard carbuilders' pattern, olive bronze finish. Forged from one piece best crucible tool steel.

With Scored Head

Number	Size	Width Cut, In.	Weight Each	Price per Doz.
0318	2	3 1/2	2 lbs. 2 oz.	\$19.80
0318 1/2	3	3 3/4	2 lbs. 6 oz.	20.60
Without Scored Head				
318	2	3 1/2	2 lbs. 2 oz.	19.00
318 1/2	3	3 3/4	2 lbs. 6 oz.	19.80

Hunters' Hatchets or Axes

A camper's or hunter's necessity. Well built with flint edge.

No.	Weight Each, Lbs.	Length H'dle, Ins.	Price per Doz.
0	1 1/4	12	\$12.00
1	2	14	14.00

Boughton Handled Axes
All Handled and Complete Assorted Standard Weights

The Boughton Brand is our best and our best axes are sold under the name "Boughton." They are made of crucible tool steel, hand-forged and tempered. Bronze finish with polished bits.
The "Usona" is our second grade, to meet the demand for a cheaper axe. Solid forged steel, tempered bit. Ebony finish.



Number	Style	Pattern	Weight, Pounds	Price per Dozen
15	Single bitted	Michigan	3 1/2 to 4 1/2	\$16.00
16	Single bitted	Michigan	4 to 5	18.00
17	Single bitted	Michigan	5 to 6	19.00
18	Double bitted	Michigan	4 to 5	20.00

Usona				
Number	Style	Pattern	Weight, Pounds	Price per Dozen
1	Single bitted	Michigan	3 1/2 to 4 1/2	\$15.00
2	Single bitted	Michigan	4 to 5	16.00

Channon Special

Well made axe with a good grade hardwood handle, bronzed head and polished bits.



Number	Style	Pattern	Weight, Pounds	Price per Dozen
11	Single bitted	Michigan	3 1/2 to 4 1/2	\$12.00
12	Single bitted	Michigan	4 to 5	13.00

Firemens' Handled Axes

Made to conform to the specifications of the fire underwriters. Head and handle enameled red, point and blade highly polished.

Weight
Five
Pounds



Width of Cut, 5 Inches

Price per dozen..... \$25.00
Rust proof hangers for attaching to wall, price per set.....

Bit Brace Auger Bits

Snell Pattern—Double Spur



Jennings Pattern—Extension Lip



These bits are accurate in size, clearance and temper. They are fully polished on the head, edges, hollows and shaft. Screw point is bright. Square is natural forged black. They will cut easily, clear freely and feed strongly.

Size, 16ths	3	4	5	6	7	8
Price per dozen	\$6.00	\$5.00	\$5.00	\$5.00	\$5.00	\$5.00
Price each	.60	.50	.50	.50	.50	.50
Size, 16ths	9	10	11	12	13	14
Price per dozen	\$6.00	\$6.00	\$7.00	\$7.00	\$8.25	\$8.25
Price each	.60	.60	.70	.70	.80	.80
Size, 16ths	15	16	17	18	19	20
Price per dozen	\$9.50	\$9.50	\$12.00	\$12.00	\$14.00	\$14.00
Price each	.95	.95	1.20	1.20	1.40	1.40
Size, 16ths	22	24	26	28	30	32
Price per dozen	\$16.00	\$15.00	\$17.00	\$19.00	\$21.00	\$23.00
Price each	1.60	1.80	1.70	1.90	2.10	2.30

Solid Center



The twist is a single spiral wound around the stem, allowing a board clearance that insures quick delivery of the chips.

There are two cutting edges fitted with spurs of the extension lip type.

Size, 16ths	3	4	5	6	7	8
Price per dozen	\$6.00	\$5.00	\$5.00	\$5.00	\$5.00	\$5.00
Price each	.60	.50	.50	.50	.50	.50
Size, 16ths	9	10	11	12	13	14
Price per dozen	\$6.00	\$6.00	\$7.00	\$7.00	\$8.25	\$8.25
Price each	.60	.60	.70	.70	.80	.80
Size, 16ths	15	16	18	20	22	24
Price per dozen	\$9.50	\$9.50	\$12.00	\$14.00	\$16.00	\$18.00
Price each	.95	.95	1.20	1.40	1.60	1.80

Irwin Pattern Car Bits



About 17 inches long overall, 12-inch twist. Two cutting edges fitted with spurs of the extension type.

Size, 16ths	4	5	6	7	8	9
Price per dozen	\$11.00	\$11.00	\$11.00	\$11.00	\$11.00	\$11.00
Price each	1.10	1.10	1.10	1.10	1.10	1.10
Size, 16ths	10	11	12	13	14	15
Price per dozen	\$11.00	\$12.00	\$12.00	\$13.00	\$13.00	\$14.50
Price each	1.10	1.20	1.20	1.30	1.30	1.45
Size, 16ths	16	17	18	19	20	21
Price per dozen	\$14.50	\$16.00	\$16.00	\$18.00	\$18.00	\$20.00
Price each	1.45	1.60	1.60	1.80	1.80	2.00
Size, 16ths	22	23	24	26	28	32
Price per dozen	\$20.00	\$23.00	\$23.00	\$27.00	\$32.00	\$45.00
Price each	2.00	2.30	2.30	2.70	3.20	4.50

Dowel Auger Bits

Either extension lip or double spur type. Extension lip sent unless otherwise specified. Bit is 5 inches overall, with 2 1/4-inch twist.

Size, 16ths	3	4	5	6	7	8
Price per dozen	\$6.00	\$5.00	\$5.00	\$5.00	\$5.00	\$5.00
Price each	.60	.50	.50	.50	.50	.50
Size, 16ths	9	10	11	12	13	14
Price per dozen	\$6.00	\$6.00	\$7.00	\$7.00	\$8.25	\$8.25
Price each	.60	.60	.70	.70	.80	.80
Size, 16ths	15	16	18	20	22	24
Price per dozen	\$9.50	\$9.50	\$12.00	\$14.00	\$16.00	\$18.00
Price each	.95	.95	1.20	1.40	1.60	1.80

Auger Bit Sets

In Wooden Boxes



Hinged Box

Any of the following sets can be furnished in either the handy or hinged box. Handy box provides individual stalls for bits, while strong springs hold bits in place in the hinged box.

Specify whether in hinged or handy box.

Handy Box

Solid Center. Set A

	In Hinged Box	In Handy Box
No. 1. With 6 bits from 1/4 to 3/4-inch	\$4.10	\$3.90
One each 1/4, 3/8, 1/2, 5/8, 3/4 and 1-inch		
No. 2. With 8 bits from 1/4 to 1-inch	5.50	5.60
One each 1/4, 3/8, 1/2, 5/8, 3/4, 7/8 and 1-inch		
No. 3. With 13 bits from 1/4 to 1-inch	8.50	8.85
One each 1/4, 3/8, 1/2, 5/8, 3/4, 7/8, 15/16 and 1-inch		

Jennings Pattern. Set J

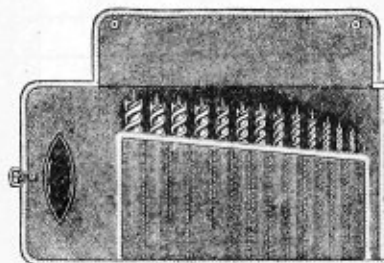
	In Hinged Box	In Handy Box
No. 1. With 6 bits from 1/4 to 3/4-inch	\$4.10	\$3.90
One each 1/4, 3/8, 1/2, 5/8, 3/4 and 1-inch		
No. 2. With 8 bits from 1/4 to 1-inch	5.50	5.60
One each 1/4, 3/8, 1/2, 5/8, 3/4, 7/8 and 1-inch		
No. 3. With 13 bits from 1/4 to 1-inch	8.50	8.85
One each 1/4, 3/8, 1/2, 5/8, 3/4, 7/8, 15/16 and 1-inch		

Snell Pattern. Set S

	In Hinged Box	In Handy Box
No. 1. With 6 bits from 1/4 to 3/4-inch	\$4.10	\$3.90
One each 1/4, 3/8, 1/2, 5/8, 3/4 and 1-inch		
No. 2. With 8 bits from 1/4 to 1-inch	5.50	5.60
One each 1/4, 3/8, 1/2, 5/8, 3/4, 7/8 and 1-inch		
No. 3. With 13 bits from 1/4 to 1-inch	8.50	8.85
One each 1/4, 3/8, 1/2, 5/8, 3/4, 7/8, 15/16 and 1-inch		

Auger Bit Sets

In Rolls



Irwin, Jennings and Snell pattern auger bits, furnished in rolls made of canvas and bound with leather. Leather strap and buckle. Each set contains 13 bits, one each 4 to 16-16ths, inclusive, same as the sets furnished in boxes. Weight of set complete about 3 1/2 pounds.

Set E-13. Irwin pattern auger bits. Price each	\$8.50
Set J-13. Jennings pattern auger bits. Price each	8.50
Set S-13. Snell pattern auger bits. Price each	8.50

Clark's Expansive Bits With Two Cutters



	Size	Cuts, Inches	Price Each
No. 1c.	Small size	$\frac{1}{4}$ to $1\frac{1}{2}$	\$1.80
No. 2c.	Large size	$\frac{1}{2}$ to 3	2.60

Extra Cutters

No.	Cuts, Inches	Price Each
1	$\frac{1}{4}$ to $\frac{3}{8}$	\$0.30
2	$\frac{3}{8}$ to $1\frac{1}{2}$	.35
3	$\frac{1}{2}$ to $1\frac{3}{4}$	.50
4	$1\frac{1}{4}$ to 3	.60
5	$2\frac{1}{2}$ to 4	.90
6	$3\frac{1}{2}$ to 5	1.20

Wright's Expansive Bits With Patent Cutter



The cutter in this bit intermeshes with a cross-feed screw, firmly held in the plate or gib, which, when screwed down, cannot move, and therefore will not slip or creep. A positive accurate adjustment can always be made. Made in two sizes.

No. W1. With No. 1 and No. 2 cutters, bores holes from $\frac{1}{4}$ to $1\frac{1}{4}$ inches. Price each.....\$2.20
No. W2. With No. 3 and No. 4 cutters, bores holes from $\frac{1}{2}$ to 3 inches. Price each.....\$2.60

Extra Cutters

No. 1 bores holes $\frac{1}{4}$ to $1\frac{1}{4}$ inches. Price each.....\$0.30
No. 2 bores holes $\frac{1}{2}$ to $1\frac{1}{2}$ inches. Price each......35
No. 3 bores holes $\frac{1}{2}$ to $1\frac{3}{4}$ inches. Price each......50
No. 4 bores holes $1\frac{1}{4}$ to 3 inches. Price each......60
No. 5 bores holes 3 to 4 inches. Price each......90

A No. 5 cutter fits the large size bit and bores holes from 3 to 4 inches.

Wright's Patent Expansive Machine Bits



The improved and patented features of this bit and cutters combined have produced the strongest and easiest boring establishment.

The cutters cannot slip and are easily and accurately adjusted. The bit bores extremely smooth holes quickly in any kind of wood.

Stock bits have a special point and a $2\frac{1}{2} \times \frac{1}{4}$ -inch turned shank.

It is a practical and money saving addition to any wood working establishment.

No. 110. Large size, boring $\frac{1}{2}$ to 3 inches. Price each. \$2.60
No. 120. Small size, boring $\frac{1}{4}$ to $1\frac{1}{4}$ inches. Price each. 2.20

Wright's Combination Set



Set No. A12, boring from $\frac{1}{4}$ to $1\frac{1}{2}$ inches, contains 1 each 4, 5, 6, 7, 3 16th-inch Wright's Jennings auger bit, small Clark expansive bit, No. 1 Superior screw driver bit. Price.....\$4.00

Set No. A14, boring from $\frac{1}{4}$ to 3 inches, contains 1 each 4, 5, 6, 8, 10, 12 16th-inch Wright's Jennings auger bits, large Clark expansive bit, No. 2 Superior screw driver. Price.....\$4.75

Set No. C14, boring from $\frac{1}{4}$ to 3 inches, contains 1 each 4, 6, 8, 10, 12 16th-inch Wright's solid center auger bits, large Clark expansive bit, No. 2 Superior screw driver. Price.....\$4.75
All sets put up in canvas roll. When rolled up measures $11\frac{1}{2} \times 10$ inches.

Ship Augurs



For heavy work in rough timber or hard wood. Crucible tool steel with or without starting screw. Square rough shanks, fitting auger bit handles.

Twist varies in length, according to size. On the 4/16ths and 5/16ths, 8 inches; 6/16ths to 8/16ths, 10 inches; 9/16ths to 16/16ths, 12 inches, and 15 inches on larger sizes. Shanks are about 5 inches long.

Carried in stock, with and without starting screws, up to 3 inches in diameter.

Ship Augur Car Bits



For Boring Deep Holes

They differ from ship augurs only in the shank. They have standard twists (8 to 12 inches) and are about 17 inches long overall. Shank is suited to the ordinary bit brace. Furnished with starting screw. Carried in stock up to $1\frac{1}{2}$ inches diameter.

Price List on Ship Augurs and Ship Augur Car Bits

Size 16ths....	4	5	6	7	8	9
Price dozen.....	\$11.00	\$11.00	\$11.00	\$11.00	\$11.00	\$11.00
Price each.....	1.10	1.10	1.10	1.10	1.10	1.10
Size 16ths....	10	11	12	13	14	15
Price dozen.....	\$11.00	\$12.00	\$12.00	\$13.00	\$13.00	\$14.50
Price each.....	1.10	1.20	1.20	1.30	1.30	1.41
Size 16ths....	16	17	18	19	20	21
Price dozen.....	\$14.50	\$16.00	\$16.00	\$18.00	\$18.00	\$20.00
Price each.....	1.45	1.60	1.60	1.80	1.80	2.00
Size 16ths....	22	23	24	25	26	27
Price dozen.....	\$20.00	\$23.00	\$23.00	\$27.00	\$27.00	\$32.00
Price each.....	2.00	2.30	2.30	2.70	2.70	3.20
Size 16ths....	28	29	30	31	32	
Price dozen.....	\$32.00	\$38.00	\$38.00	\$45.00	\$45.00	
Price each.....	3.20	3.80	3.80	4.50	4.50	
Size 16ths....	34*	36*	38*	40*	42*	
Price dozen.....	\$57.00	\$72.00	\$86.00	\$101.00	\$114.00	
Price each.....	5.70	7.20	8.60	10.10	11.50	
Size 16ths....	44*	46*	48*	50*	52*	
Price dozen.....	\$130.00	\$144.00	\$158.00	\$173.00	\$187.00	
Price each.....	13.00	14.00	15.80	17.30	18.70	

*Ship augur car bits not furnished in sizes from 34 to 52.

Augur Handles



No. 660



Nos. 1 and 2

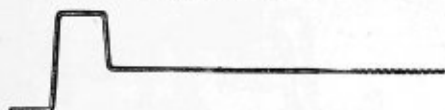
No. 660. Made of selected hickory timber; common polish. Price each.....\$0.30

No. 1. Made of ash with steel band operated by steel screw and thumb nut; 14 inches long. Price each.....\$1.00

No. 2. Same as No. 1, but 16 inches long. Price each.....1.60

We are in a position to furnish augurs for any special purpose.

Bridge Augers



For railroad construction, heavy bridge work, etc. Handles of any size, welded to bits with or without starting screw. Regular ship augers are generally used for welding to these handles, but we can furnish any style bit desired. Made to order only. Specify length overall wanted. Price on application.

Machine Bits



Double spur bits. For rapid work in all kinds of wood. Made of crucible tool steel. Shank 1/2x2 inches. Twist 6 inches. We can also furnish 4-inch twist in sizes 1/4 to 1 inch at the prices given below.

Size, 16ths.	4	5	6	7	8	9	10	11
Dosen	\$10.80	\$10.80	\$10.80	\$10.80	\$10.80	\$12.00	\$13.20	\$14.40
Each	1.08	1.08	1.08	1.08	1.08	1.20	1.32	1.44
Size, 16ths.	12	13	14	15	16	17	18	
Per dozen	\$15.60	\$16.80	\$18.00	\$19.20	\$20.40	\$21.60	\$22.80	
Price each	1.56	1.68	1.80	1.92	2.04	2.16	2.28	
Size, 16ths.	19	20	21	22	23	24	25	
Per dozen	\$24.00	\$26.20	\$28.40	\$30.60	\$32.80	\$35.00	\$37.20	
Price each	2.40	2.52	2.64	2.76	2.88	3.00	3.12	
Size, 16ths.	26	27	28	29	30	31	32	
Per dozen	\$33.00	\$34.50	\$36.00	\$37.50	\$39.00	\$40.50	\$42.00	
Price each	3.30	3.45	3.60	3.75	3.90	4.05	4.20	

Machine bits can be furnished with twists 8, 10, 12 and 14 inches long. Prices upon application.

Nut Augers



For boring dry timber, earth and clay. Handles of any size can be welded to bit.

Twist varies from 6 inches on the small sizes to inches on the 2-inch. Lengths overall, 15 to 20 in.

Size, inches.	3/8	1/2	5/8	3/4	7/8	1
Price per dozen	\$10.00	\$10.00	\$10.00	\$11.00	\$13.00	\$15.00
Price each	1.00	1.00	1.00	1.10	1.30	1.50
Size, inches.	1 1/8	1 1/4	1 3/8	1 1/2	1 3/4	2
Price per dozen	\$17.00	\$19.00	\$21.00	\$24.00	\$26.00	\$32.00
Price each	1.70	1.90	2.10	2.40	2.60	3.20

Boring Machine Augers



Length overall, 12 inches; twist, 8 inches; shank, 1/2x2 1/2 inches.

Size, inches.	3/8	1/2	5/8	3/4	7/8	1
Price each	\$1.00	\$1.00	\$1.00	\$1.10	\$1.30	\$1.50
Size, inches.	1 1/8	1 1/4	1 3/8	1 1/2	1 3/4	2
Price each	\$1.70	\$1.90	\$2.10	\$2.40	\$2.60	\$3.20
Size, inches.	2	2 1/4	2 1/2	2 3/4	3	3 1/2
Price each	\$3.20	\$4.20	\$5.20	\$7.20	\$9.20	

Millers Falls Boring Machine

This machine bores vertically, or at any angle from vertical within an arc of 50°. Depth of hole is regulated by a stop. Auger removed from hole by pushing a latch and continuing revolution of cranks in same direction as when boring. Bores to depth of 12 inches. Cranks are adjustable, regulating speed and power. Chuck holds straight shank drills up to 1/2 inch. Height, 25 inches. Weight boxed, 45 pounds. Price, without auger bits.....

\$14.00



Upright and Angular Boring Machines

These machines are well made and will bore true. The rack is strong, easily adjusted and will not slip.

No. 1. Upright wood frame; adjustable depth gauge; self withdrawing auger. Weight, about 35 pounds. Price, without augers.....

No. 2. Angular wood frame; otherwise the same as No. 1. Price, without augers.....



Henderson's Patent Joist Boring Machine

Bores holes in overhead joists from four to six times as fast as a brace and bit. Readily adjustable to varying heights of ceilings. No step ladder required. Collapsible to easy carrying length. Simply constructed, no complicated mechanisms to get out of order. Specially designed ball bearings. Universal bit holders. Adjustable 4 1/2 to 12 feet. Price.....

\$40.00

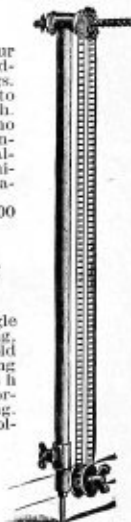
Henderson's Patent Universal Hand Boring Machine

Bores holes at any angle through studding, bridging, plates, floors and joists in old and new buildings. Working parts interchangeable with Henderson Patent Joist Boring Machine. Light running. Length in use, 28 inches, collapsed, 18 inches.

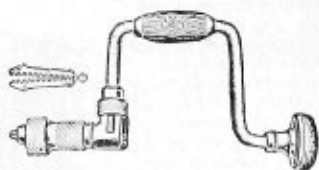
Collapsible—Can Be Carried in a Tool Bag.

Weights six pounds.

Price.....\$24.00



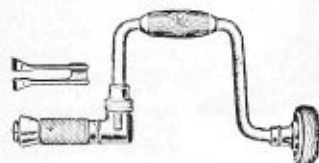
P. S. & W. Samson Ratchet Braces



A high grade tool for skilled mechanics. Head is lignum-vitae, steel clad and screw fastened; dust proof ball bearings in retaining cup. Box ring ratchet; Patent Alligator Pattern Jaws of Forged Steel, machined and hardened. Patent Ball Bearing Chuck, extra knurled and machine cut thread. Cocobolo center. All metal parts nickel plated and polished.

Nos.	8005	8008	8010	8012	8014
Sweep, inches	6	8	10	12	14
Weight, lbs.	2 1/4	3 1/4	3 1/2	3 3/4	4
Price Each	\$5.50	\$5.50	\$5.70	\$5.75	\$6.25

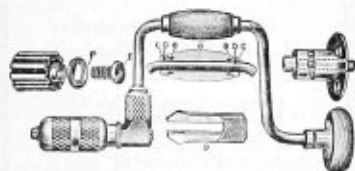
P. S. & W. Ratchet Braces



One piece, self centering, forged steel and spring tempered jaws. Steel, extra knurled chuck with machine cut thread. Lignum-vitae, steel clad, ball bearing head. Nickel Plated.

Nos.	7006	7008	7010	7012	7014
Sweep, inches	6	8	10	12	14
Weight, lbs.	2 1/4	2 3/4	3 1/4	3 1/2	3 3/4
Price Each	\$4.50	\$4.50	\$4.70	\$4.95	\$5.20

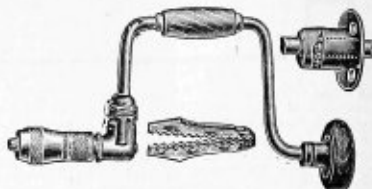
Master Ratchet Braces



Ball bearing head. Non splitting, free acting sweep handle with inserted brass rings and adjustable bearings clamped with screws. Forged steel jaws, holding positively and securely, round shanks from 1/8 to 1/2 inch, No. 1 Morse Taper and all sizes of bit stock and expansion bit shanks. Unbreakable jaw socket made from bar steel. Steel parts all nickel plated. Handles: Tropical wood.

Nos.	8133	8132	8131	8130
Sweep, inches	8	10	12	14
Weight, Pounds	3 1/4	3 1/2	3 3/4	4 1/4
Price Each	\$5.30	\$5.50	\$5.75	\$6.00

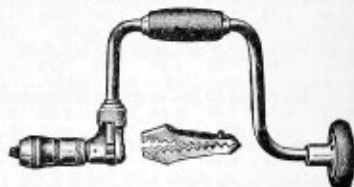
Barber Improved Ratchet Braces



Ball bearing head, covered ratchet teeth with exposed ratchet jaws. Patent cup washer and screw to hold chuck to sweep without working loose. Forged steel alligator jaws holding bit stock and many sizes of round and irregular shanks. All metal parts nickel plated.

Nos.	34	33	32	31	30
Sweep, inches	6	8	10	12	14
Weight, lbs.	2 1/4	2 3/4	3	3 1/4	3 3/4
Price Each	\$4.20	\$4.20	\$4.45	\$4.75	\$4.95

Barber Improved Ratchet Braces



A popular, medium priced brace. Handles of stained hardwood. Polished steel sweeps and jaw sockets. Forged steel alligator jaws.

Nos.	423	422	421
Sweep, inches	8	10	12
Weight, lbs.	2 1/4	2 3/4	3
Price Each	\$2.65	\$2.70	\$2.85

Barber Improved Braces



Same as the above brace except plain, without ratchet.

Nos.	23	22	21
Sweep, inches	8	10	12
Weight, lbs.	1 3/4	2 1/4	2 3/4
Price Each	\$1.80	\$1.95	\$2.10

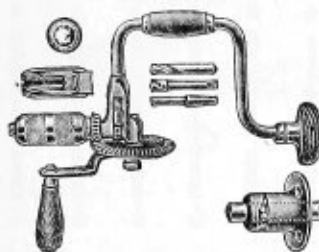
Universal Angular Bit Stock



To be used with a bit brace or a breast drill either as an extension or angular borer. Adjustable arc varies angle from 180° to 125°. Length at 180°—12 1/2 inches. Weight 2 1/2 lbs. With Master Chuck.

Price Each	\$2.75
------------	--------

No. 182 Drill Brace



High grade ball bearing ratchet brace with 10-inch sweep. Drilling attachment removed or affixed in a moment's time. Gear ratio about 3 to 1. Weight about 5 pounds.

Price each\$8.15

Corner Bit Brace

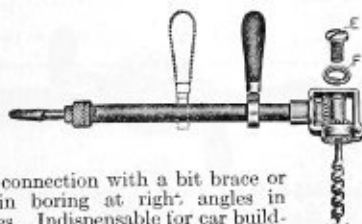
Ball-bearing head and adjustable, free-acting sweep and steadying handles. Chuck operated by inclosed gears, protected from dust and dirt. Gears case hardened and steel bushings in frame practically eliminate wear at bearings.

Handsomely finished throughout.

No. 503. 8-inch sweep, 17¼ inches long. Weight 4¾ pounds. Price each\$6.70

No. 502. 10-inch sweep, 17½ inches long. Weight 4¾ pounds. Price each\$7.25

Sill Borer or Joist Tool



For use in connection with a bit brace or breast drill in boring at right angles in cramped places. Indispensable for car builders, electricians, carpenters and other wood-workers. Main frame malleable iron; working parts, including gears, bushings, etc., hardened steel. Provided with ball bearings and take-ups for wear.

No. 51. Length, 16½ inches. Depth of head, 2¾ inches. Weight, about 3 pounds. Price each\$5.00

No. 54. Exactly the same as No. 51 except that the shank or handle is only 9 inches long, permitting it to be held more firmly. Price each\$5.00

Extension Bit Holder



Follows bits ½g-inch in diameter and larger into their bores. Bit inserted or released instantly when desired. Four strong steel jaws made in one piece grip firmly over shoulders of bit stock shanks. Polished and nickel plated.

Length, inches	12	15	18	21	24	30
Wt., doz., lbs.	7	8	9	10	11	13
Price each	\$2.25	\$2.30	\$2.35	\$2.40	\$2.50	\$2.65

Telescopic Extension Bit Holder



Outer sleeve telescoping over and engaging at half-inch intervals upon inner spindle. Combines lightness and strength. Length, collapsed, 16½ inches, extended. Weight per dozen, 13½ pounds.

No. 6. With chuck as on extension bit holder, described above. Price each\$4.00

Chain Drills

Automatic

Non-Automatic



No. 718. Automatic, self-regulating feed, or may be fed by hand. Yoke and nuts japanned; socket and bit stock nickeled. With master chuck for holding round shanks from ½ to ½-inch diameter, bit stock and No. 1 Morse taper shanks and 4 feet of chain. Weight, 4½ pounds. Price each\$5.15

No. 717. Same as No. 718, but without master chuck. Hole in socket is ½ inch in diameter. Weight, 3½ pounds. Price each\$3.45

No. 719. Same as No. 718, except has Star chuck holding round shank drills up to ½-inch. Weight, 4½ pounds. Price each\$6.60

No. 817. Non-automatic, without chuck. Diameter of hole in socket, ½ inch. Weight, 3 pounds. Price each\$3.00

No. 44 Yankee Automatic Drill



This tool has an adjustable tension for spring so its strength can be regulated to suit large or small drills, soft or hard woods, and greatly reduces risk of breaking of drill points. Has 8 drill points in plain sight when magazine is open. When drill is being inserted in chuck, open end of magazine is up, so it can be left open without drills falling out. Length, 11 1/4 inches. Provided with 8 drill points, 1/8 to 1/2-inch. Weight, 3/4 pound.

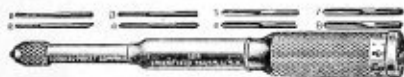
Price each.....\$3.00

Millers Falls Automatic Boring Tool
No. 45

Knurled cheek nut immediately back of chuck prevents latter from working loose. Chuck holds round shank drill bits from 0 to 1/4-inch. Handle is rare tropical wood. All metal parts polished and nickel-plated. Length, 11 1/4 inches. Weight about 3/4 pound.

Price each.....\$3.35

Goodell Automatic Drill No. 185



Drill point magazine is provided with a gauge showing exact size of drill point contained in each compartment. Equipped with 8 fluted drill points from 1/8 to 1/2-inch. Length, 10 inches. Weight, 1/2 pound.

Price each.....\$2.00

Goodell Automatic Drill No. 3



Patented magazine holds 8 drill points (1/8 to 1/2-inch), each in a separate numbered compartment, from which they can be removed through hole in rotating top. Accidental loss of drills practically impossible. Length, 10 inches.

Price each.....\$1.70

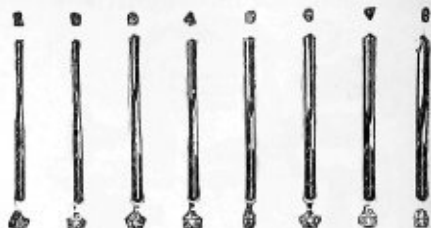
Reciprocating Drill No. 101



The mechanism of this drill is so arranged that, regardless of whether the traveling handle is moved backward or forward, chuck continues to revolve to right. A very useful tool for drilling holes in cramped quarters where no other drill can be conveniently used. Chuck holds drills from 0 to 1/4-inch. Length, 16 1/2 inches. Weight about 1 1/4 pounds each.

Price each.....\$2.30

Fluted Shank Drill Points



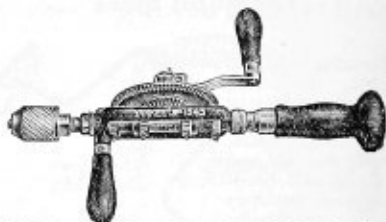
These drill points fit automatic drills. Made of the finest grade of steel.

Price per dozen, any size.....\$1.00

Price per set of 8......85

Yankee Hand Drills

With Right and Left and Continuous Ratchet Movement



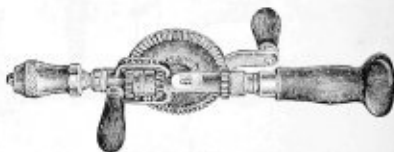
No. 1545 Double Speed No. 1540 Single Speed

No. 1545. This drill has all the latest time-saving features. When the little slide between the gears is in the first notch it is plain drill; in second, a left-hand ratchet; in fourth, a double ratchet; when any movement of crank, forward or backward, causes the drill to cut continuously. When slide is in fifth notch gears are locked to open or close chuck. Provided also with two speeds for heavy and light work. Handle is detachable, so that interior can be used as a magazine for drill points. Ball-bearing throughout. All gears have cut teeth. Side handle has a screw driver bit to adjust screws. Chuck jaws are drop forged steel. Chuck holds round shanks 3/8-inch or less. Length, 15 inches. Weight, 4 1/4 pounds.

Price each.....\$9.50

No. 1540. Exactly like No. 1545, except that it has single speed only. Length, 16 1/2 inches. Weight, 3 3/4 pounds.

Price each.....\$8.00



No. 1445 3 Jaw Chuck No. 445 2 Jaw Chuck

No. 1445. Intended for mechanics who do not require so complete a tool as the No. 1545 or 1540. Strong and substantially built for hard work, with adjustable ball-bearings to take up all strain and wear. When slide is in notch 8 drill is set for slow speed; when at F for fast speed, and in center notch 1 spindle is locked so that chuck can be readily opened or closed. Three-jaw chuck holds all round shank drills up to 3/8-inch. Length, 15 inches. Weight, 3 1/2 pounds.

Price each.....\$6.00

No. 445. Same as No. 1445, described above, except furnished with two-jaw chuck, alligator pattern, for holding all drills round or square, up to 3/8-inch.

Price each.....\$6.00

No. 303 Millers Falls Hand Drill



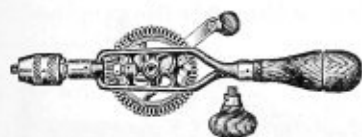
Hollow end handle, quickly detached and with receptacle large enough to hold any twist drills within capacity of tool. Three jaw chuck holds round shanks up to $\frac{1}{2}$ -inch diameter. Length, 11 $\frac{1}{4}$ inches. Weight, 1 $\frac{1}{2}$ pounds.
Price each.....\$2.65

No. 5 Millers Falls Hand Drill



Hollow end handle, with screw cap, containing 8 wood boring points, $\frac{1}{8}$ to $\frac{1}{4}$ -inch. Large gear has wide rim to be grasped between thumb and fingers when delicate work is being done. Provided with idler gear to equalize bearings. Three jaw chuck with $\frac{1}{2}$ -inch capacity. Length, 12 $\frac{1}{2}$ inches. Weight, 1 5-6 pounds.
Price each.....\$3.50
Fluted drill points. Price per dozen.....1.00
Fluted drill points. Per set of 8......50

No. 105 Millers Falls Hand Drill



A new tool with three jaw chuck of the Star pattern. Jaws open evenly by means of springs which will not get out of order. Holds round shanks to $\frac{1}{4}$ inch. Hollow end handle with screw cap. Contains 8 wood boring points. Length, 12 $\frac{1}{2}$ inches. Weight, 1 $\frac{1}{2}$ pounds.
Price each.....\$3.60
Extra drill points same as above.

No. 2 Millers Falls Hand Drill



Hollow end handle with screw cap. Shaped to be used as a breast drill if desired. Contains 8 wood boring points. Removable side grip handle. Three jaw chuck with $\frac{3}{8}$ -inch capacity. Length, 14 $\frac{1}{2}$ inches. Weight, 2 $\frac{1}{2}$ pounds.
Price.....\$4.80

No. 980 Millers Falls Hand Drill



Instantly changeable speed, 1 $\frac{1}{2}$ to 1 and 4 to 1, operated by shifting knurled ring B. Chuck is Star pattern, three jaw, capacity $\frac{3}{8}$ -inch. Hollow end handle detached by loosening knurled nut and pressing on plunger, A. Ball thrust bearing at C. Length, 15 $\frac{1}{4}$ inches. Weight, 3 $\frac{1}{2}$ pounds.
Price each.....\$3.80

No. 1980 Millers Falls Hand Drill



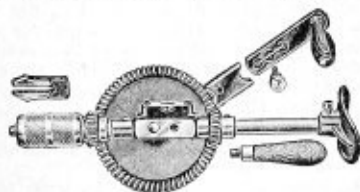
This tool is equipped with all the features of No. 980, and in addition is provided with a simple and effective ratchet, operated by raising and turning to right or left cap to a small boss on crank handle. Very convenient for crowded places and for delicate work. Capacity of chuck, $\frac{3}{8}$ inch. Length, 15 $\frac{1}{4}$ inches. Weight, about 3 $\frac{1}{2}$ pounds.
Price each.....\$8.00

No. 12 Millers Falls Breast Drill



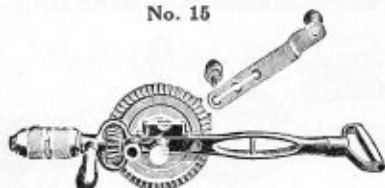
Completely equipped with ball bearing. Patent level attachment. Changeable speed from even to 3 to 1. Breast plate adjustable for different positions and removable. Extension crank with radius from 4 to 6 inches, adding to the power of the tool. Length, 17 $\frac{1}{2}$ inches. Weight, 6 $\frac{1}{2}$ pounds.
No. 12. With master chuck, holding round shanks from $\frac{1}{8}$ to $\frac{1}{2}$ inch, all sizes of bit stock and No. 1 taper shanks. Price each.....\$5.80

No. 13 Millers Falls Breast Drill



Extension crank with radius 5 $\frac{1}{2}$ to 7 inches. Speed of gearing 4 $\frac{1}{2}$ to 1, with idler to equalize bearings. Patent level attachment. Ball thrust bearing. Breast plate adjustable and removable. Length, 15 inches. Weight, about 5 $\frac{1}{2}$ pounds.
No. 13. With master chuck described above. Capacity, $\frac{1}{2}$ to $\frac{1}{2}$ inch. Price each.....\$7.90

Millers Falls Breast Drills No. 15



D handle is removable and adjustable to different positions. Extension crank has radius from 4 to 6 inches. Changeable speed from even to 3 to 1. Ball thrust bearing. Patent level attachment. Finely finished and nicked. Cut gears, and idler to equalize bearings. Length, 19 inches. Weight, 6½ pounds.

No. 15. With Master chuck holding round shanks from ½ to ¾-inch, bit stock, and No. 1 Morse taper shanks. Price each \$5.80

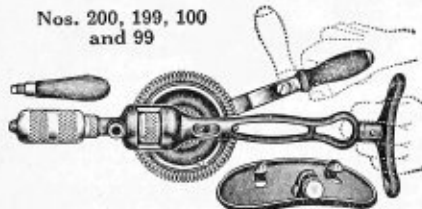
Miller's Falls Breast Drill No. 19



Rolled steel stock detachable from frame. Breast plate adjustable to different positions. Adjustable crank with radius from 4 to 7 inches. Cut gears. Ball thrust bearing. Changeable speed from even to 3 to 1. Change of speed is accomplished without removing bit from work. Barber improved chuck. Length, 18 inches. Weight, 6¼ pounds. Price each \$4.45

Millers Falls Breast Drill

Nos. 200, 199, 200
and 99



Breast plate is adjustable to different positions and made to fit the hand. When grasped with the middle finger through the hole provided for it, the tool can be easily held and steadied in awkward places when breast plate must be held in the hand. An auxiliary breast plate is also provided, for heavy work. Crank handle is adjustable to two positions, one at right angles, the other in line with the crank. Tool is also provided with a ratchet, operated by slide on crank handle. Changeable speeds from even to 3 to 1. Length, 18 inches. Weight, 7 pounds.

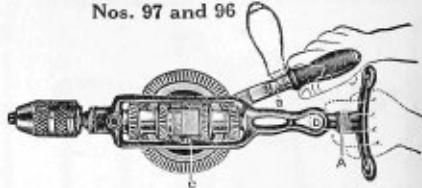
No. 200. With Star chuck, holding round shanks from 0 to ½-inch. Price each \$9.40

No. 199. Same as No. 200, except with Master chuck, holding round shank bits ½ to ¾-inch, bit stock, and No. 1 Morse taper shanks. Price each \$8.25

No. 100. Same as No. 200, except without ratchet and adjustable crank features. Price each \$7.60

No. 99. Same as No. 199, except without ratchet and adjustable crank features. Price each \$6.60

Millers Falls Breast Drills Nos. 97 and 96



Breast plate is adjustable to different positions at right angles to each other by loosening a knurled nut (A), and is made to fit the hand with finger hole for holding drill in awkward places. An auxiliary breast plate is furnished and is clamped on over regular plate, being more comfortable for heavy work. Ratchet adjustment is controlled by knurled screw (C) and includes the following actions: With-out ratchet as an ordinary breast drill, right hand ratchet, left hand ratchet, continuous right hand action and continuous left hand action, i. e., chuck turns continuously onward whether crank is moved toward right or left.

Crank handle is adjustable to two positions, at right angles to crank and in line with crank. Two speeds, 2¾ to 1 and even instantly changeable, without removing drill or work. Gears can be locked for changing drills. Double geared, cut teeth. Ball thrust bearing with take up for wear. Length, 17½ inches. Weight, 8¼ pounds.

No. 97. With Star chuck, holding round shanks from 0 to ½-inch. Price each \$13.45

No. 96. Same as No. 97, except ratchet mechanism does not have the continuous onward movements. Price each \$12.00

Yankee Breast Drills



With right and left hand and continuous ratchet movement, or can be used without ratchet. Gears can be locked for opening or loosening chuck. Breast plate is adjustable. Adjustable ball bearings for taking up wear. All gears have cut teeth. Crank is 5½ inches long. Chuck jaws are drop forged steel. Frame is malleable iron with dead black finish. Side handle has a screw driver bit to adjust screws on drill. D handle to use in place of breast plate for overhead work can be furnished as an extra part at price of \$0.30 each net.

No. 1555. With double speed and three jaw chuck, holding round shanks only up to ½-inch. Weight, 6¾ pounds. Price each \$10.80

No. 1550. Same as No. 1555, except single speed only. Weight, 5¾ pounds. Price each \$9.15

No. 555. With double speed and two jaw chuck, holding round or square shank drills up to ½-inch. Weight, 6¾ pounds. Price each \$10.80

No. 550. Same as No. 555, except single speed only. Weight, 5¾ pounds. Price each \$9.15

No. 22 Bench Drill Press



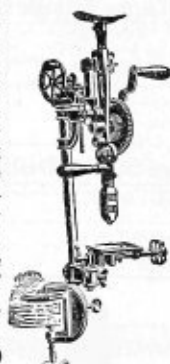
A simply constructed standard and fixtures to hold any of the Millers Falls hand drills shown in this catalog. All steel and iron parts are japanned. Provided with sensitive compound lever feed and adjustable clamp to hold drill. Height between chuck and table when chuck is raised to its highest point, 6½ to 7½ inches, depending upon drill used. Height of standard above bench, 15½ inches. Weight 8 pounds.

Price without hand drill.....\$4.00

No. 20 Universal Hand Drill Press

This standard and fixtures will hold any of the Millers Falls breast drills shown in this catalog except Nos. 13, 13A and 19. Equipped with sensitive hand feed. Drill may be swiveled into many positions and clamped at varying heights, either above or below the bench. Vise swung on pin off center, permitting its use in many positions; may be used horizontally, or at an angle or reversed and table turned uppermost. Height of standard 24 inches. Weight boxed, 28 pounds.

Price without breast drill...\$10.00

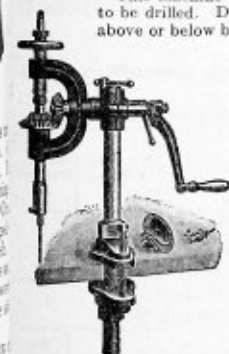


Angular and Ratchet Drilling Machine

This machine is attachable to bench or to object to be drilled. Drills vertically at any angle desired, above or below bench. Hand feed. Ratchet attachment. Extensible from standard:

No. 1 Machine, 4½ to 5½ inches; No. 2, 6 to 8 inches; No. 3, 7 to 10½ inches. Socket hole in spindle for ½-inch round shanks, but bored for ¾-inch without extra charge. One ¼-inch drill to fit socket and Star chuck to hold round shanks up to ½-inch furnished with each machine, but omitted when machine is made to order with taper socket.

No. 1, speeded; ball bearing. No. 2, with two sets of gears making either speeded or geared back; hardened anti-friction bearings. No. 3, geared back; hardened anti-friction bearings.



Nos.	1	2	3
Drills holes up to, inches.....	¾	1	1½
Height of standard, inches.....	25½	25½	28½
Weight, boxed, pounds.....	50	86	135
Price each.....	\$43.00	\$49.00	\$58.65

To order with hole for taper socket, extra, net.....1.50

Note.—When ordering state size of taper wanted.

No. 210 Bench Drill Press



Provided with changeable speed, 1½ to 1 and 4 to 1. Crank is adjustable from 3 to 6-inch radius. Table with swivel arm may be raised within range of 2 inches. Hand feed. Wrench furnished to fit all nuts on tool.

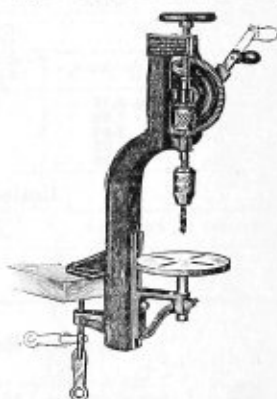
Chuck of Star pattern, holding round shanks up to ½-inch. Maximum distance from chuck to table 9 inches. Height over all 24 inches. Frame finished in gray, with red trimmings. Large gear enameled black. Weight boxed, 27½ pounds.

Price each.....\$14.75

No. 216 Bench Drill Press

Provided with two grades of automatic positive feed. Also hand feed. Change of speed is instantaneous. Speeded even and 3½ to 1. Chuck of Star pattern with 3 jaws holding round shanks up to ½ inch. Maximum distance from chuck to column, 8 inches. Height over all, 28 inches. Frame finished in gray with red trimmings. Weight boxed, 50 pounds.

Price.....\$25.50



No. 217 Vise

For No. 216 drill. Has detachable swivel jaw. Vise opens 2½ inches; without swivel jaw, 3 inches. Width of jaws, 2½ inches. Weight, 4¾ pounds.

Price each.....\$3.15



Yankee Bench Drills

These drills have two feeds, friction feed for rapid movement of spindle, and ratchet, to feed drill. Feed is adjusted for drills from No. 45 up, to work without breaking, and is thrown off automatically top or bottom to prevent jamming. Table has vertical adjustment on bracket, also adjustable bracket. Both are removable.

Chuck is of steel with hardened jaws. Spindles are of steel. Gears have teeth of extra strength, cut from the solid metal. Pinions are of steel, also the feed screws with ball bearings at end.

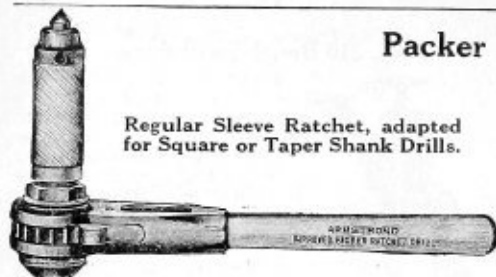


No.	1003	1005
Speed.....	Single	Double
Chuck holds up to, inches.....	¾	1½
Traverse automatic feed, inches.....	1½	2
Diameter of table, inches.....	4½	6½
Length over all, inches.....	18½	28
Shipping weight, pounds.....	20	57

Price each.....\$15.00 \$24.75

H. Channon Company Chicago

Packer Ratchets



Regular Sleeve Ratchet, adapted for Square or Taper Shank Drills.



Boiler Ratchet. Will take Square Shank Drills only.

Sleeve Ratchets—For Square Shank Drills

Number	Price Each	Length Over-all Inches	Size of Drill or Hole	Length of Head Inches	Feed Inches	Weight Pounds
1	\$ 4.75	10	* No. 1 Square Taper	6	2 1/4	4
2	6.00	12	No. 1 Square Taper	6 3/4	2 1/2	6
3	7.25	15	No. 1 Square Taper	7 3/4	3	8 1/4
4	8.50	18	† No. 2 Square Taper	9	3 1/2	12
5	10.25	21	No. 2 Square Taper	9 3/4	4	16

Sleeve Ratchets—For Taper Shank Drills

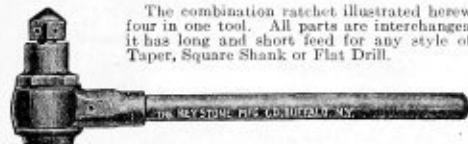
Number	Price Each	Length Over-all Inches	Size of Drill Socket	Takes Morse Taper Drill	Length of Head Inches	Feed Inches	Weight Pounds
1M	\$ 5.75	10	No. 2 Morse	3/8 to 3/4	6	2 1/4	4 1/4
2M	7.25	12	No. 3 Morse	3/8 to 1 1/4	6 3/4	2 1/2	6
3M	9.00	15	No. 3 Morse	3/8 to 1 1/4	7 3/4	3	8 1/4
4M	11.25	18	No. 4 Morse	1 1/8 to 2	9	3 1/2	12
5M	13.50	21	No. 4 Morse	1 1/8 to 2	9 3/4	4	16

Boiler Ratchet—For Square Shank Drills Only

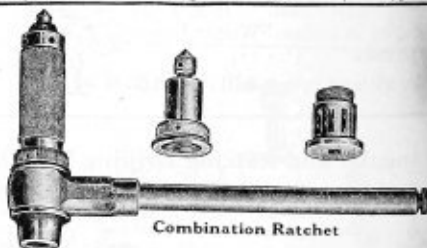
Number	Price Each	Length Over-all Inches	Size of Socket or Hole	Length of Head Inches	Feed Inches	Weight Pounds
1B	\$4.00	10	* No. 1 Square Taper	4 3/4	1 1/2	3 1/2
2B	4.75	12	No. 1 Square Taper	5	1 3/4	5
3B	7.25	15	No. 1 Square Taper	5 1/2	2	7 1/2

Keystone Reversible Ratchets

The combination ratchet illustrated herewith is a four in one tool. All parts are interchangeable and it has long and short feed for any style of Morse Taper, Square Shank or Flat Drill.



Boiler Ratchet



Combination Ratchet

Keystone Ratchets are operated by a rod passing through handle which regulates reversible feature.

For Square Shank Drills Only

No.	Price Each	Length of Handle Inches	Size Socket or Hole	Length of Head Inches	Weight Pounds
1	\$5.00	10	No. 1 Sq. Taper	5 5/8	4
2	5.75	14	No. 1 Sq. Taper	7 1/8	7
3	6.50	16	No. 1 Sq. Taper	7 3/8	8
4	7.25	18	No. 2 Sq. Taper	8 3/4	12

For Morse Taper Shank Drills Only

No.	Price Each	Length of Handle Inches	Size Socket or Hole	Length of Head Inches	Weight Pounds
21	\$5.25	10	No. 2 Morse	5 5/8	4
22	6.00	14	No. 3 Morse	7 1/8	7
23	6.75	16	No. 3 Morse	7 3/8	8
24	7.50	18	No. 4 Morse	8 3/4	12

Boiler Ratchets

For Square Shank Drills Only

No.	Price Each	Length of Handle Inches	Size Socket or Hole	Length of Head Inches	Weight Pounds
31	\$5.00	10	No. 1 Sq. Taper	3 3/4	3
32	5.75	14	No. 1 Sq. Taper	4 3/8	5
33	6.50	16	No. 1 Sq. Taper	4 5/8	6
34	7.25	18	No. 2 Sq. Taper	5 3/8	9

Combination Ratchets

For Square and Taper Shank Drills

No.	Price Each	Length of Handle Inches	Size Socket or Hole	Weight Pounds
31	\$ 7.00	8 1/2	Bit Stock Drills & No. 1 Morse	5
32	7.75	10	No. 1 Sq. Tap. & No. 2 Morse	9
33	9.00	14	No. 1 Sq. Tap. & No. 3 Morse	11
34	10.00	16	No. 2 Sq. Tap. & No. 3 Morse	17

*No. 1 or small drill socket is 3/8-inch square at small end and 1/2-inch square at large end.

†No. 2 or large drill socket is 1/2-inch square at small end and 3/4-inch square at large end.

By means of sleeves and sockets can be made to take smaller size drills, drills with square tapers and blacksmiths' straight shank drills.

Armstrong "Standard" Reversible Ratchet Drills



Ratchet is operated by knurled screw at side of handle. Will ratchet either way. No drift is required, as drill is discharged by feed screw.

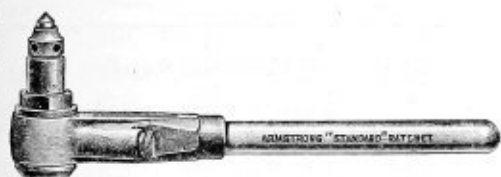
Made of drop forgings and bar steel, all parts carefully hardened.

For Square Taper Shank Drills

Number	Price Each	Length, Inches	Size of Socket or Hole	Length of Head, Inches	Feed, Inches	Weight, Pounds
9	\$4.75	9	Bit Stock Taper	5	2	1 $\frac{3}{4}$
12	5.00	12	No. 1 Square Taper*	6	2 $\frac{1}{4}$	4
15	5.75	15	No. 1 Square Taper*	6 $\frac{3}{4}$	2 $\frac{1}{2}$	6 $\frac{1}{4}$
18	6.75	18	No. 1 Square Taper*	7 $\frac{3}{4}$	3	9 $\frac{1}{2}$
22	7.75	22	No. 2 Square Morse†	9	3 $\frac{1}{2}$	13 $\frac{1}{2}$

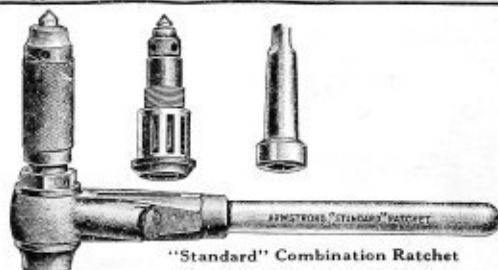
For Morse Taper Shank Drills

Number	Price Each	Length, Inches	Size of Socket or Hole	Takes Morse Taper Drills, Inches	Length of Head, Inches	Feed, Inches	Weight, Pounds
9-M	\$5.00	9	No. 1 Morse	$\frac{1}{16}$ to $\frac{1}{8}$	5	2	1 $\frac{3}{4}$
12-M	5.25	12	No. 2 Morse	$\frac{1}{8}$ to $\frac{1}{4}$	6	2 $\frac{1}{4}$	4
15-M	6.00	15	No. 3 Morse	$\frac{1}{4}$ to $\frac{3}{8}$	6 $\frac{3}{4}$	2 $\frac{1}{2}$	6 $\frac{1}{4}$
18-M	7.00	18	No. 3 Morse	$\frac{3}{8}$ to $\frac{1}{2}$	7 $\frac{3}{4}$	3	9 $\frac{1}{4}$
22-M	8.00	22	No. 4 Morse	$\frac{1}{2}$ to 1	9	3 $\frac{1}{2}$	13



"Standard" Boiler Ratchet

For Square Taper Shank Drills



"Standard" Combination Ratchet

"Standard" Boiler Ratchet—For Square Taper Shank Drills

Number	Price Each	Length, Inches	Size of Drill Socket	Length of Head, Inches	Feed, Inches	Weight, Pounds
9-B	\$4.50	9	Bit Stock Taper	3 $\frac{1}{4}$	1 $\frac{1}{8}$	1 $\frac{1}{2}$
12-B	4.75	12	No. 1 Square Taper*	4 $\frac{3}{8}$	1 $\frac{1}{2}$	3 $\frac{1}{2}$
15-B	5.50	15	No. 1 Square Taper*	5	1 $\frac{3}{4}$	5 $\frac{1}{2}$
18-B	6.50	18	No. 1 Square Taper*	5 $\frac{1}{2}$	2	8
22-B	7.50	22	No. 2 Square Taper†	6	2 $\frac{1}{4}$	11 $\frac{1}{2}$

"Standard" Combination Ratchet

The combination includes sleeve ratchet for morse taper shank drills, square taper socket to fit same and short spindle with set screw, by means of which the ratchet can be converted into a boiler ratchet or adapted to receive square taper shank drills.

Number	Price Each	Length, Inches	Size of Drill Socket
9-C	\$7.50	9	Bit Stock and No. 1 Morse
12-C	7.75	12	No. 1 Square Taper and No. 2 Morse
15-C	9.00	15	No. 1 Square Taper and No. 3 Morse
18-C	10.75	18	No. 1 Square Taper and No. 3 Morse
22-C	11.50	22	No. 2 Square Taper and No. 4 Morse

*No. 1, or small drill socket, is $\frac{3}{8}$ -inch square at small end and $\frac{5}{8}$ -inch square at large end.

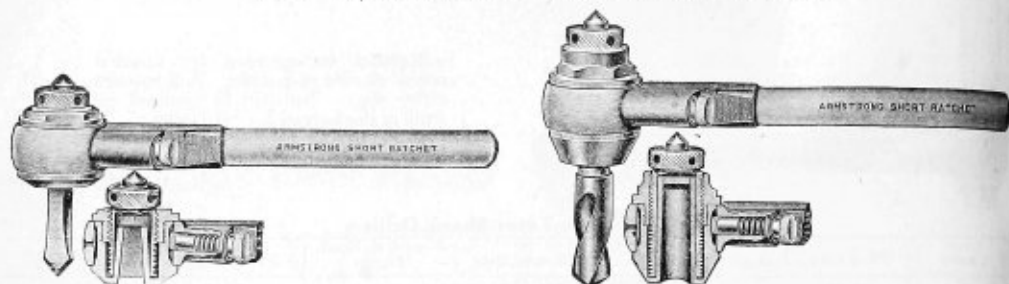
†No. 2, or large drill socket, is $\frac{1}{2}$ -inch square at small end and $\frac{3}{4}$ -inch square at large end.

No. 1 square taper is the most popular size.

By means of sleeves and sockets these ratchets can be made to take smaller size drills, drills with square tapers and blacksmiths' straight shank drills. Packed one in a box.

Drills for use in the above are listed elsewhere. See index.

The Armstrong Short Ratchet Drill



Its short head, strength, compactness and quick reverse make it a perfect boiler ratchet. Has a long feed and a short head, making it especially desirable for drilling in close quarters.

Style	Price Each	Length Over All, Inches	Size of Socket or Hole	Length of Head, Inches	Feed, Inches	Weight, Pounds
A-2	\$ 8.00	12	No. 1 Taper Square Shank	2 3/4	1 1/2	6
A-3	10.00	18	No. 1 Taper Square Shank	2 3/4	1 1/2	8
E-2	8.00	12	No. 2 Taper Square Shank	2 3/4	1 1/2	6
E-3	10.00	18	No. 2 Taper Square Shank	2 3/4	1 1/2	8
R-2	8.00	12	No. 3 Morse Taper Shank	3 3/4	2 1/2	6 3/4
R-3	10.00	18	No. 3 Morse Taper Shank	3 3/4	2 1/2	9

Extra spindles, Styles A, E or R, with nut and feed screws. \$3.50
By means of sleeves and sockets, these ratchets can be made to take smaller size drills, drills with square taper and blacksmith's straight shank drills.

Packed One in a Box.

The Renshaw Ratchet Drill



These tools are made in two sizes—No. 1 taking drills to 3/4-inch, No. 3 taking drills to 1 1/2 inches. All the parts are made from steel and hardened.

No. 1 has one collet for drills, with shank 1/4-inch square at shoulder, and one collet for drills fitting No. 1 Morse's standard taper socket.

No. 3 has one collet, No. 5, for drills, with shank 1/4-inch square at shoulder, of 1/2 to 1 1/2 inches diameter, which are the extreme sizes that this ratchet is adapted to carry, and collets Nos. 1, 2 and 3, for Morse's standard taper shanks. No. 3 and No. 5 collets are held in the spindle by screw thread. No. 1 and No. 2 collets are tapered externally to fit No. 3 socket.

No.	Price Each	Length of Handle	Depth of Head	Depth of Feed	With Collets
1	\$11.00	9 1/2	3	1 1/2	With 2 Collets
1	9.40	9 1/2	3	1 1/2	With 1 Collet
3	15.00	18	5	2 3/4	With 4 Collets
3	11.06	18	5	2 3/4	With No. 3 or 5 Col.
3	13.25	18	5	2 3/4	With No. 1, 2 or 3 Col.

No. 1 Collet with square or taper hole. \$1.60
No. 1 or 2 Collet for No. 3 ratchet. 1.10
No. 3 or No. 5 Collet for No. 3 ratchet. 1.75

Armstrong Universal Ratchet



For general use in machine shops and structural iron and bridge work in setting up work. Very efficient for close, cramped positions. Two inches of motion at end of handle in any direction will drive drill.

Price with One Spindle

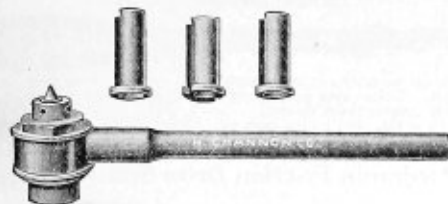
Number	4	5	6
Length, inches	14	16	18
Feed, inches	1 1/2	1 7/8	2 1/4
Capacity of hole, inches	1	1 1/2	2
Weight, pounds	5	8	12
Price each	\$12.00	\$15.00	\$18.00

Extra Spindles

Style	Fitting Ratchet	Taking Drills
M	No. 4	With No. 1 Square Taper Shanks
K	No. 4	With No. 2 Morse Taper Shanks
J	No. 5	With No. 1 Square Taper Shanks
L	No. 5	With No. 2 Square Taper Shanks
O	No. 5	With No. 3 Morse Taper Shanks
P	No. 6	With No. 2 Square Taper Shanks
N	No. 6	With No. 3 Morse Taper Shanks
S	No. 6	With No. 4 Morse Taper Shanks

Note.—When ordering specify style spindle wanted. We ship No. 4 ratchet equipped with M spindle, No. 5 ratchet with J spindle, and No. 6 with F spindle, unless otherwise ordered.
By means of sleeves and sockets spindles can be made to take smaller sizes of Morse taper shank drills, drills with square taper shanks and blacksmith drills.

The Satco Reversible Ratchet



This ratchet may be used for all classes of work, as the size and style of drill may be instantly changed without using either tools or force. An interchangeable feed screw sleeve allows worn out threads to be replaced, thus making ratchet equal to new. Any style of drill shanks may be used—Morse, taper, square shank and flat twisted drills. The short head enables operator to work at close quarters, while a patent reversible device in the end of handle makes ratchet suitable for either right or left drilling. All moving parts are protected and there are no small screws, pins, etc., to get out of order. This ratchet possesses great strength, is light in weight and of good appearance.

No.	Takes Morse Taper	Length, Ins.	Length Head, Inches	Feed, Ins.	Weight, Pounds	Price
1	No. 1	9 1/2	2	1 1/2	1 1/2	\$9.00
2	No. 2	12	2 1/2	2 1/4	3 1/2	12.00
3	No. 3	20	3	2 3/4	5	15.00

"Giant" Railroad Track Ratchet



Made to demand for an extra strong, powerful all around tool. Drop forged steel handle, heavy tool steel pawl, solid steel socket, hexagon feed nut, tool steel feed screw, Acme thread.

No. 324-A. 24-inch handle for No. 2 square shank drills. Length of head 8 3/4 inches. Feed 2 1/2 inches. Approximate weight, 15 pounds. Price each \$9.00

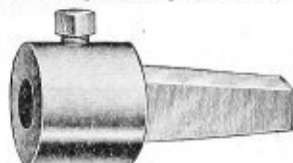
Blacksmiths' Drill Sockets With Morse Taper Shank



Takes blacksmiths' drills with shanks 1/2 or 5/8-inch diameter. Made from bar steel. Specify size of hole when ordering.

No.	Price Each	Diam. of Socket, Inches	Size of Shank Morse Taper
02	\$1.50	1/2	No. 2 Morse taper
03	1.75	1/2	No. 3 Morse taper
003	1.75	5/8	No. 3 Morse taper
04	2.00	1/2	No. 4 Morse taper
004	2.00	5/8	No. 4 Morse taper

Blacksmiths' Drill Sockets With Square Taper Shanks



Takes blacksmiths' drills with shanks 1/2 or 5/8-inch diameter. Made from bar steel.

No.	Price Each	Diameter of Socket, Inches	Size Shank Square Taper
0	\$1.25	1/2	No. 1
00	1.25	5/8	No. 1
01	1.50	1/2	No. 2
001	1.50	5/8	No. 2

Square Taper Drill Sockets

With Morse Taper Shank



No.	Price Each	Size of Shank	Takes Drills with Square Taper Shanks
1	\$1.00	No. 1 Morse	No. 1, Shank 3/4 x 1/8 sq.*
2	1.25	No. 2 Morse	No. 1, Shank 3/4 x 1/8 sq.
3	1.50	No. 3 Morse	No. 1, Shank 3/4 x 1/8 sq.
4	1.75	No. 4 Morse	No. 2, Shank 1/2 x 1/4 sq.
5	2.50	No. 5 Morse	No. 2, Shank 1/2 x 1/4 sq.

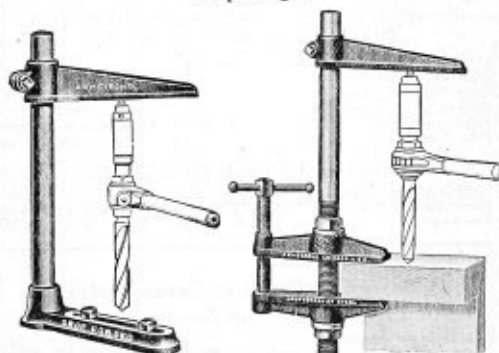
*Sizes given are dimensions at small and large end of drill shank.

Drilling Post (Old Man)

Type A

Type B

Drop Forged



The finished steel post is screwed into the foot and can easily be removed for packing in tool kit.

For Use with Ratchet Drills

No.	Price Each	Height, Inches	Arm Radius, Inches
8	\$5.00	16	8
10	6.00	20	10
12	7.50	26	12

Prices—Type B

No.	Price Each	Height of Post, Inches	Arm Radius, Inches	Capacity Clamp, Ins.
C-8	\$ 7.00	16	8	4
C-10	8.00	20	10	4 1/2
C-12	10.00	26	12	5

Price does not include ratchet.

Drill Bits suitable for the above ratchets can be found by referring to index.

Perfect Handle Screw Driver



A solid, one-piece, drop forging. The oval shaped wood handle gives great leverage, fits the hand, and is more comfortable than other shapes. Blade extends from end to end so that it can never become loose.

Lgth. Blade, Inches	Diam-eter, Inches	Price		Lgth. Blade, Inches	Diam-eter, Inches	Price	
		Dozen	Each			Dozen	Each
3	$\frac{3}{4}$	\$3.50	\$0.35	7	$\frac{1}{2}$	\$7.00	\$0.70
4	$\frac{3}{4}$	4.25	.40	8	$\frac{1}{2}$	8.00	.80
5	$\frac{3}{4}$	5.00	.50	10	$\frac{1}{2}$	10.00	1.00
6	$\frac{3}{4}$	6.00	.60	12	$\frac{1}{2}$	12.00	1.20

Perfect Handle Machinists' or Heavy Service Screw Driver



This tool has become very popular with automobilists and mechanics. Made extra heavy throughout and has a square shank for wrench.

No.	915	1015	No.	915	1015
Lgth. over all, ins.	9 1/2	10 1/2	Width point, ins.	3/4	3/4
Lgth. blade, ins.	4 1/2	5	Thickness, in.	1/4	1/4
Size of sq., in.	3/8	1/2	Price, dozen	\$12.00	\$13.00
			Price each	1.20	1.30

Champion Screw Driver

Genuine



Forged from Toughest Steel, Well Finished Throughout. Regular Pattern

Length of blade, inches	2 1/2	3	4	5
Price per dozen	\$3.00	\$3.50	\$4.25	\$5.00
Price each ....	.30	.35	.40	.50
Length of blade, inches	6	8	10	12
Price per dozen	\$6.00	\$8.00	\$10.00	\$12.00
Price each ....	.60	.80	1.00	1.20

Extra Heavy Double Grip Handles

Length blade, inches	12	15	18	24	30
Price per dozen	\$14.00	\$16.00	\$18.00	\$24.00	\$30.00
Price each	1.40	1.60	1.80	2.40	3.00

Champion Cabinet Screw Driver

Light Handle and Slender Blade

Length blade, inches	2 1/2	3 1/2	4 1/2	5 1/2
Price per dozen	\$3.00	\$3.50	\$4.50	\$5.50
Price each ....	.30	.35	.45	.55
Length of blade, inches	6 1/2	8 1/2	10 1/2	12 1/2
Price per dozen	\$6.50	\$8.00	\$9.50	\$11.00
Price each ....	.65	.80	.95	1.10

Boughton Screw Driver



This tool is similar to the Champion screw driver, except the blade is riveted to the ferrule. Will give good service and will not turn in the handle.

Length blade, inches	2 1/2	3	4	5
Price per dozen	\$3.00	\$3.50	\$4.25	\$5.00
Price each ....	.30	.35	.40	.50
Length of blade, inches	6	8	10	12
Price per dozen	\$6.00	\$8.00	\$10.00	\$12.00
Price each ....	.60	.80	1.00	1.20

Perfect Handle "Rubber Covered" Screw Driver No. 613



When working around electricity use a rubber covered screw driver. Tinker with your spark plug or electric wires in daylight or darkness without danger.

3-inch blade, 6 1/2 inches over all. Dozen, \$6.00. Each, \$6.00.
6-inch blade, 11 1/4 inches over all. Dozen, 9.00. Each, 9.00.

Benjamin Friction Drive Screw Drivers



The cap on the end of the handle revolves freely. Transfers the friction from palm of hand to friction clutch and prevents chafing. Can be operated either right or left without adjustment.

Number..... A33 A34 B44 B45 B46 C56 C58
Diameter blade..... $\frac{3}{8}$ $\frac{3}{4}$ $\frac{1}{2}$ $\frac{1}{4}$ $\frac{1}{4}$ $\frac{1}{4}$ $\frac{1}{4}$
Length blade..... 3 4 4 5 6 6 8
Price per dozen..... \$2.40 \$3.00 \$3.60 \$4.20 \$4.80 \$5.40 \$6.00
Price each..... .24 .30 .36 .42 .48 .54 .60



Screw Driver Sets

Set No. 1 contains 1 friction drive handle with 4 jaw screw chuck and 4 screw driver blades packed in a box. The 4 blades are of different lengths and shapes and cover a large range of work. Blades are of tool steel perfectly tempered. Price complete in box \$1.10

Number.....	1	2	3	4
Diameter.....	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$
Length.....	6	8	10	12
End.....	Cabinet	Regular	Cabinet	Regular

Set No. 2 contains 1 friction drive handle with 4 jaw screw chuck, 4 screw driver bits as in Set No. 1, also 1 special screw driver bit with 3 driving projections so that a screw can be driven from the side with an angular motion of only 60 degrees. Price complete in canvas roll \$1.10

Set No. 3 contains 1 friction drive handle with 4 jaw screw chuck, 5 screw driver bits same as in Set No. 2, and the following crucible steel tools: 1/2-inch gimlet bit; flat counter-sink; 1/2-inch gimlet bit; tapered reamer; sharp point awl; 1/2-inch brad awl. Price complete in canvas roll \$2.10

Set No. 4 contains 1 friction drive screw driver handle with 4 jaw screw chuck, 5 screw driver blades same as Set 2, 6 tools same as Set 3, also a tap holder and threading die holder. The threading die holder holds 5/8-inch round adjustable dies and has set screws for adjusting the dies as well as holding die all sizes of machine screw taps from No. 2 to 10. Price complete in canvas roll \$2.10



No. 30 "Yankee" Spiral Ratchet Screw Driver



Drives or draws screws by pushing on handle or by ratchet movement on handle, three bits are included with each tool, extreme length with bit in chuck, extended 19 1/4 inches, closed 13 1/4 inches.

Price each.....\$3.20

No. 31. Extended 26 1/4 inches, closed 17 1/4 inches.

Price each.....\$4.30

Yankee Quick-Return Spiral Ratchet Screw Drivers



These are the regular Nos. 30 and 31 drivers with a spring in the handle which causes the handle to come back for the next push in driving screws in or out.

No. 130. Extreme length with bit in chuck, 20 3/4 inches.

Price each.....\$3.30

No. 131. Extreme length with bit in chuck, 28 inches.

Price each.....\$4.30

No. 11 Yankee Ratchet Screw Driver Right and Left Hand Ratchet and Rigid



Adjustment for right or left hand ratchet is made by slide in section across length of blade.

Length blade, inches.....\$0.85 \$0.90 \$1.00 \$1.15 \$1.35 \$1.55

Price each.....\$0.85 \$0.90 \$1.00 \$1.15 \$1.35 \$1.55

No. 12 "Yankee" Ratchet Screw Driver

This is the same tool as the 6-inch No. 11 "Yankee" ratchet screw driver, except that the blade is only 1 1/4 inches long, and made for special use of gunsmiths, fitters, electricians and mechanics requiring a strong, substantial screw driver with a short blade.

Made in one size only: Blade 3/4-inch diameter, 1 1/4 inches long, entire length of screw driver 5 3/4 inches.

Price each.....\$1.05

No. 15 "Yankee" Ratchet Screw Driver Right or Left Hand and Rigid



A light blade screw driver for small screws in electric work. It has on its blade a knurled washer, as shown in cut, and means of this blade can be turned with a finger and the thumb.

Length blade, inches.....\$0.75 \$0.80 \$0.90 \$0.95

Price each.....\$0.75 \$0.80 \$0.90 \$0.95

No. 20 "Yankee" Spiral Ratchet Screw Driver



Made for special class of work, where driving of screws is the only requirement. Blade can be used rigid as in an ordinary screw driver.

Number.....1 2 3

Length over all, extended, inches.....14 17 19

Length over all, closed, inches.....10 12 13

Price each.....\$2.15 \$2.45 \$2.80

Attachments for Yankee Spiral Ratchet Screw Drivers

The following attachments cost little and add very much to the all-around usefulness of the tools.

In ordering attachments he particular to state for what style and size spiral ratchet screw driver they are wanted.

Chuck and Drill Points



Chuck



HALF ACTUAL SIZE

Those for Nos. 30 and 131 have shanks 1/4-inch diameter and also fit No. 20, size 3.

Price per set, chuck and drill points.....\$1.25

Price per set, drill points only.....1.00

Bit with Screw Holder



A longer bit than regular, with holder for screw attached. Especially useful in places difficult to reach, or where only one hand can be used. The jaws open as the head of screw sinks into the wood.

Made for Nos. 30, 31, 130, 131 and 20, sizes 1, 2 and 3.

Price each.....\$1.00

Combination Screw Driver and Hammer

A very practical tool with a folding "T" handle which can be used as a hammer for starting screws. It can be instantly changed so as to conform to an ordinary screw driver and is fitted with spring which holds blade rigidly in either position. Owing to the increased leverage due to its shape, the T handle is very useful for setting screws firmly. It is knurled to insure a good grip and is nickel plated. The blade of screw driver is of best quality forged, tempered and hardened steel.



Length of blade, inches.....	4	6
Length over all, inches.....	7 1/2	10
Weight, ounces.....	5 1/2	14
Width of point, inch.....	3/8	5/8
Thickness of point, inch.....	3/16	1/4
Price per dozen.....	\$7.80	\$9.00
Price each.....	.75	.90

Three Bit Perfect Handle Screw Driver



A three-bit screw driver. Considerable leverage can be obtained and screws can be operated in out-of-the-way places. 9 inches over all, 5-inch blade length. Bits 3/4 inch wide, 1 1/4 inches thick, shank 1/2 x 3/8 inch.

Price per dozen.....\$6.00

Price each......60

All Steel Screw Driver



Being all steel in construction, stubborn screws may be taken out with a wrench applied to the shank or the handle, or a hammer may be used without fear of injuring the handle. Length over all, 9 inches. Is also useful as a tire remover.

Price each.....\$0.50

Patented Steel Tool Chests



Made from $\frac{1}{2}$ -inch cold rolled steel with malleable iron corner pieces and box wood braces, and fitted with heavy wrought iron hinges and hasp, with cover so arranged as to be held open by support from back of chest. Provided with a good brass lock and two keys and bolts to screw down cover at front corners. They will outwear several wood chests, and are lighter in weight. Nicely painted and well proportioned. Recommended especially for plumbers' and steamfitters' use and construction shops. No. 3 chests and larger sizes have handles on four sides.

Dimensions and Prices

No.	Length, Inches	Width, Inches	Depth, Inches	With One Drawer	With Two Drawers
1	24	12	11	\$18.50	\$21.00
2	30	15	14	25.00	27.50
3	36	17	16	28.00	29.50
4	42	20	19	32.00	33.00
5	48	22	20	36.00	38.50

Joint Runners



These joint runners are time savers and sure joint makers for plumbers, water and gas companies. Adapted for soil, water or gas pipes, or a bell pipe of any description where a joint is poured with molten lead. Always ready and not affected by heat or cold. Red-hot lead does not affect them. Easy to handle and convenient to apply for making joints in bell pipe. The different sizes are applicable to any size pipe from two-inch to the largest pipe for water main.

No.	Asbestos, Square Inches	Applicable to Pipe, Size, Inches	Price Each
1	$\frac{3}{4}$	2, 3, 4	\$2.30
2	$\frac{3}{4}$	4, 5, 6	2.45
3	1	6, 8, 10	4.70
4	1	10, 12, 14	6.00

Regular Calking Chisel



No. 307. Made of $\frac{3}{4}$ -inch octagon steel. Blade 15 inches long. Price each...\$4.40

Gasket Chisel



No. 311. Blade 1-inch or 1 1/2-inch as ordered. Made of $\frac{3}{4}$ -inch octagon steel. Blade 2 inches long. Price each...\$1.80

Yarning Chisel



No. 308. Made of $\frac{3}{4}$ -inch octagon steel. Blade 4 inches long. Price each...\$4.40

Long Yarning Chisel



No. 309. Made of $\frac{3}{4}$ -inch octagon steel. Blade 10 inches long. Price each...\$4.40

Dressers



Made of Dogwood

No. 295. Price each...\$1.00

Drift Plugs



Size, inches.	1	1 1/4	1 1/2	2
Price each	\$0.20	\$0.20	\$0.25	\$0.25

Turn Pins

Made of Dogwood, $2\frac{1}{4}$ inches in diameter.

No. 301. Price each...\$0.25

Plumbers' Chisels



Solid forged steel. Body finished black. Polished flat part and bevel. Oil tempered.

Cutting edge, inches	1 1/2	3/4	1	1 1/2
Diameter steel, inches	5/8	3/4	1	1 1/2
Length over all, inches	9 1/2	10	11	11 1/2
Approx. weight per dozen, lbs.	3 1/2	6	10 1/2	13 1/2
Price each	\$0.70	\$0.80	\$0.90	\$1.30

Plumbers' Gouges



bevel. Oil tempered.

Cutting edge, inches	1 1/2	3/4	1	1 1/2
Diameter of steel, inches	5/8	3/4	1	1 1/2
Length over all, inches	9 1/2	10	11	11 1/2
Approximate weight per dozen, lbs.	3 1/2	6	10 1/2	13 1/2
Price each	\$1.00	\$1.05	\$1.10	\$1.15

Shave Hooks or Plumbers' Scrapers

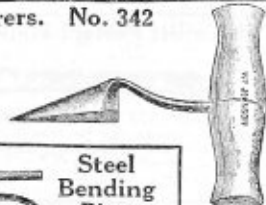


Made so that blade can be removed or attached by means of a set screw as shown.

No. 304. Price each...\$0.35

Tap Borers. No. 342

For boring and reaming lead pipe. Has steel blade. Shipping weight $\frac{3}{4}$ -lb. Price each...\$0.35



Steel Bending Pins

Made of $\frac{1}{2}$ -inch round steel. Specify whether single or double. Price each...\$0.30

Pipe Bending Springs

Size, inches	1	1 1/4	1 1/2	2
No. 361. Price each	\$1.20	\$1.50	\$1.80	\$2.10

Nye Wiping Cloth

Perfect in design, quality and workmanship. No stitching is exposed to gather solder while wiping a joint. Prepared for use.

Style A. Made of genuine English mole skin, size 3x3 inches. Price per dozen, \$4.00 Each...\$0.40
Style B. Best quality herring bone ticking, 16-ply, size 3x3 inches. Price per dozen, \$3.00 Each...\$0.30



Plumbers' Tool Bags

Made of Brussels carpet, lined with duck and leather bound.

No.	Style, Bottom	Size, Inches	Price Each
100	Plain	18x26	\$2.70
102	Leather	18x26	4.00
*103	Leather	18x26	4.00

*Has leather sides.

All kinds of tool bags will be found in our Tent and Camp Supply Catalog. Write for Copy

Cold Chisels

We furnish cold chisels in two grades, "Extra" and "Regular." "Regular" quality is always furnished unless otherwise ordered. "Extra" cold chisels are forged from highest grade octagon crucible steel, oil tempered, polished bevel and head, natural finish body. Warranted to stand the hardest usage. "Regular" cold chisels are forged from high grade octagon steel. Oil tempered.

Hand



Size, inches.	1/4	3/8	1/2	5/8	3/4	7/8	1
Length, ins.	5 1/4	5 3/4	6	6 1/2	7 1/2	7 3/4	8
Wt. doz. lbs.	1	1 1/2	2 1/4	4	7	11	20
"Extra,"							
dozen.....	\$4.50	\$5.10	\$5.70	\$7.20	\$10.80	\$16.20	\$28.20
"Extra," each.....	.45	.50	.55	.70	1.05	1.60	2.80
"Regular,"							
dozen.....	1.10	1.15	1.25	1.50	2.35	3.45	6.00
"Regular," each.....	.10	.11	.12	.15	.23	.34	.60

Cape



Cutting edge.....	1/4	3/8	1/2	5/8	3/4	7/8	1
Length, inches.....	7	7 1/2	8	9 1/2	10 1/2	11 1/2	12 1/2
Wt. doz. lbs.	6	6 1/4	6 1/2	7 1/2	9 1/2	10 1/2	12 1/2
"Extra," dozen.....	\$11.25	\$11.25	\$11.25	\$16.80	\$16.80	\$23.25	\$23.25
"Extra," each.....	1.10	1.10	1.10	1.65	1.65	2.30	2.30
"Regular," dozen.....	4.50	4.50	4.50	5.70	5.70	8.25	8.25
"Regular," each.....	.45	.45	.45	.55	.55	.80	.80

Diamond Point



Cutting edge.....	1/4	3/8	1/2	5/8	3/4	7/8	1
Length, inches.....	7 1/4	7 1/2	7 3/4	8 1/2	9 1/2	10 1/2	11 1/2
Weight dozen, pounds.....	7	7	11	15	15	15	15
"Extra," dozen.....	\$12.00	\$12.00	\$13.50	\$16.50	\$16.50	\$16.50	\$16.50
"Extra," each.....	1.20	1.20	1.35	1.65	1.65	1.65	1.65
"Regular," dozen.....	4.50	4.50	5.70	7.50	7.50	7.50	7.50
"Regular," each.....	.45	.45	.55	.75	.75	.75	.75

Round Nose



Cutting edge.....	1/4	3/8	1/2	5/8	3/4	7/8	1
Length, inches.....	6 1/4	7	7 1/2	8 1/2	9 1/2	10 1/2	11 1/2
Weight dozen, pounds.....	5 1/4	6	6	6	6	6	6
"Extra," dozen.....	\$11.25	\$11.25	\$11.25	\$16.80	\$16.80	\$16.80	\$16.80
"Extra," each.....	1.10	1.10	1.10	1.65	1.65	1.65	1.65
"Regular," dozen.....	4.50	4.50	4.50	5.70	5.70	5.70	5.70
"Regular," each.....	.45	.45	.45	.55	.55	.55	.55

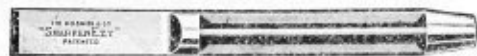
Long Brick Chisels

For Digging Through Brick Walls



Made of solid forged steel. Oil tempered. Polished head and vel. Natural finish body.			
Length, inches.....	16	18	20
Diameter, inches.....	3/4	3/4	3/4
Weight each, pounds.....	1 1/2	2 1/2	2 3/4
Price dozen.....	\$6.45	\$9.00	\$9.50
Price each.....	.60	.90	1.00

"Sharpenezy" Cold Chisel



Made like a carpenter's chisel. The thin blade makes re-sharpening easy and increases the life of the tool. Drop forged and carefully tempered. Head and blade polished.

Length, inches.....	3/8	1/2	3/4	7/8	1	1 1/4
Width blade, inches.....	1/8	1/4	3/8	1/2	3/4	1
Price dozen.....	\$1.75	\$2.25	\$3.25	\$4.75	\$6.75	\$8.75
Price each.....	.15	.20	.30	.45	.65	.85

Knurled Cup Point Nail Set



Made from the finest tool steel, 3/8-inch in diameter, knurled as shown in cut, and tempered the entire length. Sizes, 1/2, 3/4, 1, and 1 1/4-inch.

Price per dozen.....	\$2.00
Price each.....	.20

Knurled Center Punches



These punches are the champion tools to nail sets, above described, and are tempered their entire length. The diameter of steel at knurling is 3/8-inch.

Price per dozen.....	\$2.00
Price each.....	.20

Square Head Nail Set



Hand forged from the finest crucible steel, electrically tempered. This is a new tool of distinctive features. Body is specially knurled and head is 3/8-inch square. Carpenters and other users of this tool will appreciate the knurling, which is easy on the fingers, and the square head admits of its being laid down with no danger that it will roll off the bench.

Length, 1 inches. Sizes, 3/4, 1, 1 1/4 and 1 1/2-inch. Weight 1 1/4 pounds per dozen.	
Price per dozen.....	\$2.50
Price each.....	.25

Chisel Sets

This set of chisels consists of six of the most commonly used chisels. Indispensable to die and tool makers. Made by hand of high grade steel. Set consists of one each of the following:

No. 30 Chisel Set

Price per set of six in pasteboard box.....\$1.30

	Cutting Edge	Ln.	Ln.	Dia.
Cold chisel.....	1/4	4 1/2	1 1/2	1/2
Diam. point chisel.....	1/4	4 1/2	1 1/2	1/2
Groove chisel.....	1/4	4 1/2	1 1/2	1/2
Half round chisel.....	1/4	4 1/2	1 1/2	1/2
Cape chisel.....	1/4	4 1/2	1 1/2	1/2
Rd. nose cape chisel.....	1/4	4 1/2	1 1/2	1/2

No. 40 Chisel Set

Price, per set of six in pasteboard box.....\$1.50

	Cutting Edge	Ln.	Ln.	Dia.
Cold chisel.....	1/4	5 1/2	1 3/4	3/4
Diam. point chisel.....	1/4	5 1/2	1 3/4	3/4
Groove chisel.....	1/4	5 1/2	1 3/4	3/4
Half round chisel.....	1/4	5 1/2	1 3/4	3/4
Cape chisel.....	1/4	5 1/2	1 3/4	3/4
Rd. nose cape chisel.....	1/4	5 1/2	1 3/4	3/4



Before buying a lathe refer to our machinery section.

H. Channon Company Chicago

Solid Drive Punches



Made of $\frac{1}{2}$ -inch octagon steel. Length, 6 inches. Weight per dozen, about 3 pounds.

Number.....	00	0	2	4	6
Diameter.....	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{7}{16}$	$\frac{1}{2}$	$\frac{9}{16}$
Price per dozen.....					\$2.00
Price each.....					.20

Machinists' Bell Centering Punch



Polished.	No.
50. Centers up to $1\frac{3}{4}$ -inch.	
Price each.....	\$1.00

Reamer Bits



Square pattern. Extra warranted steel, drop forged, oil tempered, polished finish. The four sides of this reamer bit are hollow ground, thereby giving clearance to the cutting edges.

No. 80. Reams holes up to $\frac{5}{8}$ -inch. Length, 6 inches.

Price each.....	\$0.50
-----------------	--------

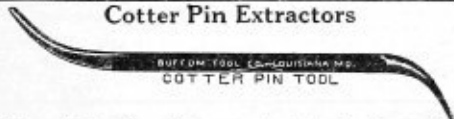
Screw Driver Bits—Forged Steel



Made with bits $\frac{1}{4}$, $\frac{5}{16}$, $\frac{3}{8}$, $\frac{1}{2}$ inches wide. Length, $4\frac{1}{2}$ to 5 inches. Made of high grade tool steel.

Sizes $\frac{1}{4}$ and $\frac{5}{16}$ -inch. Price each.....	\$0.40
Sizes $\frac{3}{8}$ and $\frac{1}{2}$ -inch. Price each.....	.50

Cotter Pin Extractors



Seven inches long, $\frac{3}{8}$ square tool steel. One pointed end and one wide end.

Price per dozen.....	\$2.00
Price each.....	.20

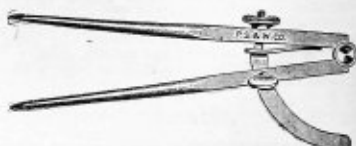
Tinners' Hollow Punch



Drop forged and oil tempered. Polished finished ends with black finished body. The holes are drilled accurately for punching thin sheet metals.

Size, inches.....	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$
Length, inches.....	5	5	5	5	5
Weight, ounces.....	$2\frac{1}{2}$	$2\frac{1}{2}$	4	$6\frac{1}{4}$	8
Price each.....	\$0.38	\$0.56	\$0.75	\$0.94	\$1.12
Size, inches.....	$\frac{3}{8}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	$1\frac{3}{4}$
Length, inches.....	5	$5\frac{1}{2}$	$5\frac{1}{2}$	6	6
Weight, pounds.....	$\frac{3}{4}$	$\frac{7}{8}$	$1\frac{1}{8}$	2	$2\frac{1}{4}$
Price each.....	\$1.30	\$1.50	\$1.88	\$2.25	\$2.62
Size, inches.....	2	$2\frac{1}{4}$	$2\frac{1}{2}$	$2\frac{3}{4}$	3
Length, inches.....	6	6	6	7	7
Weight, pounds.....	$2\frac{3}{4}$	3	$3\frac{1}{2}$	$4\frac{1}{4}$	$4\frac{1}{2}$
Price each.....	\$3.00	\$3.38	\$3.75	\$4.12	\$4.50

No. 35 Wing Dividers



Made of forged steel, well polished, and have brass joints.

Sizes and Prices

Size, inches.....	5	6	7	8	9
Price per dozen.....	\$5.50	\$5.50	\$6.50	\$7.50	\$9.00
Price each.....	.55	.55	.65	.75	.90
Size, inches.....	10	12	15	18	24
Price per dozen.....	\$10.00	\$12.00	\$28.00	\$39.00	\$56.00
Price each.....	1.00	1.20	2.80	3.90	5.60

Tweezers

Length, 4 Inches



Price per dozen, polished.....	\$2.00
Price each.....	.20



Price per dozen, nickel plated.....	\$2.50
Price each.....	.25

Glass Cutters

No. 1. The turret head glass cutter is a novel feature recently placed on the market. The turret-like holder holds six cutters which may be revolved on or clamped to the frame by means of the screw at the center, the head of which appears on the reverse side of the tool from that shown in the cut. Any of the cutters may be instantly placed in position. The turret may be removed if desired and new cutters inserted in a minute's time. Polished and nicked frame, turret holder, six cutters, nickel-plated ferrule, rosewood handle. Each in separate carton, 12 cartons to a box.

Price per dozen.....	\$4.00
Price each.....	.40

No. 337. Wheel glass cutter. Gives perfectly smooth cut. Polished and red finish. Metal handle.

Price per dozen.....	\$2.00
Price each.....	.20



No. 1



No. 337

"Carolus" Nut Splitter and Bolt Clipper



Will cut nuts, bolts or iron at almost any angle. Reaches all corners and depressions that side cut clippers cannot.

Number	Price	Parcel Post Weight, Pounds	Cuts to, Inches
0N	\$2.60	4	1 1/2
1N	3.50	7	2 1/2
2N	4.70	11	3 1/2

"New Easy" Bolt and Rivet Clippers



Will cut annealed bolts from $\frac{1}{8}$ to $\frac{1}{2}$ -inch. A force of 26 pounds applied to the handles exerts 2,000 pounds at the cutting jaws. The handles are malleable iron, and the jaws are high grade tool steel, carefully tempered for their purpose, and can be pressed when necessary with a mill file. Jaws adjusted to take up wear by turning a screw. All parts are interchangeable. Cutting blades should be oiled frequently.

No.	Price Each	Jaws per Set	Cuts Bolts up to, Inches	Length, Inches	Weight, Pounds
0	\$3.75	\$1.35	$\frac{1}{8}$	18	3
1	5.00	1.65	$\frac{1}{4}$	24 1/2	5 1/4
2	7.00	2.35	$\frac{3}{8}$	30	9
3	9.00	3.00	$\frac{1}{2}$	36	13

Compound Lever Snips

Forged from solid bar high grade crucible steel, carefully made, tempered and ground. Designed for heavy work. The compound leverage distributes the cutting power full length of blade. With the larger sizes four thicknesses of 24 gauge metal may be cut at the throat, middle, or point of the blades with practically the same pressure of the hand. Thicker metal can be cut at the points of the blades than at the throat of an ordinary snip.



No.	Price Each	Length Blade, Inches	Total Length, Inches	Weight, Ounces
7	\$1.00	1 1/2	7	5 oz.
8	1.50	2	8	10 oz.
10	2.25	3	10 1/2	1 1/2 lbs.
12	3.00	3 1/2	12	2 lbs.
14	3.50	4 1/2	14	2 1/2 lbs.

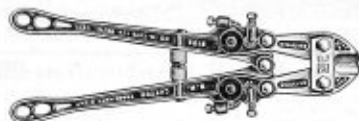
Bench Shears

Suitable for bench work and especially for extra heavy cutting.



No.	Price Each	Length of Cut, Inches	Length Overall, Inches	Cuts Iron No.	Weight, Pounds
6	\$ 3.50	5 1/4	25	22	8 1/2
5	4.00	6 1/4	27	21	9
4	5.00	7 1/4	30	20	12
3	6.00	7 3/4	31	19	13
2	7.00	8 3/4	37	19	19
1	8.00	9	39	18	24
0	12.00	10 1/4	42 1/2	18	30
00	13.50	11 1/4	46	18	36

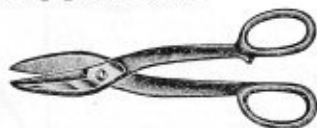
O. K. Bolt Cutter



Similar to the "Carolus" only shorter in length and used for lighter work. We especially recommend them for cutting wires and rods used in concrete construction. Jaws can be easily adjusted to take up wear. All parts are interchangeable. No. 10. Capacity $\frac{3}{8}$ inch; weight 1 1/2 pound; length 10 inches. Price Each.....\$2.75 No. 14. Capacity $\frac{1}{2}$ inch; weight 2 pounds; length 14 inches. Price Each.....3.00

Tinners' Snips

Forged from solid steel. Black japanned. Cutting blades (inlaid) are of high grade tool steel.



Straight Blade

No.	Price Each	Length, Inches	Cuts, Inches	Weight, Pounds
12	\$1.00	10	2	8 1/2
10	1.40	11	2 1/2	1 1/2
9	1.50	12	3	1 3/4
8	2.00	13 1/2	3 1/2	2 1/4
7	2.50	14 1/4	4	2 3/8
6 1/2	3.00	15 3/4	4 1/4	3 1/2

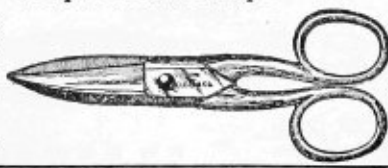


Curved Blade

No.	Price Each	Length, Inches	Cuts, Inches	Weight, Pounds
10 CB	\$2.25	11	2 1/2	1 1/2
9 CB	2.50	12	3	1 3/4
8 CB	3.00	13 1/2	3 1/2	2 1/4
7 CB	3.50	14 1/4	4	2 3/8
6 1/2 CB	4.00	15 3/4	4 1/4	3 1/2

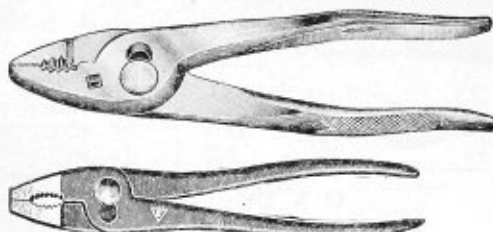
Telephone Wire Snips

A strong short snip for cutting small soft wires. Nickel plated. Length 5 1/2 inches. Price each \$1.00



H. Channon Company Chicago

Combination Pliers



Style of 8 and 10-inch Size

Genuine B. & S. Combination Pliers

Strictly high grade material is used in the manufacture of this plier. Otherwise it is the same as above.

Length, inches	6	8	10
Black, price per dozen	\$13.50	\$16.00	\$18.00
Black, price each	1.35	1.60	1.80
Nickel, price per dozen	15.00	18.00	21.00
Nickel, price each	1.50	1.80	2.10

For automobilists, machinists, repairmen, gas fitters, plumbers, etc., this tool is indispensable. It is superior to the ordinary combination plier in three respects—first, the nose is not quite as round, which makes it more useful in corners and out of the way places; second, it has a socket for use on presto-light tanks; third, the handles are knurled enabling the user to secure a better grip. By opening the plier full, it can easily be changed from gas pipe size to 1/2-inch pipe size. 8 and 10-inch sizes take 1 1/2-inch pipe. Drop forged from tool steel, oil tempered and nicked. First class in every respect. 6-inch, black, has no presto-light socket.

Length	6	8	10
Capacity, inches	1	1 1/4	1 1/2
Black, price per dozen	\$13.50	\$16.00	\$18.00
Black, price each	1.35	1.60	1.80
Nickel, price per dozen	15.00	18.00	21.00
Nickel, price each	1.50	1.80	2.10

Auto Tire Chain Repair Tool



Used to open automobile tire chains, to remove links and to clamp down on chain links in putting in new sections. Length 12 1/2 inches. Oil finish. Price each \$1.00

Gittatit Offset Combination Slip Joint Pliers



Mechanics in all lines of work will find this new plier a very convenient tool. It will do practically all the work of the ordinary plier and will go into many out of the way places where others will not. It can be used as a cotter pin extractor and a wire cutter as well. The offset head permits plenty of room for the hand when working on flat surfaces, or around corners and still allow a flat, right angle, forceful grip. Made in one size only, 7 inches long. Price per dozen \$6.00. Price each 0.50

Parallel Grip Combination Pliers



These pliers are a great improvement over the ordinary combination pliers. They will hold securely any irregular shapes, such as taper, half-round and triangular, as well as rectangular, parallel and round objects. Straight jaw has a V groove for holding wire and rods parallel to the jaw. There is also a convenient wire cutter and screw driver. Length 7 inches. Price per dozen \$6.00. Nickel finish. Price each 0.50

Burner Pliers



Made of extra refined steel, drop forged, oil tempered, highly polished. Handles blued. The most approved pattern.

Length, inches	5	6
Price per dozen	\$5.85	\$6.30
Price each	.58	.63

Gas Pliers



Long and thin in construction for use in difficult places. Screw driver end.

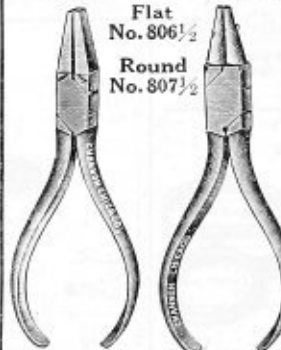
Length, inches	7	8	10	12	14
Holds pipe, inches	1	1 1/4	1 1/2	1 3/4	2
Price per dozen	\$7.95	\$9.00	\$10.80	\$12.75	\$15.75
Price each	0.80	0.90	1.08	1.28	1.58

Nose Pliers

Flat Flat Round

Flat No. 806 1/2

Round No. 807 1/2



Extra Quality Stub's Pattern

Length...	4	5	6	8
Price doz...	\$3.20	\$3.90	\$5.10	\$9.20
Price each	0.32	0.40	0.50	0.92

Long Nose Pliers

Stub's Pattern Quality Box Joints

No. 810 Flat Nose

No. 811 Round Nose

No. 812 Chain

No. 822 Weavers

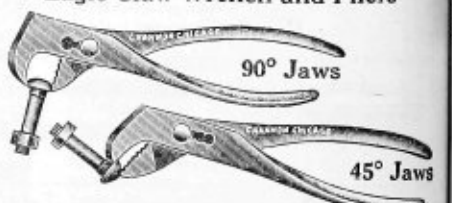
Chain Pliers Furnished Up to 6-Inch Only

Length, ins.

Price per dozen

Price each

Eagle Claw Wrench and Pliers



90° Jaws

45° Jaws

This tool will grip like a vise in places where no other wrench can hold. Holds and gives tremendous leverage on round, square, hexagonal or other shaped objects without slipping. 13 inch has 90° jaw only.

In ordering, state whether 45 or 90-degree jaw type is wanted otherwise 90-degree furnished.

Length, inches	7	10	13
Capacity, rounds	3/8	1	1 1/4
Capacity, squares	1	1 1/4	2
Price per dozen	\$9.00	\$12.00	\$15.00
Price each	0.90	1.20	1.50

Improved Bernard Patent Pliers

Made of Crucible Steel Closed in Handles
Open Throat, Parallel Jaws, Full Nickel Plated



No. 100. Flat Nose

Length, inches.....	5	6	7	8
Price dozen.....	\$6.00	\$9.00	\$12.00	\$15.00
Price each.....	.60	.90	1.20	1.50



No. 101. Round Nose

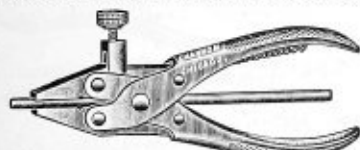
Length, inches.....	5	6	7	8
Price dozen.....	\$7.00	\$9.00	\$12.00	\$15.00
Price each.....	.70	.90	1.20	1.50



No. 102. Cutting Pliers

Length, inches.....	5	6	7	8
Price dozen.....	\$13.00	\$16.00	\$20.00	\$25.00
Price each.....	1.30	1.60	2.00	2.50

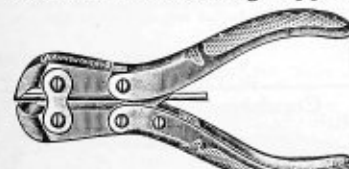
Bernard New Model Vise Pliers



No. 113. Open throat and handles. Parallel jaws. Full nickel plated. Can be used as a plier wrench and hand vise. A very useful tool for mechanics, pattern makers, jewelers, clocksmiths, etc.

Length, inches.....	5	6 1/2
Price dozen.....	\$10.00	\$13.00
Price each.....	1.00	1.30

Bernard End Cutting Nippers



No. 125. Open throat jaws and handles. Full nickel plated. Interchangeable parts. The compound leverage makes this tool very powerful cutter.

Length, inches.....	5	6	7	8
Price dozen.....	\$15.00	\$18.00	\$21.00	\$26.00
Price each.....	1.50	1.80	2.10	2.60

Bernard Music Wire Cutters

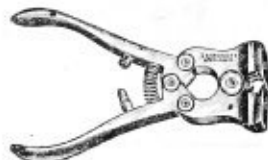


No. 135. Made especially for cutting hardened steel wire.

Length, 5 inches.....	
Price dozen.....	\$17.00
Price each.....	1.70

Starrett's No. 1 Adjustable Jaw Cut Nipper

Jaws are detachable so they can be removed, ground and adjusted when worn. Each jaw can be ground away, 1/4-inch remaining as good as new for all practical purposes. When used up, new jaws can be obtained. Head and handles are of drop forged steel, finely finished, all parts are case hardened except jaws which are made from a high grade of steel, nicely tempered. The 5 1/2-inch nippers open 3/4 inch, and the 7-inch open 1 1/2 inch.



5 1/2-inch, M (for music wire).....	Price each.....	\$2.75
5 1/2-inch, C (for common use).....	Price each.....	2.75
5 1/2-inch, B (for bicycle use).....	Price each.....	2.75
7 -inch, either M, C or B.....	Price each.....	3.25
Extra jaws, either M, C or B, which should be designated as above, per pair.....		\$0.50

Unless otherwise ordered, cut-nippers with M jaws will be sent.

Starrett's No. 235 Tile Cut Nipper

These nippers are similar to No. 1, except that frames are cut out to allow jaws to be adjusted for wide opening, thus fitting them to be used for cutting tile.

Size 5 1/2-inch.....	Price each.....	\$2.75
Size 7 -inch.....	Price each.....	3.25

Utica Diagonal Cutting Pliers



No. 42. Used by electricians and other electrical workers. Cutting edges are made so they will cut silk covered wire without injuring the covering or bruising the wire. Will also cut small diameter music wire. Although not shown in illustration, handles are checkered.

Length, inches.....	5	6
Price dozen.....	\$10.50	\$14.00
Price each.....	1.05	1.40

Diagonal Cutting Nippers



No. 853 1/2. Extra quality cast steel, polished face. Hand forged. (Stubs Pat.) Box joint.

Length, inches.....	5	6	8
Price dozen.....	\$6.50	\$8.00	\$13.00
Price each.....	.65	.80	1.30

End Cutting Nippers



No. 850 1/2. Made of extra quality cast steel, polished face. Hand forged. Stubs pattern.
 Length, inches..... 5 6 8
 Price, dozen..... \$8.25 \$10.50 \$16.00
 Price, Each..... .80 1.05 1.60

Carew's Patent Wire Cutter



Forged steel with adjustable jaws of tool steel. A very durable tool used for cutting wires on concrete forms.
 Length, inches..... 8 10 12 14
 Price, each..... \$2.00 \$2.25 \$2.60 \$3.00
 Extra Jaws, pair..... .55 .60 .65 .70

Carpenters' Pincers



Made of extra refined steel. Drop forged, oil tempered and tested. Claw and screw driver handles, and wire cutter inside of jaws. Polished jaws; handles, black finish.
 Length, inches..... 6 8 10 12
 Price, dozen..... \$6.75 \$8.55 \$10.80 \$12.30
 Price, each..... .65 .85 1.05 1.20

Enchased Joint, Slot Cutting Pliers



The joint has a bearing around the entire face except where there is an opening for cutter.

Size, inches..... 6 8 10
 Price, per dozen..... \$5.00 \$6.50 \$8.00
 Price, Each..... .50 .65 .80
 Packed 1/2 dozen in a box. 12 dozen in case.

Klein's Pattern Side Cutting Pliers



No. 1950. Same pattern as Klein's described above, superior quality. Handles are checkered, not knurled, which gives an ideal gripping surface when the hand is wet, oily or gloved. Head full polished. Handles blued.
 Length, inches..... 6 7 8 9
 Price, dozen..... \$21.00 \$25.50 \$30.00 \$39.00
 Price, each..... 2.10 2.55 3.00 3.90

P. S. & W. Side Cutting Pliers



No. 30. Made of the best forged steel. Star rivet, joint, raised cutters, superior quality. Gun metal finish, knurled handles.
 Length, inches..... 5 6 7 8
 Price, dozen..... \$19.00 \$21.00 \$25.50 \$30.00
 Price, each..... 1.90 2.10 2.55 3.00

No. 240 Side Cutting Pliers



Forged from crucible steel. Blued handles, not knurled. Lap joint.
 Length, inches..... 5 6 7 8
 Price, dozen..... \$11.00 \$12.00 \$14.00 \$16.00
 Price, each..... 1.10 1.20 1.40 1.80

Long Chain Nose Side Cutting Pliers

No. 63



Forged from high grade crucible steel, have polished joint with a cutting blade and are lap joint.

Size, inches..... 5 1/2 6 1/2 7 1/2 8 1/2
 Jaws, inches..... 1 3/4 2 3/4 3 3/4 4 3/4
 Price, dozen..... \$9.60 \$14.00 \$18.00 \$22.00
 Price, each..... .95 1.40 1.80 2.20

Improved Combination Pliers



No. 2880. Made of cast steel. Polished.
 Length, inches..... 6 7 8
 Price, dozen..... \$9.00 \$10.00 \$11.00
 Price, each..... .90 1.00 1.10

Utica Giant Button's Pliers



Has four wire cutters and the wire, after being cut is bent between the jaws. Handles are checkered and finished by polished head.
 Length, inches..... 4 1/2 6 8 10
 Price, dozen..... \$8.25 \$9.45 \$12.00 \$15.00
 Price, each..... .80 .90 1.20 1.50

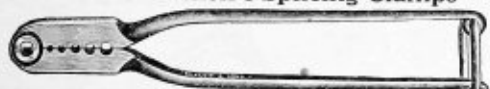
Combination Nut Pliers



A new tool for automobile and general machinist use. The end nut wrench will be found useful in many places inaccessible with a wrench. Holes at side of jaw can be used for removing and inserting cotter pins. Length, 8 inches.
 Price, each..... \$2.00

Klein's Electricians', Linemen's and Mechanics' Tools

Klein's Linemen's Splicing Clamps



No. 102-3. Length, 10½ inches. Polished heads and black handles. Suitable for telephone work. For Nos. 6, 8, 10, 12 and 14 Iron wire or Nos. 4, 6, 8, 10 and 12 Copper wire.

Price, each.....\$27.25

Price, dozen.....2.70

No. 102-5. Same as above only has three oval holes and two round holes. For iron wire Nos. 4 to 14 Birmingham Wire Gauge, and copper wire Nos. 2 to 12 B. & S. Gauge.

Price, dozen.....\$25.50

Price, each.....2.50



No. 105-6. Has four sets of chambers adapted for twisting double tube copper sleeve joints Nos. 8 to 14 B. & S. Gauge, and iron sleeve joints Nos. 10 to 16 Birmingham Gauge.

Price, dozen.....\$25.50

Price, each.....2.50

No. 105-12. Same as above only for copper sleeve joints Nos. 6 to 17 B. & S. Gauge, and iron sleeve joints Nos. 8 to 18 Birmingham Gauge.

Price, dozen.....\$25.50

Price, each.....2.50

Combination Wire and Sleeve Clamp



No. 132-3. Length, 10½ inches. By reversing handles it is converted into a five round hole wire clamp. Accommodates iron wires Nos. 6 to 14 Birmingham Gauge, copper wire Nos. 4 to 12 B. & S. Gauge, twists double tube copper sleeve joints Nos. 8 to 14 B. & S. Gauge, and iron sleeve joints Nos. 10 to 16 B. W. G.

Price, dozen.....\$29.00

Price, each.....2.90

Long Nose Pliers Without Cutters



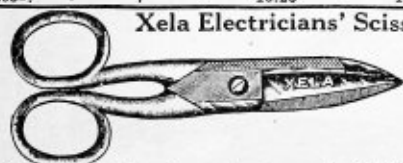
Used largely by electricians and general mechanics. Adapted to stripping the ends of insulated wire. Correctly tempered and hardened so jaw will not spring when pressure is applied.

No.	Size, Inches	Price, Dozen	Price, Each
301-5	5	\$12.00	\$1.20
301-6	6	13.60	1.35
301-7	7	14.50	1.45

Long Nose Side Cutting Pliers

The same as No. 301 shown immediately above, with addition of the cutting knives.

No.	Size, Inches	Price, Dozen	Price, Each
203-5	5	\$13.75	\$1.35
203-6	6	14.60	1.45
203-7	7	15.25	1.50



Xela Electricians' Scissors

Made of high grade steel, properly tempered, and will stand continued hard service. Has screw hinge, allowing adjustment. Nickel plated finish.

No.	Size, Inches	Price, Dozen	Price, Each
2100-5	5	\$8.00	\$0.80

Klein's Side Cutting Pliers



No. 201. For linemen's use on bare copper or iron wire. Made from special bar steel, carefully forged, machined, fitted and tempered by skilled mechanics.

Guaranteed against imperfections.

Length, inches.....6.....7.....8.....9.....10

Price, dozen.....\$20.85.....\$28.00.....\$30.00.....\$33.35.....\$36.75

Price, each.....2.05.....2.50.....3.00.....3.30.....3.65

Side Cutting Pliers With Sleeve Twister



For use on insulated wire. Has chambers for twisting double tube sleeve joints.

No.	Size, Inches	Sleeve Twister, For Sleeves		PRICE	
		B. & S. Gauge No.	Birm. Gauge No.	Dozen	Each
213-6	6	17	19	\$24.00	\$2.40
213-7	7	12	14	28.00	2.80
213-8	8	10	12	32.00	3.20
213-9	9	10	12	36.00	3.60

Rubber Sleeves for Insulating Pliers



Made of pure Gum Rubber. Fits tightly over handles. Will not crack or chip. For safeguarding the user of pliers against accidental shock.

No.	Size, Inches	Price, Dozen	Price, Each
2400-6	6	\$12.00	\$1.20
2400-7	7	12.00	1.20
2400-8	8	12.00	1.20

Klein's Oblique Cutting Pliers



Universally used by electricians, telephone men and switch-board builders. The narrow head permits its use in confined places, and cuts close. Knives are perfectly fitted, and meet accurately at all points.

No.	Size, Inches	Price, Dozen	Price, Each
202-5	5	\$16.25	\$1.60
202-5½	5½	17.00	1.70
202-6	6	17.50	1.75

Xela Electricians' Knife



No. 1550-2. Screw driver blade is locked when open.

Price, dozen.....\$12.00

Price, each.....1.20

Klein's Electricians, Linemens and Mechanics' Tools

Eastern Climbers

For continuous work this pattern will be found to be more comfortable and safer than any other. Furnished in lengths from 15 to 18 inches, from the instep to the end of shank, any size by half inches. Be sure to state length wanted when ordering. Punched strap loops.

No. 1901. Price per dozen pairs.....	\$32.00
Per pair.....	3.20
No. 1900. Same as above only riveted strap loops instead of punched.	
Price per dozen pairs.....	\$36.00
Price per pair.....	3.60

Straps for Eastern Climbers

A set consists of two upper straps, with 4x4-inch leather pads, and 2 lower straps. Heel straps (overall), 22 inches long by 1 3/4 inches wide; calf strap (overall), 22 inches by 1 1/4 inches.

No. 5301-1. Price per dozen sets.....	\$36.00
Price per set.....	3.60

Tool Belts

Made of select harness leather with six tool loops and roller buckle. Supplied in 38, 40, 42, 44 and 46-inch lengths. Specify size when ordering.

No. 5202. 23 1/2-inch wide.	
Price per dozen.....	\$25.00
Price each.....	2.50
No. 5204. 3 1/2-inch wide.	
Price per dozen.....	\$36.00
Price each.....	3.60

Safety Straps



Cut out of selected harness leather, securely sewed, riveted, and doubly reinforced. Best grade hardware used. Snaps of Imperial type, japanned. Strap may be shortened or lengthened by adjusting buckle.

No. 5250. Price per dozen.....	\$28.00
Price each.....	2.80

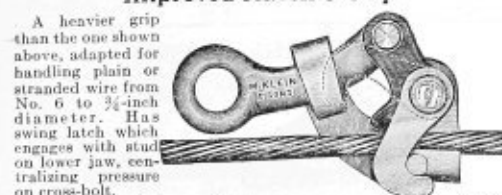
Combination Steel Lag Screw Wrench



Forged from high grade bar steel. Will fit machine bolts, nuts or lag screws from 3/8-inch to 5/8-inch, small end fits 3/8-inch machine bolts or lag screws. The round hole allows end of bolt to come through as nut is run on.

No. 3109-20. Price per dozen.....	\$24.00
Price each.....	2.40

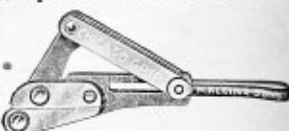
Improved Haven's Grip



No. 1625-20. Price per dozen.....	\$60.00
Price each.....	6.00

Chicago Grips for Bare Wire

Grips and holds tightly and is very convenient to handle. Draw link does not hang down at right angles, and is therefore not in the way of the line when the grip is put on.



No.	Size	Price Each
1613-20.	For No. 10 wire and smaller.....	\$ 4.00
1613-30.	For No. 6 wire and smaller.....	5.00
1613-40.	For 0 wire and smaller.....	8.00
1613-80.	For 0000 wire and smaller.....	12.00

Chicago Grips for Insulated Wire

The upper jaw has a series of transverse shallow grooves into which on applying strain the insulation is tightly compressed but not injured.



No.	Size	Price Each
1611-10.	For No. 10 wire and smaller.....	\$ 1.00
1611-20.	For No. 4 wire and smaller.....	5.00
1611-30.	For No. 00 wire and smaller.....	8.00
1611-40.	For No. 0000 wire and smaller.....	12.00

Haven's Steel Clamp



A very efficient clamp for all around work. Electro galvanized finish.

No. 1604-10. For No. 8 wire and finer. Price dozen.....\$24.75

Price each..... 2.45

No. 1604-20. For 1/2-inch wire and finer. Price dozen.....\$36.00

Price each..... 3.60

Price dozen.....	\$36.00
Price each.....	3.60

The P. & G. Wire Skinner

Skins Wire Clean at One Stroke

Skins or splits any kind of insulated wire, including weather-proof, rubber covered, cotton covered, braided, lead covered, single and duplex wires, lamp cord, etc., 3 1/2 inches long.



Price.....	\$1.00
------------	--------

Quick Samson Grip

For strand or messenger wire, self adjusting jaws.

Will not slip or crush wire.



Size Diameter, Inches	Gripping Surface, Inches	Weight per Dozen, Pounds	List Price Each
3/8 to 1/2	7	96	\$20.00
1/2 to 3/4	7	117	22.00
3/4 to 1	9	175	24.00

Favorite Tree Trimmers



Knife is forged from carbon steel and is integral with the lever and the cutting edge is carefully tempered and set.

ground. Knife is held open by a flat steel spring, and is operated by a rope attached to the end of lever.

No. 3600-20. 19 inches overall, without saw. Price each.....	\$2.75
No. 3600-21. 21 inches overall, with saw. Price each.....	3.75

Klein's Electricians' Linemen and Mechanics' Tools

Pole Supports



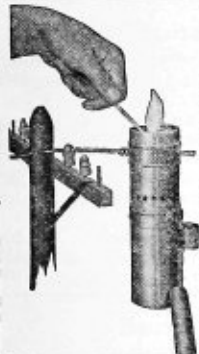
This construction is distinctly superior to the ordinary article. The uprights are 2x4 dressed on all sides. The joint where the uprights cross is gabled and the joint reinforced by strong iron plates bolted through the uprights. The bottom has spiked iron shoes bolted through the uprights.

No. 4004-6. Size 6 feet. Price Ea. \$7.50

No. 4004-7. Size 7 feet. Price Ea. 8.25

No. 4004-8. Size 8 feet. Price Ea. 9.00

"Staysalite" Linemen's Torch



Small and light in weight. Stays lit in the wind, burns alcohol without odor or noise. Can be used as a small heater for soldering iron.

Provided with a cup for holding soldering paste. To suspend the torch on a wire under a joint, place the wire in the slots on the upper edge of the rim, give the body of the torch a half turn in the opposite direction, and it is off. Drop it back in your belt by means of the hook.

Price each.....\$10.00

Pay-Out Reel on Barrow



Constructed of hardwood and reinforced with steel plates. The barrow is supported by substantially made steel legs, side braced and bolted through the wood. Will stand

hard usage. Guard pins are adjustable for 12, 18 and 24-inch coils. Weight, 80 pounds. Price each \$16.00

Extra heavy reel. Weight, 90 pounds. Price each.....\$20.00

Improved Take-Up Reel



Showing How Cross Piece Can be Detached for Removing Coil of Wire

Constructed of oak throughout. Solidly built, securely bolted and riveted. Cross sections fully mortised and bolted. Sides are steel braced. Has separate guard base which slips over shaft and fastens with a flat key, allowing wire to be removed easily.

No. 4608-3. For 18-inch coil. Price each.....\$30.00

No. 4608-4. For 21-inch coil. Price each.....30.00

Cable Reel Jack



A pair of these jacks will support cable reels of any size while the cable is being run off. The forked head will hold a 2 1/2-inch diameter shaft and will swivel to any position. The cable may be raised or lowered while it is supported on the jacks. The screw is operated by inserting a bar into the holes in the head of the screw. These jacks are fitted with 2x16-inch locomotive jack screws, braced on oak bases. No. 4700-2 is same as 4700-1, but with ratchet operated screw.

No. 4700-1. Price each.....\$25.00

No. 4700-2. Price each.....35.00

Cable Sheath Splitting Knives



Knife edge tempered and ground to keen edge. Forged complete in one piece. Handle and blade made of tool steel.

Price per dozen.....\$12.00

Price each.....1.20

Cable Stripper Knife



3 1/2-inch blade. Length overall, 8 1/2 inches. For stripping heavy insulated wire and cable. Hardwood handle. Blade securely riveted in handle. Rivet is deeply countersunk, eliminating chance of shock.

Price per dozen.....\$18.00

Price each.....1.80

"Xela" Special Cableman's Saw



Has coarse teeth on one side for cutting through lead cable sheath. Other side has fine teeth for cutting through the wire core. 14-inch blade, 18 inches overall.

Price per dozen.....\$16.20

Price each.....1.60

Common Pay-Out Reel

Substantially built of hardwood and reinforced with steel plates. We also furnish reel spools with turnpin and disk, without base, for wagon reels or for multiple stringing.

Guard pins are adjustable for 12, 18 or 24-inch coils. Price each.....\$10.00



Soldering Coppers



3	pounds to pair and larger.....	base
2½	pounds to pair. Advance per pound.....	\$0.01
2	pounds to pair. Advance per pound.....	.02
1½	pounds to pair. Advance per pound.....	.03
1	pound to pair. Advance per pound.....	.06

When ordering, specify weights by the pair; for example, a soldering iron marked 4 means that a pair of that particular size weighs 4 pounds.

Soldering Copper Handles



Made of Soft Wood, Well Wired

Price per gross.....	\$2.25
Price per dozen.....	.25

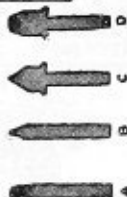
Electric Soldering Irons
American Beauty

No. 3130



Not adapted for very heavy duty, but for light soldering no better tool is made.

Has removable copper tip which extends clear back through the heating element, so that all heat is conducted directly to the point. No. 3111 is a standard iron used by the telephone companies.



No.	Wt., Lbs.	Diam. Tip, Ins.	Lgtb. Overall, Ins.	Tip	Watts	Price
3108	5/8	5/16	11	Straight Bar	100	\$ 6.50
3110	1	5/8	12	Cast Head	100	6.50
3111	1	7/8	13	Straight Bar	100	6.50
3120	1½	1	12	Cast Head	150	7.00
3121	1½	1½	13	Straight Bar	130	7.00
3130	2½	1½	14	Cast Head	300	8.00
3131	2½	1½	14	Straight Bar	240	8.00
3132	3½	1	14	Cast Head	225	8.00
3140	3½	1½	16	Cast Head	480	10.00

Made in the following voltage ranges: 95-104, 105-114, 115-125, 190-209, 210-229, 230-250.

Furnished with 6-foot cord and lamp socket attachment plug.

Allen Aluminum Flux



Non-acid and used with ordinary solder. It may be used as a solder where no part of it is exposed to the air.

Recommended as a flux, and very inexpensive as little is needed, and as no other flux or acid is required. Price per pound.....\$1.00

Allen Soldering Liquid

For all flat, straightway soldering, as well as surfaces involving small crevices where liquid goes most easily, Allen Soldering Liquid gives the best results.

Can be applied with brush or squirt can, and makes positive and sure unions between practically any metals except aluminum. It contains no acid, will not corrode and is non-poisonous.

5-pound bottles, price each.....\$1.75
10-pound cans, price each.....3.00

Prices on larger quantities quoted upon application.



Allen Soldering Salts

This comes in pulverized form, making it easy to ship and handle. By adding water, 3 parts water to one part of the salts, a perfect liquid flux is obtained of sufficient strength for use in soldering old metals.

A gallon of water to one pound of salts makes an excellent flux for bright tin work, etc.

½-pound bottles, price each.....\$0.50

1-pound bottles, price each......55

5-pound bottles, price each.....3.10



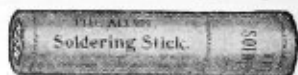
Allen Fountain Brush



This ingenious device for facilitating the application of liquid flux, consists of a container, which serves as a handle, one end of which has a removable cap for filling. The flux passes through the tube and trickles through the bristles.

Price each.....\$0.60

Allen Soldering Stick



The Allen Soldering Stick is the handiest method of applying flux to exactly the right spot. Can be used to the extreme end. Non-acid; non-corrosive, and non-poisonous. Size 1x5½ inches.

Price each.....\$0.20

Allen Soldering Paste

Allen Soldering Paste is the same compound as the soldering stick, except in softer form, making it much more convenient for many kinds of work.

2-oz. tubes, price each.....\$0.20

2-oz. cans, price each......16

4-oz. cans, price each......28

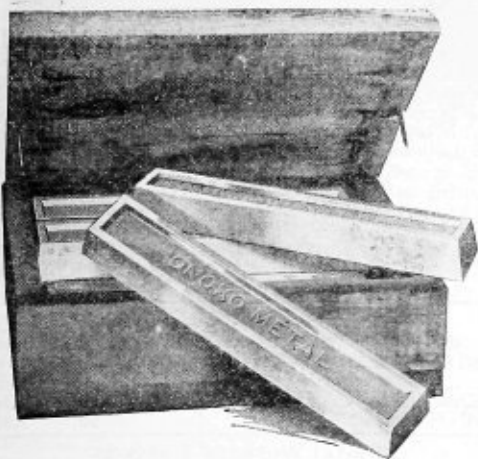
½-lb. cans, price each......48

1-lb. cans, price each......80

5-lb. cans, price each.....3.70



Babbitt Metals



Onoko is packed in 28, 56 and 112-pound boxes.

Onoko babbitt metal is an alloy of metals possessing the requisite hardness and anti-friction qualities to make it satisfactory for all general work.

What Onoko Metal Will Do

We do not claim that Onoko is as hard as genuine babbitt metal or that it will give satisfactory service under all conditions, but do claim that for 98 cases out of 100 it is the best value on the market.

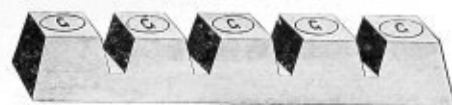
It is especially adapted for general machinery bearings in mills, factories, steamships, railroads, etc. Many tests under crushing loads in factories and shops have proven its superiority. It is made from a special formula, under skillful direction. The result is a metal that always runs smooth and cool, that is adapted for medium and low speeds on all classes of transmission bearings, and is the best and most economical babbitt metal that can be used. Its low coefficient of friction effects a large saving in oil and permits the use of very moderate priced lubricants. Onoko babbitt metal always permits the fullest motive power and thus increases the efficiency of any machinery on which it may be used.

We are very confident of Onoko babbitt metal because we know it will accomplish all we claim for it. It is cheaper and far better in every respect than many widely advertised brands. Its continued use is a money saving habit. A trial order is all that is necessary to convince and to secure a lasting customer.

Block Tin



Pigs weigh about 100 pounds. Market rates.
Bars weigh about 1½ pounds. Market rates.



At lowest market prices.

Nickel babbitt.
Pure genuine babbitt.
No. 1 babbitt.

No. 2 babbitt.
No. 3 babbitt.
No. 4 babbitt.

Magnolia Babbitt Metal

At market.

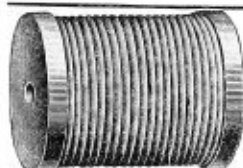
Genuine Aluminum Copper Anti-Friction Metal

Market rates.

Bar Solder



Onoko solder 45-55, market rates.
Channon's 50-50, market rates.



Wire Solder

No. 10 gauge. Half and half solder. Price on application.

Brazing Spelter or Solder

Coarse, medium and fine grain, at market.

Brazing Compound or Flux

In 1, 5 and 10-pound boxes, at market.



Pigs weigh about 100 pounds. Market rates.

Sheet Lead

Stock rolls average 20 feet in length. From 7 feet to 9 feet 2 inches in width. At market rates.

Thickness, Inches	Pounds, per Sq. Ft.	Thickness, Inches	Pounds, per Sq. Ft.	Thickness, Inches	Pounds, per Sq. Ft.
1/24	2½	1/12	5	3/8	9
1/20	3	1/10	6	7/16	10
1/18	3½	1/9	7	1/2	11
1/16	4	1/8	8	5/8	12
1/14	4½				

Borax

Refined and powdered.
In full barrels or broken lots, at market rates.

Antimony, Antimonial Lead, Aluminum, Nickel, Spelter—Quoted on application.

Curved Bearing Scraper Sets



No. 1765. Made of high grade steel, hollow ground, sharpened ready for use. Used by engineers and automobile repair men. Ends are polished. Handles are hardwood. One set packed in a box.

Price per set \$1.50

Engineer Bearing Scraper Set



No. 1750. Made for use of high class mechanics. Set consists of 4 bent blades, 8, 10, 12 and 14 inches long. 1 double end blade 10 inches long and 1 triangular blade 8 inches long. All packed in a golden oak box, as illustrated.

Price per set \$4.50

Three Cornered Automobile Bearing Scrapers



No. 1754. Hardwood, mahogany stained handle. Blade hollow ground and sharpened ready for use. A most useful tool to get into small bearings, and on small surfaces where a long or large scraper cannot be used. Length over all, 7 1/2 inches.

Price per dozen \$3.00

Price each30

Carbon Scraper Sets



For scraping the carbon out of cylinder heads through the spark plug and valve openings. The removal of the carbon often saves tearing down entire engine, and often increases pulling power of car over 50 per cent.

Ends of scraper are left untempered to prevent them from scratching sides of cylinder. Set consists of 1 out turn end, 1 in turn end and 1 curved end. Length over all, 16 inches.

Price per set \$1.00

Boughton Lumber Crayon



Boughton lumber crayons are unequalled for marking wet or dry lumber, steel, stone, etc. Made entirely from a special mineral compound containing absolutely no wax. Ground and moulded into hexagon form and covered with paper. The compound is colored with high grade dyes and is guaranteed absolutely waterproof. They are 5 3/4 inches long and 1/2 inch thick, and packed 1/2 gross in a box. Made in the following colors: Black, hard, soft and regular; blue, white, yellow and red.

	Prices	Gross	Dozen
Black, hard, soft or regular.....		\$12.00	\$1.20
Blue, red, white or yellow.....		16.00	1.60
Approximate weight, per gross, 14 pounds.			

Dixon's Lumber Crayons

Made in black: hard, soft and medium; green, blue, red and yellow. Size 1 1/2 x 4 3/4 inches.

	Prices	Gross	Dozen
Black: hard, soft or medium.....		\$13.50	\$1.35
All other colors.....		18.00	1.80

Metal Workers' Crayons
Soapstone

SOAPSTONE CRAYON

Made of genuine soapstone, selected for its high and uniform quality. Markings made on steel will remain even if steel is heated. Suitable for marking on iron, steel and other metals, weather stained lumber, etc. Cheaper, stronger and more convenient than other substances for marking on rough surfaces. Made in three shapes.

	Flat	Square	Round
	1/2 x 1 1/2 x 5 inches	1/2 x 1 1/2 x 5 inches	1/2 x 5 inches
			Dozen
Flat or round.....			\$3.50
Square.....			3.00

No. 10. Choice selected high grade talc crayons. Will satisfy those who desire the very best. 3/4 x 1 1/2 flat.

Price per gross \$4.50

Approximate weight 8 pounds per gross.

Railroad Chalk Crayons



White, red or blue
Hardened surface. Size
1 x 4 inches.

Weight per gross, 12 pounds.	
White. Price per gross.....	\$1.50
Red or blue. Price per gross.....	1.80

School Crayons



White only. Packed 1 gross in a wooden box. Weight per box about 2 1/4 pounds.

Price per gross..... \$0.40



Carpenters' Chalk

Half round. Colors, white, red or blue. Packed 1/2 gross in a box.

Price per gross, white... \$1.20 Red or blue... \$1.60

Lump Chalk

In odd size chunks. Full barrels weigh about 500 pounds.

Price per pound..... \$0.10



Boughton Flint (Sand) and Garnet Paper

Raw materials of the highest quality are used in the manufacture of Boughton Flint Paper. The paper backing is flexible, tough and strong; the glue is high test and high grade, and the sand is clean and sharp. Pattern makers, painters, bench workers and wood workers generally find their work is made easier by using Boughton flint paper, and that it is fast cutting and of great durability. No. 3/0 to 1/2 are the finer numbers and are used to finish the surface after the rough cut with the coarser numbers (1 to 3). Full packages contain 1/2 ream; 24 sheets in a quire; 20 quires to a ream.

Boughton Garnet paper is harder, tougher and less brittle than flint and has, therefore, displaced that abrasive for many purposes in the wood working industries. It costs a little more, but lasts longer and does more and better work than flint paper, and is by far the cheaper in the long run. The numbers run the same as for flint paper with respect to their degree of fineness and coarseness.

Prices—Boughton Flint Paper

In Sheets 9x11 Inches					In Rolls 50 Yards Long									
No.	Size of Original Packages	Number of Reams in a Bundle	Price per Ream	Price per Quire	No.	Width of Roll, Inches								
						12	18	24	30	36	40	42	48	
4/0 to 1½	1½ Ream	5	\$7.00	\$0.43	3/0 to 1½	\$4.50	\$7.15	\$8.00	\$10.75	\$13.25	\$16.00	\$17.00	\$19.75	
1	1 Ream	4	7.50	.46	1	4.85	7.45	8.25	11.15	13.75	16.50	17.75	21.60	
1½	1 Ream	3	8.00	.50	1½	6.15	7.50	9.25	12.00	14.50	17.00	18.25	22.25	
2	1 Ream	2½	8.50	.53	2	5.45	8.15	10.25	12.50	15.00	17.75	19.00	23.00	
2½	1 Ream	2	9.00	.56	2½	5.80	8.45	11.00	13.25	16.00	18.50	19.75	24.00	
3	1 Ream	1½	10.50	.65	3	6.50	9.10	12.25	14.50	17.00	20.00	21.50	26.50	

Prices—Boughton Garnet Paper

In Sheets 9x11 Inches					In Rolls 50 Yards Long								
No.	Size of Original Packages	Number of Reams in a Bundle	Price per Ream	Price per Quire	No.	Width of Roll, Inches							
						12	15	18	24	30	36	40	48
4/0 to 1/2	1/2 Ream	5	\$7.00	\$0.43	4/0 to 1/2	\$4.35	\$5.55	\$6.60	\$8.00	\$10.75	\$13.00	\$15.50	\$19.00
1	1/2 Ream	3 3/4	7.50	.46	1	4.60	6.00	7.15	8.50	11.25	13.75	16.00	20.00
1 1/2	1/2 Ream	3	8.00	.50	1 1/2	4.70	6.30	7.40	8.75	11.50	14.50	16.75	21.00
2	1/2 Ream	2 1/2	9.00	.56	2	5.15	6.75	7.85	9.50	12.50	14.75	17.50	22.00
2 1/2	1/2 Ream	2	10.00	.62	2 1/2	5.85	7.40	8.60	11.00	13.50	16.00	18.50	23.00
3	1/2 Ream	1 1/2	11.00	.68	3	6.30	7.95	9.10	12.00	15.00	17.50	20.00	26.00

Boughton Emery Cloth

A high quality cloth coated with imported Turkish emery, universally recognized as the best emery for abrasive purposes. Only high grade glue and a cloth backing which tears evenly and without raveling is used in the manufacture of Boughton emery cloth. The emery stays on and maintains its cutting edge even under the hardest usage. The finer grits, 3/0 to 12, are used to finish and polish metal surfaces and irregular metal parts, which are then ground with medium and coarse grits. The coarser numbers are used to remove stock before finishing with the finer grits.

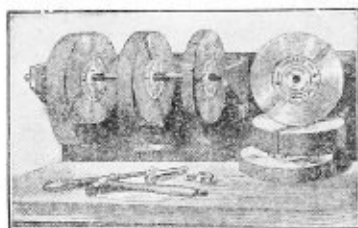
In Sheets 9x11 Inches

No.	Grit Nos.	Size of Original Packages	Number of Reams in a Bundle	Price per Ream	Price per Quire
Crocus		$\frac{1}{2}$ Ream	2	\$31.00	\$1.93
3/0 to $\frac{1}{2}$	180-190	$\frac{1}{2}$ Ream	2 $\frac{1}{2}$	31.00	1.93
1	80	$\frac{1}{2}$ Ream	1 $\frac{1}{4}$	33.00	2.06
1 $\frac{1}{2}$	70	$\frac{1}{2}$ Ream	1 $\frac{1}{2}$	35.00	2.19
2	60	$\frac{1}{2}$ Ream	1 $\frac{1}{4}$	38.00	2.37
2 $\frac{1}{2}$	54	$\frac{1}{2}$ Ream	1	41.00	2.56
3	46	$\frac{1}{2}$ Ream	$\frac{3}{4}$	44.00	2.75


Price Per 50 Yard Roll

Number	Grit Numbers	Width of Roll			
		9 Inches	18 Inches	24 Inches	27 Inches
3/0 to 3/2	180-190	\$11.50	\$22.25	\$39.30	\$32.50
1	80	12.00	23.50	31.25	34.50
1 1/2	70	13.00	25.25	33.40	37.00
2	60	14.00	27.25	35.80	40.00
2 1/2	54	15.00	29.25	38.90	43.00
3	46	16.00	31.50	41.80	46.50
3 1/2	40	17.00	33.50	44.50	49.50
4	36	18.00	35.50	47.30	52.50

Aloxite Cloth



Made from artificial abrasives in an electric furnace.



In Sheets 9x11 Inches

Numbers	3/0 to 3/8	1	1½	2	2½	3
Grit	180-190	80	70	60	50	36
Price per ream.	\$31.00	\$33.00	\$35.00	\$38.00	\$41.00	\$44.00
Price per quire.	1.93	2.06	2.18	2.37	2.56	2.70

Price Per 50 Yard Roll

Number	6-In.	9-In.	12-In.	18-In.	24-In.	27-In.
3/0 to $\frac{1}{2}$	\$7.70	\$11.50	\$14.90	\$22.25	\$29.30	\$32.60
1	8.20	12.00	15.85	23.50	31.20	34.50
$1\frac{1}{2}$	8.75	13.00	16.95	25.25	33.40	37.00
2	9.35	14.00	18.15	27.25	35.80	40.00
$2\frac{1}{2}$	10.10	15.00	19.70	29.25	38.90	43.00
3	10.80	16.00	21.15	31.50	41.80	46.50

Handy Rolls—50 Yard

Width of Roll	Standard Roll Weights by Thickness					
	$\frac{1}{8}$ Inch	$\frac{3}{16}$ Inch	$\frac{1}{4}$ Inch	$\frac{1}{2}$ Inches	2 Inches	$2\frac{1}{2}$ Inches
3/0 to $\frac{1}{2}$	\$1.10	\$1.50	\$1.70	\$3.30	\$2.90	\$3.55
1	1.15	1.55	1.80	2.45	3.05	3.70
$1\frac{1}{2}$	1.20	1.60	1.90	2.55	3.25	3.95
$2\frac{1}{2}$	1.25	1.65	2.00	2.70	3.45	4.20
3	1.30	1.70	2.10	2.90	3.60	4.50
4	1.35	1.80	2.20	3.10	3.95	4.80

Oil Stones

Hard Arkansas



Arkansas stones are hard and fine enough to remove every trace of burr from the cutting edge. Used by all makers and users of fine tools and instruments who require long lasting, keen cutting edges. Unmounted stones are packed in individual boxes. Mounted stones are furnished in durable hard wood boxes.

Unmounted		Price Each
Size	Dimensions, Inches	
4	3 3/4-4 1/2 x 2 x 3/4-1	\$1.75
6	5 1/4-6 x 2 x 3/4-1	3.50
8	7 3/4-8 x 2 x 3/4-1	5.00
Mounted		
Size, inches	4x1 1/2 6x2 8x2	
Price each	\$1.25 \$2.50 \$3.50	

Lily White Washita



For efficient tool sharpening many prefer Washita Oilstones. They are more porous and cut faster than Arkansas. The best natural stone for giving a long lasting edge to general woodworkers' tools. Mounted or Unmounted same as the Arkansas.

Unmounted		Price Each
Size	Dimensions, Inches	
4	3 3/4-4 1/2 x 2 x 3/4-1	\$0.50
6	5 1/4-6 x 2 x 3/4-1	.75
8	7 3/4-8 x 2 x 3/4-1	.85
Mounted		
Size, inches	4x1 1/2 6x2 8x2	
Price each	\$0.75 \$1.00 \$1.25	

Royal Edge Slips



For gouges, channel knives, bead planers, moulder knives and all curved surfaces. Size 3 3/4-4 1/2 x 1 3/4-2 x 3/4-1 x 1/2-3/4 inches. Hard Arkansas, price each.....\$1.00
Lily White Washita, price each......50

Pen Knife Pieces



Lily White Washita Stones. Size 3 3/4-4 1/2 x 1 3/4-3/4 inches. Price each.....\$0.35

Combination Stones



This combination possesses the advantage of two stones in one, coarse on one side for very dull or badly nicked tools, and the other side fine, for putting on a finishing edge. The two grits are vitrified, not glued together, making solid stones.

No. 0.	8 x2 x1 inches.	Price each.....\$1.50
No. 1.	8 x1 3/4 x1 1/4 inches.	Price each.....1.50
No. 1 1/2.	7 x2 x1 inches.	Price each.....1.25
No. 2.	6 x1 3/4 x 3/4 inches.	Price each......75
No. 24.	4 1/2 x1 1/2 x 3/8 inches.	Price each......50
No. 29.	6 x2 x1 inches.	Price each.....1.00
No. 63.	Circular 4 inches diam.	Price each.....1.25

India Oil Stones

India sharpening stones are made from Alundum, an artificial abrasive of extreme hardness, toughness and sharpness. Made in three grits as follows:

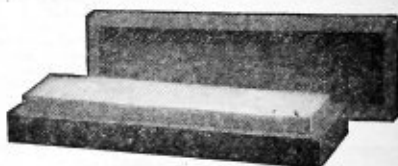
Coarse. For sharpening very large or very dull tools, nicked tools, etc., and are very fast cutting.

Medium. For ordinary sharpening or mechanics' tools not requiring finishing edge. Especially recommended for tool working soft woods, leather, etc.

Fine. For sharpening tools of machinists and engravers and all other users of tools requiring a very fine keen edge.

Illustrations showing the different shapes and prices will be found on the following page.

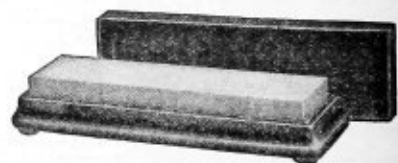
Mountings for India Stones



Wood Mountings

A wood mounting will keep stones clean and in good condition, thus prolonging the life of the stone. Made of solid oak and are supplied for the following shapes, which will be found illustrated and priced on the following pages: Nos. 0, 1, 1 1/2, 2, 3 and 29.

Price of Wood Mounting only.....\$0.35



Iron Mountings

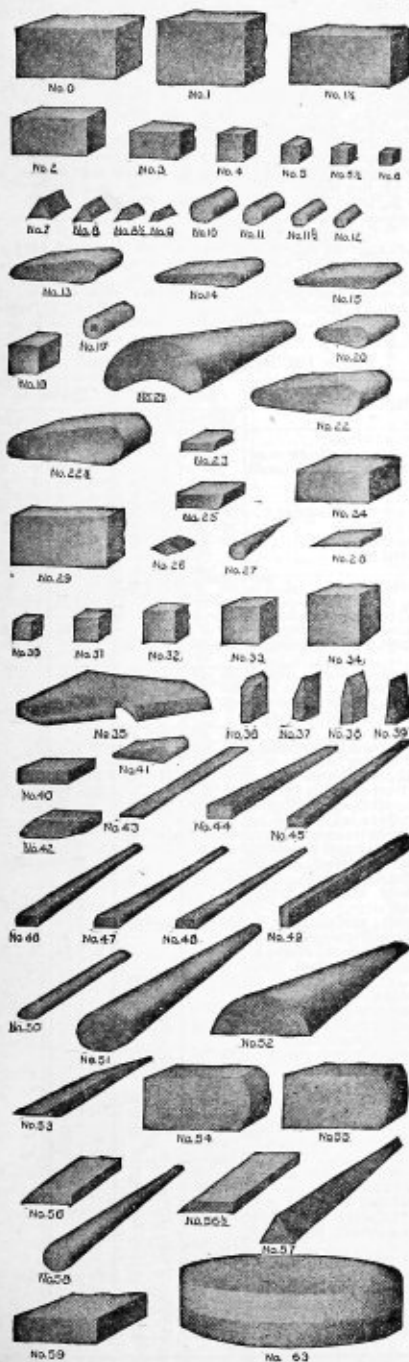
These iron mountings are supplied with cork feet, which prevent slipping on the bench. A felt pad absorbs the surplus oil and keeps the stone ready for use. Furnished for the following shapes, which are illustrated and priced on the following pages: Nos. 0, 1 1/2, 2 and 29.

Price of Iron Mounting only.....\$0.75

India Oil Stones

Effective October 1, 1916

Coarse, Medium or Fine Grits



Shape	Dimension	Price Each	Shape	Dimension	Price Each
0	8x2x1	\$1.25	34	Square File 6x1	\$0.60
0	8x2x1 Combination	1.50	35	Bath Universal Slip	1.75
1	8x1 1/4 x 1 1/4	1.25	36	1 Set (4) Carvers' Slips	1.20
1	8x1 1/4 x 1 1/4 Combination	1.50	37	2 1/4 x 3/8 x 3/8	
1 1/2	7x2x1	1.00	38	2x1x1/4	.30
1 1/2	7x2x1 Combination	1.25	39	5x1/8 x 3/8 x 3/8	.50
2	6x1 1/2 x 3/4	.60	40	4x1x1/4	.45
2	6x1 1/2 x 3/4 Combination	.75	41	4x1 1/2 x 1/8	.60
3	4x1x1 1/2	.35	42	4x1/2 x 1/4 x 3/8 x 1/8	.60
3	4x1x1 1/2 Combination	.45	43	4x1/2 x 1/4 x 3/8 x 1/8	.60
4	Square File 4x1 1/2	.35	44	4x1/2 x 1/4 x 3/8 x 1/8	.60
5	Square File 4x3/4	.35	45	4x1/2 x 1/4 x 3/8 x 1/8	.60
5 1/2	Square File 4x1	.35	46	4x1/2 x 1/4 x 3/8 x 1/8	.60
6	Square File 4x1/4	.35	47	4x1/2 x 1/4 x 3/8 x 1/8	.60
7	Triangular File 4x1/2	.45	48	4x1/2 x 1/4 x 3/8 x 1/8	.60
8	Triangular File 4x3/4	.45	49	4x1/2 x 1/4 x 3/8 x 1/8	.60
8 1/2	Triangular File 4x1	.45	50	3 1/2 x 3/8 x 3/8	.60
9	Triangular File 4x1/4	.45	51	Oval Plug 6x7 1/2 x 3/8	.75
10	Round File 4x1 1/2	.45	52	Heel Breast Stone 6x2x3/8	.50
11	Round File 4x3/4	.50	53	Automobile Stone	.45
11 1/2	Round File 4x1	.50	54	Automobile Stone in Case	.70
12	Round File 4x1/4	.50	55	8x2x3/4	1.00
13	4 1/2 x 1 1/4 x 3/8 x 3/8	.50	56 1/2	5x1 1/2 x 3/4	.75
14	4 1/2 x 1 1/4 x 3/8 x 3/8	.50	57	4x1 1/2 x 3/4	.60
15	4 1/2 x 1 1/4 x 3/4 x 3/8	.50	58	4x1 1/2 x 3/4	.60
16	8x2x3/4	.75	59	3x1 1/2 x 1/2	.30
19	Engravers' Pencils	.45	60	Axe Stone, Coarse Grit only	.40
20	Fine one end, medium the other	1.00	61	Circular Stone Axe, 3x3/4	.15
21	6x2x1x3/8 x 3/8	.60	62	Sportsmen's Stone, 3x1 1/2 x 1/2	.75
22	4 1/2 x 2 1/2 x 3/8 x 3/8	.80	63	Circular Comb, 4x1	1.25
22 1/2	6x2 1/4 x 3/4 x 3/8	.35	64	Above in Steel Box	1.75
23	3 1/2 x 3/4 x 1/2 x 3/8	.50	65	Triangular File 6x1 1/2	.55
24	4 1/2 x 1 1/2 x 3/8	.60	66	Triangular File 6x3/4	.65
24	4 1/2 x 1 1/2 x 3/8 Comb'tion	.35	67	Triangular File 6x1	.65
25	4 1/2 x 1 1/2 x 3/8 Reamer Stone	.60		Engravers' Chuck	.50
26	4x1 1/2 x 3/8	.60		Points, 1x1/4 per dozen	1.00
27	3x1 1/2 Points	.60		4 1/2 x 3/4 x 3/8	.25
28	4x1x1/2	.50		Wood Boxes (each list)	.35
29	6x2x1	.75		Iron Boxes (each list)	.75
29	6x2x1 Combination	1.00			
30	Square File 6x3/4	.50			
31	Square File 6x1 1/2	.50			
32	Square File 6x3/8	.50			
33	Square File 6x1/4	.60			

*No. 21 made in special fine only.

†No. 52 made in medium fine only.

Norton Grinding Wheels

Alundum and Crystolon



The cutting materials used in Norton Grinding Wheels are Alundum and Crystolon. Both are Electric Furnace products, but differ radically in chemical composition.

Alundum is the most efficient for cutting material of high tensile strength, particularly all kinds of steel. It is adapted for grinding more kinds of metal and under a wider range of conditions than any other material.

Crystolon is highly efficient for grinding and polishing on such metals as cast iron, brass, bronze, also marble, granite and pearl—in general, all materials of low tensile strength.

Alundum in chemical composition is similar to the ruby and sapphire—the hardest natural minerals except, the diamond. The raw material used in making Alundum is known as Bauxite, the purest form of aluminum oxide found in nature. It is a soft clay like substance and is transformed in an electrical furnace into Alundum, a hard, sharp, product with remarkable cutting qualities. The physical formation of the grain of Alundum is such that when it is broken or fractured it leaves sharp cutting corners or edges. It has a very high melting point, a low coefficient of expansion and is a non-conductor of electricity.

Crystolon is also an electric furnace product, made from coke, sand, sawdust and salt. The characteristic property of brittleness makes it highly efficient for polishing and grinding such metals as cast iron, etc., as given above.

Testing for Safety

All Norton Wheels of 5 inch diameter and larger are tested at 9,000 surface feet per minute. As the usual working speed is from 5,000 to 6,000 feet, these tests insure a high factor of safety.

How to Order Grinding Wheels

We can make the proper selection of wheels suitable for the work if we are furnished the following information:

- (1) The kind of material to be ground, whether iron—cast, wrought or malleable—brass, composition, hard or soft steel, etc.
- (2) Speed of spindle.
- (3) Whether wet or dry grinding is done.
- (4) The diameter and width of wheel wanted.

Explanation of Grain and Grade

Grinding wheels are made in many combinations of coarseness and hardness to meet the variety of conditions under which they are used. These combinations are known as Grain and Grade.

GRAIN—The size or number of the abrasive grain used determines wheel's degree of coarseness.

GRADE—The degree of hardness of the wheel. The resistance of the cutting particles under pressure.

The following list is used to designate the degree of hardness of the wheel.

Medium Soft.	Medium.	Medium Hard.	Hard.
I J K L M N O P	Q R S	T U	

Conditions under which grinding wheels are used vary to such an extent that no absolute rule can be given for selecting the right grades for the work. The following table, however, will give an approximate idea of what is most commonly furnished for grinding each kind of material under ordinary conditions. It is merely intended as a guide for those who prefer to select their own wheels.

Table for Selection of Grades

Class of Work	Alundum		Crystolon	
	Grain	Grade	Grain	Grade
Aluminum castings.....			29 to 24	P to R
Brass or Bronze castings (large).....			29 to 24	Q to R
Brass or Bronze castings (small).....			24 to 36	P to R
Cast iron, cylindrical.....	24 comb	J to K	36 to 46	J to L
Cast iron, surfacing.....	20 to 46	H to K	16 to 30	J to L
Cast iron (small) castings.....	24 to 30	P to R	20 to 30	Q to S
Cast iron (large) castings.....	16 to 20	Q to R	16 to 24	Q to S
Chilled iron castings.....	20 to 30	P to U	20 to 30	Q to S
Dies, chilled iron.....			20 to 30	Q to S
Dies, steel.....	36 to 60	J to L		
Drop forgings.....	20 to 30	P to R		
Hammers, cast steel.....	30	P		
Internal grinding of Automobile Cylinders (cast iron).....			30 to 60	I to L
Internal grinding, hardened steel.....	46 to 60	J to M		
Knives (paper) automatic grinding.....	36 to 46	J to K		
Knives (planer).....	30 to 46	J to M		
Knives, moulding bits, etc.....	46 to 60	M		
Knives (planing mill), hand grinding.....	46 to 60	J to M		
Knives, shear and shear blades.....	30 to 60	J to M		
Lathe and planer tools.....	20 to 36	O to P		
Machine shop use, general.....	20 to 36	O to Q	16 to 20	R to S
Malleable iron castings (large).....	14 to 20	P to U	20 to 30	Q to S
Malleable iron castings (small).....	20 to 30	P to R		
Milling cutters, automatic or semi-automatic grinding.....	46 to 60	H to M		
Milling cutters, hand grinding.....	46 to 60	J to M		
Plow bodies (cast iron), surfacing.....			24	R
Plows (steel), jointing.....	20 to 24	R to S		
Plow points (chilled iron), surfacing.....			20 to 30	Q to S
Plows (steel), surfacing.....	16 to 24	Q to S		
Pulleys (c) surfacing faces of.....			30 to 36	K to L
Radiators (cast iron) edges of.....			24 to 30	R to S
Razors, grinding and concaving.....	46 to 120	H to O		
Reamers, taps, milling cutters, etc., hand grinding.....	46 to 60	K to O		
Reamers, taps, milling cutters, etc., special machines.....	46 to 60	J to M		
Saws, grimming and sharpening.....	36 to 60	M to N		
Saws, cold cutting-off.....	60	O to Q		
Snovels, edging.....	24	Q to R		
Steel (soft), cylindrical grinding.....	24 comb	L to N		
Steel (soft), surface grinding.....	14 to 60	L to N		
Steel (hardened) cylindrical grinding.....	24 to 36	H to K		
Steel (hardened) surface grinding.....	24 comb	K to L		
Steel, large castings.....	14 to 60	J to L		
Steel, large castings.....	36 to 46	H to K		
Steel, small castings.....	12 to 20	Q to U		
Steel (manganese), safe work.....	20 to 30	P to R		
Steel (manganese), frogs and switches.....	14 to 46	L to P		
Structural steel.....	14 to 16	Q to U		
Stove castings.....	16 to 24	P to R		
Twist drills, hand grinding.....	20 to 36	P to Q	20 to 36	Q to R
Twist drills, special machines.....	46 to 60	M		
Wrought iron.....	36 to 60	K to M		
Woodworking tools.....	12 to 30	P to U		
	46 to 60	K to M		

Grinding Wheels

We are prepared to furnish any of the leading brands of grinding wheels, such as Norton's Alundum, Crystolon, Carborundum, Abrasive and Emery wheels. Specify grain and grade desired or order of work for which they are intended. Also state at what speed wheel is intended to run.

Price List on All Wheels Mentioned Above—Regular Shapes

Diam., Inches	Thickness of Wheels, Inches											Recommended Rev. per Minute for Surface Speed of 5000 Feet
	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	
1	\$0.40	\$0.50	\$0.60	\$0.70	\$0.80	\$0.95	\$1.15	\$1.35	\$1.55	\$1.80	\$2.00	19099
2	.60	.75	.90	1.00	1.15	1.30	1.60	1.85	2.15	2.40	2.70	9549
3	.80	1.00	1.20	1.45	1.65	1.85	2.30	2.70	3.15	3.55	4.00	6366
4	1.10	1.40	1.65	1.95	2.25	2.55	3.10	3.70	4.25	4.80	5.40	4775
6	1.90	2.40	2.90	3.40	4.05	4.50	5.40	6.50	7.50	8.50	9.60	3183
8	2.70	3.55	4.40	5.20	6.10	6.90	8.60	10.30	12.00	13.70	15.40	2387
10	3.60	4.90	6.20	7.50	8.90	10.20	12.80	15.40	18.00	20.70	23.30	1910
12	4.20	6.00	7.80	9.50	11.30	13.10	16.70	20.20	23.80	27.30	30.90	1592
14	4.90	7.20	9.60	11.90	14.20	16.50	21.20	25.80	30.50	35.10	39.80	1364
16	5.70	8.70	11.60	14.60	17.60	20.50	26.50	32.40	38.30	44.30	50.20	1194
18	6.60	10.30	14.00	17.70	21.40	25.10	32.50	39.80	47.20	54.60	62.00	1061
20	12.30	16.80	21.40	25.90	30.50	35.00	44.70	54.00	63.00	72.00	81.00	955
24			24.00	30.60	37.30	44.00	59.00	71.00	85.00	99.00	113.00	706

Price List—Cup Wheels

Dia. In.	Hgt. In.	Thickness of Rim and Back in Inches							Dia. In.	Hgt. In.	Thickness of Rim and Back in Inches						
		1	1 1/2	2	2 1/2	3	3 1/2	4			1	1 1/2	2	2 1/2	3	3 1/2	4
4	1/4	\$16.20							4	1/4	\$61.60	\$66.40	\$69.75	\$73.30	\$76.05	\$77.95	\$79.50
8	1/4	18.90							8	1/4	71.63	77.05	81.10	85.15	88.55	90.75	92.85
8	1/2	21.45							8	1/2	81.70	87.70	92.35	97.00	100.90	103.65	106.20
8	3/4	23.85							8	3/4	92.25	98.95	104.20	109.35	113.85	117.10	120.10
8	1	27.35							8	1	105.40	113.10	119.10	124.35	129.10	133.85	137.25
Back per in.		.65							Back per in.		6.05	5.40	4.75	4.20	3.65	3.15	2.70
4	1/4	18.25	\$19.20						4	1/4	74.25	79.65	84.40	88.45	91.65	94.30	96.30
4	1/2	21.55	22.75						4	1/2	86.80	92.95	98.25	103.00	106.80	110.50	112.60
4	3/4	24.60	26.00						4	3/4	98.85	105.75	110.85	115.20	118.65	121.65	124.55
4	1	27.15	28.80						4	1	112.35	119.95	125.60	130.70	134.70	137.70	140.65
Back per in.		.90	.65						Back per in.		128.40	137.10	144.70	151.65	157.35	162.35	166.45
4	1 1/4	21.60	22.20	\$23.20					4	1 1/4	7.45	6.75	6.05	5.40	4.75	4.20	3.65
4	1 1/2	24.70	26.20	27.40					4	1 1/2	84.10	90.55	96.15	100.85	104.65	107.90	111.05
4	1 3/4	27.75	29.55	30.70					4	1 3/4	99.40	106.65	113.10	118.50	123.30	127.10	130.50
4	2	31.45	33.45	35.20					4	2	113.65	121.65	128.55	135.00	140.50	145.05	148.95
Back per in.		35.90	38.25	40.25					Back per in.		128.85	137.65	145.75	152.50	158.65	163.90	168.30
4	2 1/4	25.50	27.30	28.65	\$29.70	\$30.25			4	2 1/4	147.25	157.20	166.35	174.30	181.30	187.30	192.35
4	2 1/2	29.50	31.30	33.30	34.60	35.35			4	2 1/2	9.65	8.25	7.45	6.75	6.05	5.40	4.75
4	2 3/4	33.45	35.85	37.90	39.45	40.45			4	2 3/4	95.40	103.00	109.60	115.30	120.10	124.15	127.50
4	3	38.35	40.90	42.80	44.65	46.25			4	3	112.30	120.70	128.10	134.45	140.10	144.90	148.95
Back per in.		46.65	49.00	51.35	52.80				Back per in.		128.55	137.85	146.10	153.45	159.75	165.25	169.90
4	3 1/4	1.85	1.50	1.20	.90	.65			4	3 1/4	7.45	6.35	5.65	5.15	4.60	4.05	3.50
4	3 1/2	31.80	34.20	36.10	37.50	38.55	\$39.25	\$39.60	4	3 1/2	166.40	176.45	185.85	194.65	202.85	210.35	217.35
4	3 3/4	37.45	40.20	42.55	44.50	46.00	46.50	47.10	4	3 3/4	10.75	9.85	9.05	8.25	7.45	6.75	6.05
4	4	42.60	45.90	48.55	50.55	52.35	53.50	54.30	4	4	110.10	120.00	128.20	135.45	142.10	148.10	153.50
4	4 1/4	49.00	52.60	55.55	58.55	60.00	61.50	62.65	4	4 1/4	149.10	160.50	170.40	178.85	186.75	193.90	199.65
4	4 1/2	56.00	60.10	63.60	66.35	68.50	70.30	71.60	4	4 1/2	169.50	181.95	192.75	202.00	210.05	216.85	222.30
Back per in.		2.70	2.25	1.85	1.50	1.20	.90	.65	4	4 1/2	193.70	207.95	220.20	230.35	239.65	248.10	255.70
4	4 3/4	39.75	42.85	45.30	47.25	48.30	49.80	50.50	4	4 3/4	12.45	11.80	10.95	9.95	9.15	8.35	7.55
4	5	47.55	51.25	54.15	56.65	57.90	59.80	60.85	4	5	226.00	238.15	245.00	253.60	261.30	268.30	274.55
4	5 1/4	55.00	59.00	62.40	65.25	66.85	68.25	70.60	4	5 1/4	150.15	161.35	171.25	180.80	189.00	195.15	201.75
4	5 1/2	62.35	66.85	70.65	74.55	75.85	78.70	80.35	4	5 1/2	170.50	182.65	193.60	203.25	211.55	218.90	225.70
4	5 3/4	71.25	76.40	80.75	84.60	86.70	89.95	91.80	4	5 3/4	193.35	206.25	218.50	229.65	239.55	247.65	255.35
Back per in.		77.70	83.20	87.90	91.95	95.20	97.40	100.30	4	5 3/4	239.85	256.00	269.45	281.30	291.65	299.85	307.00
4	6	51.40	55.15	58.30	60.85	62.80	64.05	65.40	4	6	14.55	13.60	12.45	11.80	10.95	9.90	9.15
4	6 1/4	60.25	64.60	68.25	71.35	73.75	75.40	77.10	4	6 1/4							
4	6 1/2	68.85	73.50	76.00	78.65	81.30	84.40	86.55	4	6 1/2							
4	6 3/4	77.70	82.30	85.70	88.60	91.50	94.50	97.10	4	6 3/4							
4	7	88.90	95.10	100.45	105.10	108.80	111.75	114.60	4	7							
Back per in.		4.75	4.20	3.65	3.15	2.70	2.25	1.85									

Price List—Cylinders

Dia. In.	Hgt. In.	Thickness of Rim in Inches							Dia. In.	Hgt. In.	Thickness of Rim in Inches						
		1	1 1/2	2	2 1/2	3	3 1/2	4			1	1 1/2	2	2 1/2	3	3 1/2	4
4	1/4	\$13.75							4	1/4	\$51.15	\$53.85	\$56.10	\$58.80	\$61.20	\$63.15	\$65.20
4	1/2	17.35							4	1/2	61.30	64.60	67.50	70.75	73.75	76.05	78.60
4	3/4	19.75							4	3/4	70.60	74.50	77.90	81.90	85.45	88.45	91.40
4	1	22.50							4	1	80.95	85.50	89.65	94.00	98.10	101.40	104.85
Back per in.		25.50							Back per in.		92.50	97.70	102.45	107.40	112.10	115.90	119.80
4	1 1/4	16.30	\$17.20						4	1 1/4	62.80	65.80	68.70	71.50	74.05	76.45	78.70
4	1 1/2	19.40	20.95						4	1 1/2	75.60	79.35	82.95	86.35	89.45	92.30	95.30
4	1 3/4	22.45	24.35						4	1 3/4	87.15	91.60	95.85	100.00	103.75	107.25	110.55
4	2	25.60	27.15						4	2	100.05	105.25	110.10	114.90	119.25	123.40	127.20
4	2 1/4	29.25	31.00						4	2 1/4	114.35	120.30	125.80	131.30	136.30	141.00	145.40
4	2 1/2	33.00	34.95						4	2 1/2	130.15	136.85	143.10	148.85	154.10	158.95	163.35
4	2 3/4	36.85	38.85						4	2 3/4	146.10	153.65	160.70	167.30	173.40	179.05	184.30
4	3	40.75	42.90						4	3	162.25	170.45	178.15	185.40	192.15	198.45	204.30
Back per in.		44.70	46.90						Back per in.		178.50	187.35	195.70	203.60	211.00	217.95	224.40
4	3 1/4	44.70	46.90						4	3 1/4	195.05	204.85	213.25	220.90	228.30	235.30	242.70
4	3 1/2	48.75	50.95						4	3 1/2	213.15	223.55	231.95	239.30	246.45	253.25	259.65
4	3 3/4	52.85	55.15						4	3 3/4	231.55	242.55	250.95	258.30	265.45	272.25	278.65
4	4	56.95	59.30						4	4	250.15	261.65	269.95	277.15	284.15	290.95	297.45
4	4 1/4	61.10	63.50						4	4 1/4	269.85	281.85	290.95	298.05	304.95	311.65	318.15
4	4 1/2	65.35	67.85						4	4 1/2	290.65	303.15	312.15	319.15	325.95	332.55	338.95
4	4 3/4	69.65	72.20						4	4 3/4	312.55	325.55					

Emery, Carborundum, Aloxit and Alundum Grains

Emery Grains or Powders

Quantities	Nos. 12 to 180 F, FF and FFF Price per Lb.
Kegs, about 350 pounds	\$0.15
100-pound lots	.18
25-pound lots	.20
Less quantities	.25

Carborundum Grains or Powders

Quantities	Nos. 6 to 220 F, FF and FFF Price per Lb.
300, 200, or 150-pound kegs	\$0.15
100-pound kegs or 50-pound drums	.18
25-pound drums	.20
5-pound cans	.30
1-pound cans	.40

Aloxit Grains or Powders

Quantities	Nos. 6 to 220 F, FF and FFF Price per Lb.
360, 275 and 175-pound kegs	\$0.15
125-pound kegs	.18
50 and 25-pound drums	.20
5-pound tins	.30
1-pound tins	.40

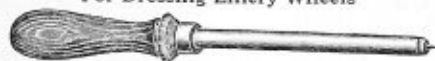
Alundum Grains or Powders

Quantities	Nos. F, FF and FFF Price per Lb.	Nos. 18 to 220 Price per Lb.
340-pound kegs		\$0.15
100-pound kegs		.18
10 pounds and over	\$0.30	.20
5-pound cans	.40	.30
1-pound cans	.60	.40

Rubbing Bricks



No.	Size, Inches	Price	
		Per Dozen	Each
1	8x2x2	\$12.60	\$1.25
2	8x2x1	7.80	.75
3	6x2x2	10.80	1.05
4	6x2x1	6.00	.60
5	4x2x2	7.80	.75
6	4x2x1	4.80	.45

Diamond Hand Tools
For Dressing Emery Wheels

The black diamonds used in our tools are carefully selected both as to their quality and shape and will give complete satisfaction if not misused. The stones are mounted by a special process in a round steel shank $\frac{1}{4}$ x7 inches.

When using Diamond hand tools they should be brought gradually into contact with the object worked upon, because although extremely hard, they are brittle and shocks or jars should be avoided.

The price on Diamond hand tools varies according to the size of the stone. We invite correspondence on this subject and are always ready to give customers the benefit of our experience in selecting the proper stone for their requirements.

Diamond Grinder Tools



For Norton Grinder

Diameter, $\frac{1}{4}$ -inch.
Length over all, $\frac{3}{8}$ -inch.



For Landis Grinder

Diameter, $\frac{3}{8}$ -inch.
Milled to $\frac{1}{4}$ -inch.
Length over all, $\frac{3}{8}$ -inch.

Prices quoted upon application.

Unmounted Black Diamonds



The prices of diamonds vary according to the weight. An assortment of stones will be sent to responsible firms for selection. Correspondence on this subject is invited.

The Diamo-Carbo Dresser



Consists of a steel tube filled with an abrasive of such intense hardness that it will cut and dress any grinding wheel except the very hard grade or extremely coarse and large wheels used to grind castings. The abrasive wears slowly and lasts indefinitely.

Number	3	5	8	9
Diameter, inches	$\frac{3}{8}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{1}{2}$
Length, inches	10	12	10	12
Price each	\$3.50	\$4.00	\$3.50	\$4.00

Huntington Emery Wheel Dresser



A strictly high grade tool with hardened steel bushing. Cutters are milled from best quality steel, hardened and tempered, and have extra long teeth for hard wear. The washers, being tempered, do not prevent cutters from turning as in the case of untempered washers.

For use on the largest and hardest grinding wheels and where quick action is desired, the No. 12 extra large Huntington Dresser will be found practical and economical.

There is quite a demand for the No. 11 large Huntington Dresser where larger than the ordinary sizes, but not so large as the No. 12 is desired.

Regular size, diameter $1\frac{1}{2}$ inches, width of face, $\frac{3}{4}$ inch. Price each, with one set extra cutters.....\$0.75

Extra cutters, per dozen sets.....1.00

Extra cutters, each set......10

No. 11. Diameter, $1\frac{1}{2}$ inches, width of face $\frac{3}{4}$ inch. Price each, with one set extra cutters.....\$1.50

Extra cutters, per dozen sets.....3.00

Extra cutters, each set......30

No. 12. Diameter, $2\frac{3}{8}$ inches, width of face, $1\frac{1}{2}$ inches. Price each, with one set of extra cutters.....\$2.00

Extra cutters, per dozen sets.....6.00

Extra cutters, each set......60

Sherman Emery Wheel Dresser



Designed for hard, coarse or large wheels upon which a diamond could not be used.

A hood effectually protects the eyes from flying particles. It is being adopted by all shops where the employee's safety is of first importance.

No. 1, complete.....\$1.50

Extra cutters, same size as No. 11 Huntington. Price per dozen set of 3 each.....\$1.50

Each set......15

No. 2, complete.....\$2.00

Extra cutters, same size as No. 12 Huntington. Price per dozen sets of 4 each.....\$2.50

Each set......25

How to Use Dressers

The dresser must be forced against the wheel by fixing the work rest or some similar support at the right distance from and parallel to the wheel face.

With one hand pressing down on the handle near the cutter end, a slight upward pull is given with the other hand. This forces the cutters into the wheel. The dresser can then be moved along the work rest across the wheel face in both directions until the required condition is obtained.

If sparking occurs, use greater pressure, as the sparks indicate that the wheel is grinding particles off the cutters.

When dressing large wheels, the cutters are apt to become excessively hot. They should be quenched in water and the cutter spindle well lubricated.

Wrigley Emery Wheel Dresser



This dresser will trim off the hardest emery wheels and do it rapidly. The cutters have no teeth to wear out, and cut obliquely or on a slant. Provided with hardened steel bushings at pin bearings, and hardened washers at side bearings. An extra set of cutters is furnished with each dresser.

No. 1. Length, 12 inches. Has 3 cutters, $1\frac{1}{8}$ -inch diameter and is intended for general work. Price each.....\$1.50

Extra cutters:

Per dozen sets of 36 cutters.....\$1.50

Per set of 3 cutters......15

No. 3. Length, 24 inches. Has 6 cutters, $2\frac{1}{8}$ -inch diam. For facing very large wheels. Price each.....\$3.50

Extra cutters:

Per dozen sets of 72 cutters.....\$2.25

Per set of 6 cutters......30

Collmer Emery Wheel Dresser



No. 1 Cutter



No. 2 Cutter

The cutters are made as a unit. They cut fast and as the wear is evenly distributed over the entire face they will outwear four to six sets of Huntington cutters. The extra Collmer Nos. 1 and 2 cutters will fit the regular Huntington handle.

No. 1. Type is used for fine grade wheels and will dress for finishing.

No. 2. Type is for general work, will dress a wheel very rapidly and is especially adapted for fast grinding.

Price of dresser with either No. 1 or No. 2 cutter and one extra set of cutters.....\$1.50

Per dozen.....2.00

Each......20

No. 3 Collmer Emery Wheel Dresser

The cutters of this dresser are exactly like the No. 2 illustrated above, except that diameter is $2\frac{1}{4}$ inches, width $\frac{3}{8}$ -inch, bore $\frac{3}{8}$ -inch. This large size dresser is especially suited for dressing large, coarse wheels.

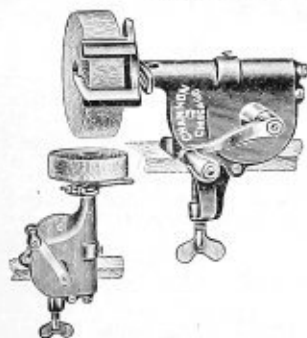
Price of dresser, with extra set of cutters.....\$2.00

Extra cutters, per set......50

We can furnish emery wheels to meet every purpose. Send us your specifications.

Tool Grinders

"Best Maide" No. 51

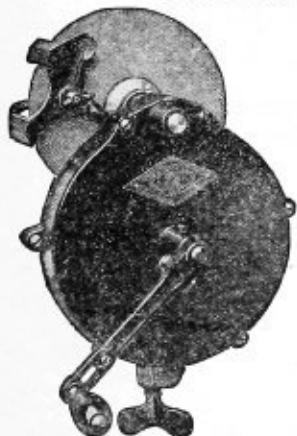


This machine finds a wide use among carpenters, cabinet makers and other tool users. It has enclosed concave driving gear, worm gear running in oil, adjustable ball bearings and rigid frame. Casing is made of the best grade of cast iron; malleable iron handle and clamp; frame can be tilted to any position and set at any angle; equipped with a 5x1½-inch double grit wheel with medium body and extra fine face; provided with patent tool rest and chisel

and plane bit guide; weight 12½ pounds.

Price each.....\$6.00

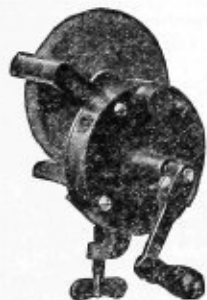
Channon Special



The Channon Special grinders, made in three sizes, are high class machines and intended for long wear and hard usage. The spiral pinion gear is cut from solid steel. The casing is in one piece and oil tight. The No. 7M is intended for use by contractors and general mechanics. No. 7M only has adjustable handle as shown. Can furnish attachment for grinding regular twist drills up to 1¼-inch. These machines are very practical and will grind the correct bevel on drills.

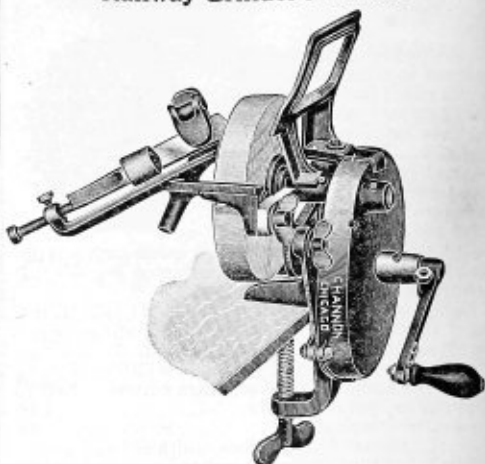
Number.....	7M	6M	5M
Size of grinding wheel.....	7x1½	6x1	5x1
Weight, pounds.....	24	13	9
Price each.....	\$10.00	\$7.50	\$5.00
Twist drill holder, extra.....	1.50		

Challenge



Built especially to meet the demand for a practical machine at a moderate price. This machine, while right in line with all competitive machines, is the lowest priced of its type. The frame is made in two separate halves with one bearing in each half, while other machines make use of one piece castings. This accounts for the much lower price. It has spur cut gears, runs easily and with care will give long and satisfactory service. The gears are fully enclosed and dust-proof. Equipped with sharpening wheel 4½-inch in size and a tool rest. Weight ready for shipment, 5½ pounds. Price each.....\$2.50

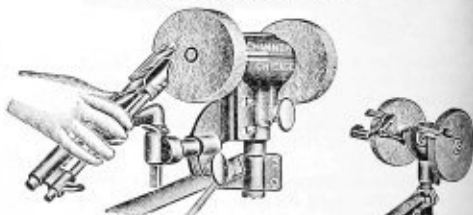
Railway Grinder No. 175B



A portable railway grinder that is large and heavy enough to do any work within the range of a hand-power machine. Weight 26 pounds. It is far lighter than a grindstone and can easily be made a part of the regular road equipment of any section or construction gang. Will cut twenty times as fast as the grindstone. There is no water needed and no danger of drawing the temper. The grinding wheel (7-inch diameter, 1¼-inch face) is an aluminum oxide wheel, with its temper and toughness, makes it the most satisfactory abrasive for general use. Furnished with attachments for grinding flat and twist drills, adzes and scythes.

Price per outfit.....\$12.00

Hummer No. 271

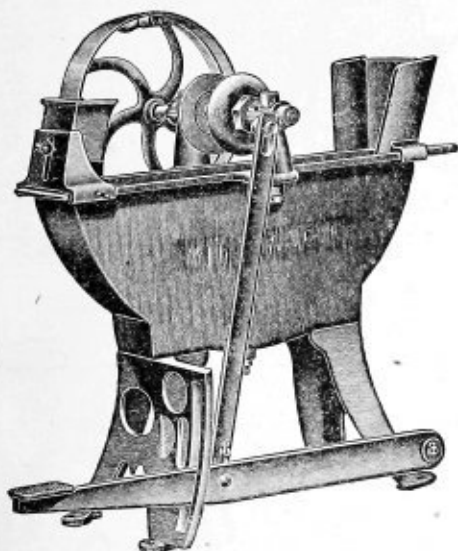


Drill Sharpening Attachment

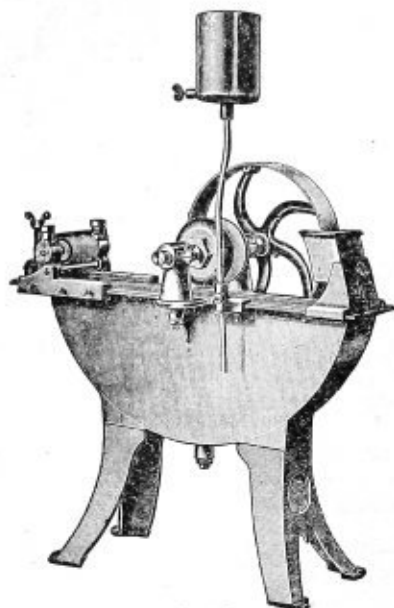
This grinder is simply but strongly made with enclosed gearing, making it absolutely dust-proof and oil retaining. The head can be swiveled to any angle which is very convenient when grinding tools of different shapes and requiring different edges. Equipped with two carbide wheels 6x1½ inches, one medium grit and one coarse. Steel tubing and angle iron frame. Malleable iron parts. Universal tool rest and chisel and plane bit guide. Weight 62 pounds.

Price each.....\$15.00
Drill sharpening attachment.....\$2.00

Athol Iron Grindstone Frames



No. 156
With Water Guard and Adjustable Tool Rest



No. 157
With Adjustable Tool Rest, Truing Attachment
and Water Pot

No. 156

Frame, with water guard, tool rest, pulley and treadle attachment	\$15.00
Pulley	1.50
Treadle	1.50
Will take stone, maximum size	30" x 4"
Weight, without stone	170 lbs.

No. 157

Frame, with tool rest, truing attachment and pulley	\$17.00
Water Pot	1.00
Will take stone, maximum size	30" x 4"
Weight, without stone	200 lbs.

Prices do not include stones.

Improved Ball Bearing Family Grindstone

The best family grindstone made. Supplied with a fine specially selected Berea grindstone, turned and rubbed smooth.

Mounted in an extra heavy cast iron trough, on a pressed steel base and fitted with patent hub, a steel shaft and steel ball bearings.

The bearing sleeve is turned out of cold rolled steel shafting and ball case is of heavy pressed steel.

It can be set up in two minutes or a new stone can be applied in no longer time—no cement necessary; anyone can apply the stone.

Japanned red and black. Packed 1/4 dozen in a box. Knocked down.

Price List

6-inch.	Shipping weight per dozen, 125 pounds.	Price per dozen	\$12.00
7-inch.	" " " " 140 "	" " " "	13.00
8-inch.	" " " " 150 "	" " " "	14.00
9-inch.	" " " " 270 "	" " " "	16.00
10-inch.	" " " " 300 "	" " " "	18.00
11-inch.	" " " " 400 "	" " " "	20.00
12-inch.	" " " " 430 "	" " " "	22.00



Bi-Treadle Steel Frame Grindstone

Provided with double treadle, steel seat, and front shield or water guard of 1½ x ½ inch flat steel and steel drip can and holder. Frame is wrought steel, 26 inches long, 26½ inches high and 12½ inches wide over all.

Stone is 19 to 22 inches in diameter and weighs 50 to 60 pounds. Weight of grind stone complete, 100 pounds.

Price Each with Common Bearings \$4.00
Price Each with Ball Bearings 4.35



Empire Grindstone

Frames of seasoned hardwood, braced and bolted. Equipped with regular roller or improved ball bearings, treadle, crank and water bucket holder. Crank can be used to tighten bolts.

No. 1. Diam. Stone 23½ inches. Weight 150 pounds. Price Each with Ball Bearings \$4.50
With Roller Bearings 4.25

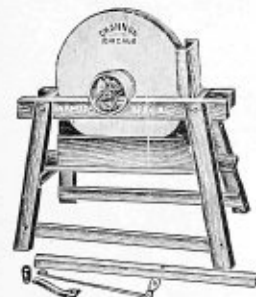
No. 2. Diam. Stone 22½ inches. Weight 100 pounds. Price Each with Ball Bearings \$4.15
With Roller Bearings 4.00

No. 3. Diam. Stone 18 inches. Weight 75 pounds. Price Each with Ball Bearings \$3.60
With Roller Bearings 3.35



Always shipped knocked down unless otherwise ordered

Farmers' Special Power Grindstone



The Farmers' Special Wooden Frame Power Grindstone is intended to supply the demand for a high grade power grindstone at a popular price. Frame is well made of selected hardwood. Sides and legs are extra heavy and entire frame is oiled and varnished to prevent decay. The stone is 24 to 26 inches in diameter, 2 to 3 inches thick and of high quality. Fixtures consist of a steel shaft, 6 inch pulley and hardened steel annular ball bearings, also a foot treadle with ball bearings on crank and emergency hand crank.

Frame is shipped knocked down, stone crated. Weight complete about 175 pounds. Price Each \$10.50

Empire Special Grindstone

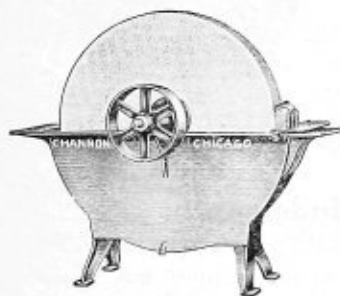
The Empire Ball Bearing Power Grindstone is especially designed to meet the needs of the farmer or small shop owner, who desire a grindstone to be operated by a gasoline engine. It possesses the necessary strength and staunchness to withstand the strenuous service of every day use, but is light of weight and easily operated. The frame and trough are cast iron, and the trough will not rust out. The fixtures consist of a steel shaft, 12-inch pulley and hardened steel ball bearings.



Stone is a genuine Berea, 24x2 to 3½ in. Weight about 225 pounds. Price Each \$14.00

Keystone Iron Frame Power Grindstone

Trough is cast in one piece, making it water tight, avoiding all joints, which invariably work loose and leak. Legs are cast separate and securely fastened in place with two wrought iron bolts. Adjustable tool rest with drip pan furnished with each frame. Stone and frame shipped separately if desired, and stone will run true when set up. Unless otherwise ordered, however, grindstone is shipped set up ready to use. A 12x4 inch single pulley is furnished with all sizes. In some states tight and loose pulleys are required. Loose pulley is furnished for \$2.50 net extra with any size grindstone.



No.	Price Each			Size of Stone		Size of Shaft at Bearings, Inches	Size of Frame		Weight without Stone, Lbs.
	Complete with Stone	Complete without Stone	Each Frame Only	Diam. Inches	Thickness		Length, Inches	Height, Inches	
302K	\$36.50	\$33.00	\$21.00	30	3	1	40	26	250
304K	38.00	33.00	21.00	30	4	1	40	26	250
364K	46.00	39.00	28.00	36	4 to 1½	1½	56	30	450
366K	49.00	39.00	28.00	36	5½ to 6	1½	56	30	450
406K	51.00	39.00	28.00	40	5½ to 6	1½	56	30	450
465K	65.00	52.00	35.00	46	4½ to 5	1½	66	33	700
486K	68.00	52.00	35.00	48	5½ to 6	1½	66	33	700
508K	80.00	52.00	35.00	50	7½ to 8	1½	66	33	700

Unmounted Grindstones

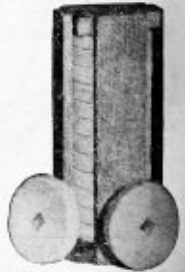
We can furnish grindstones of suitable grits for every variety of grinding. Unless otherwise ordered, however, we furnish a specially selected, medium grit, suitable for all general purposes.

Unmounted grindstones are sold by actual weight (or cut weight), which is the exact scale weight as stone comes from the lathe. Stones weighing 200 pounds or more, are sold by estimated weight called "measured weight" and approximates 150 pounds per cubic foot. Stones 42 inches in diameter and smaller have 2½-inch square hole in center.

Stones up to 60 inches diameter by 8 inches thick are carried in Chicago stock. Larger sizes shipped from quarry.

In ordering, state approximate diameter and width required.

Weight, pounds, average.....	110 to 120	120 to 130	135 to 150	140 to 180
Diameter, inches.....	24	26	28	30
Thickness, inches.....	2 to 3	2 to 3	2 to 3	2½ to 3½
Weight, pounds, average.....	180 to 225	245 to 325	400 to 500	580 to 900
Diameter, inches.....	32	36	42	48
Thickness, inches.....	2½ to 3½	3 to 4	3½ to 4½	4 to 6
Under 40 lbs., \$2.25 per cwt. 40 to 200 lbs., \$1.75 per Cwt. Over 200 lbs., \$2.00 per Cwt.				



First Aid to the Injured Cabinets



First Aid Cabinet No. 1

Made in two sizes: No. 1—Size of cabinet 12x8x3 1/4 inches, for homes, offices, etc.; No. 2—size of cabinet 15x10x5 inches. Cabinets made of hard wood, oak finished and are nicely varnished.

First Aid Cabinet No. 1

Contains: 1 gauze bandage, 1-inch; 2 gauze bandages, 2-inch; 1 cotton bandage, 2-inch (to bind other dressings); 1 can mustard (specially prepared for emetics); 2 packages absorbent cotton; 1 package court plaster; 1 package styptic gauze (medicated, to stop bleeding); 1 package surgical gauze (plain, for pads and compresses); 1 tourniquet; 3 safety pins; 1 can powdered antiseptic soap; 1 can Reocoso ointment; 1 can Kapsikar Ebrocation (for use as a counter irritant, for sprains, strains, congestion, etc.).
Price, each.....\$5.00

First Aid Cabinet No. 2

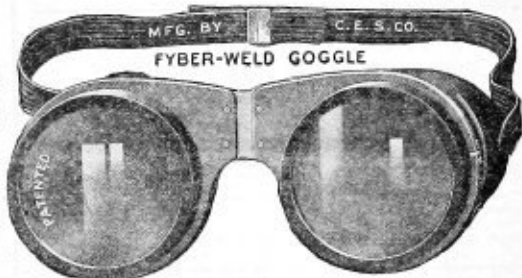
Contains: 3 gauze bandages, 1-inch; 12 gauze bandages, 2-inch; 5 cotton bandages, 2-inch (to bind other dressings); 5 packages absorbent cotton; 2 packages court plaster; 2 packages styptic gauze (medicated, to stop bleeding); 3 packages surgical gauze (plain, for pads and compresses); 2 cans Reocoso ointment; 1 bottle arnica, 2-oz.; 1 can Kapsikar Ebrocation (for use as a counter irritant); 1 bottle peroxide hydrogen, 4-ounce; 1 bottle aromatic spirits of ammonia; 2-ounce (stimulant); 1 5-yard spool adhesive tape; 2 cans powdered antiseptic soap; 1 bottle antiseptic tablets; 12 safety pins; 1 pair scissors; 1 pair forceps; a can mustard. Plates to hang cabinet on the wall.
Price, each.....\$12.00

No. 510 Fiber Weld Industrial Goggle

For use in acetylene or arc welding or wherever intense light is encountered.

The frame is of vulcanized fibre and conforms perfectly to the face. It is an absolute non-conductor of heat, which enables the Fiber-Weld goggle to be worn with comfort in foundries, rolling mills, blast furnaces, and wherever molten metal is handled. Equipped with blue, smoked, amber, green, or any ordinary colored lenses desired, but we recommend and furnish, when not otherwise specified, the new Essentialite Lens, which absolutely eliminates all ultra-violet rays. This lens is made of a new glass that positively wards off all harmful light rays and insures perfect vision.

Price, each.....\$2.50



No. 128 Safety Spectacles

This industrial Eye Protector has a German silver frame with wire screens on the sides. Can be washed or sterilized in hot water or live steam, and will not rust. Has adjustable nose bridge that will fit any face. The lenses are large, of special tempered glass, fitted into special rims and can be easily removed by a slight pressure on the inside when pitted or broken.

Price, each.....\$2.50

Rubber Respirator and Goggles

The respirator is designed for the use of persons who are exposed to the danger of inhaling poisonous dust fumes or gases.

A fine damp sponge is the best known filter for separating the impurities from the air and this in connection with the automatic valve insures perfect protection and ventilation. Sponge can be removed, cleaned and replaced again in one minute.

The automatic valve is so simple that it cannot get out of order and will always act, no difference what position the wearer assumes at his work. Made of pure white rubber, and is easily kept clean. Bends to fit any face perfectly.

The goggles are made of a simple piece of pure rubber. The lenses are clear glass and can be removed, cleaned and replaced in a moment. Mica lenses can also be furnished where there is danger from flying chips. The cushion is a curved flange extending downwardly and outwardly from the lens portion. It has no filthy pads and is easily kept clean. Used largely by men in foundries, fire departments, chemical works, men operating grinders, polishers, etc., and autoists. Either air tight or ventilated, as desired. Should be air tight for use in irritating gases, lime, etc., but ventilated when used in most other places.

Respirator, price per dozen.....\$22.00

Price, each.....2.00

Goggles, price each.....1.80

If your requirements are not shown in the catalog, write us



Revolving Stencil

Alphabet and figures for marking barrels, boxes, signs, show cards, signs, etc. Complete outfit consists of revolving stencil, special dry stencil ink, sponge and brush.



Alphabet and Figures Combined

Size of letters, inches	$\frac{1}{8}$	$\frac{3}{16}$	$\frac{1}{4}$	$\frac{1}{2}$
Price, set complete	\$2.50	\$3.00	\$4.00	\$5.00

Special Dry Stencil Ink

Same as furnished with revolving stencil listed above. Makes a neat, clear impression, will not gum or corrode the stencil, does not waste like ordinary ink and is always ready for use. Diameter of cake 3 inches.

No. 4. Cake only.	
Price per dozen	\$4.00
Price each	.40

New Jumbo Nail Puller



Shank and claw forged from high-grade tool steel. Has hand guard and will not turn in handle. Tested and fully warranted. Size, 18 inches.

Price each	\$2.00
------------	--------

Victor Pry Bar and Nail Puller



One of the simplest and handiest tools made. Electricians, plumbers and carpenters will find it unequalled for prying or cutting into floors, ceilings, walls, etc. In the packing or receiving room it will be found very effective for opening boxes. Will draw a nail as high as a man can reach and will not injure the lumber. It has a cold chisel cutting edge that will cut a nail if it can't pull it.

Length	Finish	Weight	Price
14 in.	Gum Metal	$1\frac{1}{8}$ lbs.	\$1.00
23 in.	Gum Metal	$3\frac{1}{8}$ lbs.	1.50

Box Hooks

Style No. 30

Style A



Style A. Made of high quality octagon tool steel. Strong and durable.

Length, inches	8	10	12	15
Diameter, inches	$\frac{1}{8}$	$\frac{3}{16}$	$\frac{1}{4}$	$\frac{1}{2}$
Price per dozen	\$5.00	\$6.00	\$7.00	\$11.00
Price each	.60	.60	.70	1.10

Style No. 30. Hexagon Steel. Natural finish. Loop Handle.	
$6\frac{1}{4} \times 3\frac{1}{4}$. Weight, $1\frac{1}{2}$ pounds.	
Price per dozen	\$7.20
Price each	.70

Stencils

Cut out of sheet brass in any size, shape or design desired.

Prices Quoted Upon Application.



Key Checks

Exact size.



No. A-40.



No. A-50.

Cuts show exact sizes of most commonly used style and are carried in stock. Any lettering desired stamped and enameled black. No. A-40 also furnished 1-inch in diameter. Link for attaching key furnished with each check.

Quantity of	12	25	50	100
Price	\$1.50	\$2.25	\$3.75	\$6.00
Blank	1.00	1.50	2.50	4.00

Tool Checks

Made of Brass or Aluminum.

$\frac{3}{4}$ Actual Size.



No. A-85



No. A-87



No. A-86

Cuts show most commonly used shapes of tool checks. No. A-87 also made in octagon shape. Any lettering desired will be stamped and enameled black. No reduction is made when stamping only is required.

Quantity of	12	25	50	100
Price	\$1.50	\$2.25	\$3.75	\$6.00
Blank	1.00	1.50	2.50	4.00

Time Checks

Made of Brass or Aluminum.

$\frac{1}{2}$ Actual Size.



No. A-101.



No. A-99.



No. A-102

Any desired lettering stamped and enameled black without extra charge.

Quantity of	12	25	50	100
Price	\$2.25	\$3.75	\$6.00	\$9.00
Blank	1.50	2.50	4.00	6.00

Blank Checks

Blank checks of any special size or shape of brass or aluminum furnished when desired. Price on application.

Steel Letters and Figures

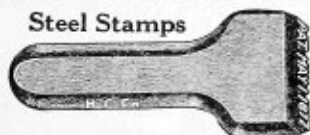


Our hand cut letters and figures are made of the best grade of steel possible to use for this purpose. They are accurately made entirely by hand and carefully tempered. We recommend them as the best for constant use and where satisfactory work is required. Will stamp all metals except hardened and tempered steel.

The machine cut letters and figures are made from high grade cold drawn steel and are especially adapted for stamping soft steel and brass, aluminum, wood, leather, etc. Each set is produced in a neat wooden box. Unless otherwise ordered we will furnish the hand cut.

Size, Ins.	Full Sets, Price per Set				Broken Sets Letters or Figures, Price Each	
	Hand Cut		Machine Cut		Hand Cut	Machine Cut
	Figures	Letters	Figures	Letters		
1/8	\$ 3.00	\$ 9.00	\$ 1.50	\$ 4.50	\$0.34	\$0.17
3/16	3.00	9.00	1.50	4.50	.34	.17
1/4	3.00	9.00	1.50	4.50	.34	.17
5/16	3.50	10.50	1.75	5.25	.40	.20
3/8	4.00	12.00	2.00	6.00	.44	.22
7/16	4.50	13.50	2.25	6.75	.50	.25
1/2	5.00	15.00	2.50	7.50	.60	.30
5/8	6.00	18.00	3.00	9.00	.70	.35
3/4	7.00	21.00	3.50	10.50	.90	.45
7/8	9.00	27.00	4.50	13.50	1.10	.55
1	10.00	30.00	5.00	15.00	1.20	.60
	12.00	36.00			1.50	
	18.00	54.00			2.00	
	24.00	72.00			2.70	

Steel Stamps



Hand made of the best tool steel for marking tools, wood, iron, steel and metals of all kinds. Always state for what purpose stamps are to be used. Hammer stamps with hole for handle, 50c lb. net extra for steel forgings. Stamps with letters larger than 1/4-inch 50c lb. net extra for steel forgings. 25 per cent extra for stamps of two or more lines or cut on curve. Initial stamps 1/2 to 1/4-inch 20c net per letter. All other sizes of initial stamps, 25 per cent additional. As all forgings are made by hand it is impossible for us to estimate the weight.

Size, Inches	Per Letter	Size, Inches	Per Letter	Size, Inches	Per Letter
1/8	\$0.30	3/16	\$0.50	1/2	\$1.20
3/16	.30	1/4	.60	5/8	1.50
1/4	.30	5/16	.70	3/4	2.00
5/16	.36	3/8	.90	1	2.60
3/8	.40	7/16	1.10		

Steel Log Marking Stamps

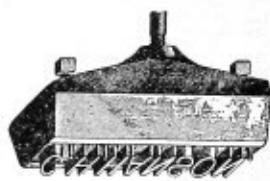


Made of the best steel obtainable and fully warranted. Intended for marking the ends of logs. When stamps are for marking the sides of logs mention should be made of the fact, as stamps for that purpose are made with sharp face letters. Stars are same price as letters. Borders \$1.00 and up net extra; 50c lb. net extra for steel forgings. On initial stamps the period is half the price of a letter. It is impossible for us to estimate the weight of forgings as they are made by hand and vary.

Size, inches	1/4	1	1 1/4	1 1/2
Per letter	\$1.50	\$2.00	\$2.50	\$3.00

Adjustable Burning Brands

For branding cattle, tools, farming implements, etc. Letters are all the same width at base, and fit all holders. Should any letters become damaged or burned out they can be replaced at any time at small expense.



Price Complete

Size letters, inches	1/4	3/8	1/2	3/4	1	1 1/4
Brand of:						
4 letters	\$ 2.00	\$ 2.00	\$ 2.00	\$ 4.00	\$ 4.60	\$ 5.00
6 letters	2.60	2.80	3.00	5.50	6.40	7.00
8 letters	3.20	3.60	4.00	8.00	8.20	9.00
10 letters	3.80	4.40	5.00	9.50	10.00	11.00
12 letters	4.40	5.20	6.00	10.50	11.80	13.00
14 letters	5.00	6.00	7.00	11.50	13.60	15.00
Ext. letters and figures	.16	.18	.20	.40	.50	.60

Adjustable Stencil Letters

Made with a beaded lock on the edge so that they can be joined together to form any combination of letters, and after use can be taken apart and formed together for another name or address.



These letters will save a great deal of time in printing signs, marking boxes, barrels, bales, etc., and do very neat work.

Alphabets

Set consists of 26 letters, 1 beginner, 1 ender, 1 period, 1 apostrophe, 1 comma, 1 blank and 1 &.

Size of letters, inches	1/2	3/4	1	1 1/2
Weight of set, ounces	4	6	7	8
Price per set	\$1.70	\$1.80	\$2.10	\$2.60

Sets packed one in a box.

Figures

Set consists of 1 figure each Nos. 1, 2, 3, 4, 5, 6, 7, 8, 9, and 0, \$ mark, cent mark, period, beginner and ender to complete stencil.

Size of figures, inches	1/2	3/4	1	1 1/2
Weight of set, ounces	2	3	3 1/2	4
Price per set	\$0.70	\$0.80	\$0.90	\$1.20

Sets packed one in a box.

Pattern Letters



A—Roman. A popular style. Has flat face.
P—Sharp Face Gothic. Draws easily from sand.
D—Round Face Gothic. Heavier than Sharp Gothic.
 Convex sides.
H—Hair Line. A very light Gothic style.

IMPORTANT—Pattern Letters are measured by the height of face and not height over all. For example, the size of the letter P shown above is $\frac{3}{8}$ -inch, of the letter H $\frac{1}{2}$ -inch. Minimum charge, 20c net.

N—Antique Pointed or Fancy. Ornamental, flat top.

4—Reversed Gothic Branding. Very deep.

L—Reversed Gothic Branding. Not as deep as Gothic Branding Style 4.

White Metal				Brass Letters			
Size	All Styles Excepting Branding, per 100	Gothic and Roman Branding, per 100		All Styles Excepting Branding, per 100	Gothic and Roman Branding, per 100		
$\frac{3}{8}$	\$3.00			\$5.00			
$\frac{7}{8}$	2.00			4.00			
$\frac{1}{2}$	2.00			4.00			
$\frac{1}{4}$	2.00	\$4.00		4.00	\$7.00		
$\frac{3}{16}$	2.00			4.00			
$\frac{5}{16}$	2.50	6.00		5.00	8.00		
$\frac{3}{8}$	3.00			5.00			
$\frac{1}{2}$	3.00	8.00		5.00	8.00		
$\frac{3}{4}$	4.00			6.00			
$\frac{7}{8}$	4.00	9.00		6.00	9.00		

Size	All Styles Excepting Branding, per 100	Gothic and Roman Branding, per 100		All Styles Excepting Branding, per 100	Gothic and Roman Branding, per 100		
$\frac{3}{8}$	\$ 5.00	\$10.00		\$ 7.00	\$10.00		
$\frac{7}{8}$	6.00	8.00		7.00	9.00		
1	7.00	11.00		10.00	12.00		
$1\frac{1}{4}$	10.00	12.00		15.00	18.00		
$1\frac{1}{2}$	15.00	15.00		20.00	25.00		
$1\frac{3}{4}$	20.00			30.00	30.00		
2	30.00	30.00		40.00	40.00		
$2\frac{1}{2}$	40.00			50.00	50.00		
3	50.00			60.00	60.00		
4	60.00						

Perfect Leather Fillet

For Pattern Makers, Founders and Machinists



Perfect Leather Fillet can be easily and quickly applied on single or compound curves, and on straight work, with a single operation; tacking, clamping and use of mitre box being dispensed with.

Is not affected by heat, cold or moisture, and is light, neat and durable.

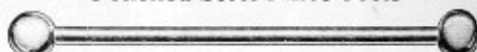
Cut with curved sides, geometrically correct, forming a perfect arc of a circle when in place.

Packed 100 feet in a bundle.

Price per 100 Feet

No.	Size of Radius, Ins.	Width of Flat Face, Ins.	Price per 100 Feet	No.	Size of Radius, Ins.	Width of Flat Face, Ins.	Price per 100 Feet
1	$\frac{1}{8}$	$\frac{3}{16}$	\$2.00	8	$\frac{1}{2}$	$\frac{3}{4}$	\$ 8.00
2	$\frac{3}{8}$	$\frac{1}{2}$	2.00	10	$\frac{3}{4}$	$\frac{1}{2}$	10.00
3	$\frac{1}{2}$	$\frac{3}{4}$	3.00	12	$1\frac{1}{4}$	$1\frac{1}{2}$	12.00
4	$\frac{3}{4}$	$1\frac{1}{4}$	4.00	14	$1\frac{3}{4}$	$1\frac{3}{4}$	14.00
5	$1\frac{1}{4}$	$1\frac{3}{4}$	5.00	16	2	$1\frac{3}{4}$	16.00
6	$1\frac{3}{4}$	2	6.00				

Polished Steel Fillet Tools



In applying leather fillet, a set of steel fillet tools is almost a necessity. They are not only used to press the fillet into position, but are perfect gauges as well.

Price List

No. 1, for $\frac{1}{8}$ and $\frac{1}{4}$	\$0.15
No. 2, for $\frac{3}{8}$ and $\frac{1}{2}$	.30
No. 3, for $\frac{1}{2}$ and $\frac{3}{4}$	.45
No. 4, for $\frac{3}{4}$ and $1\frac{1}{4}$	.60
Complete set	1.50

Brass Dowel Pins



Made of brass and threaded. They may be driven into place and removed any time by unscrewing. Being threaded, they can be removed from pattern for alteration or repair without injury. They do not swell like wood dowel pins and last much longer. They are made so that upper half of pattern frees itself easily. They produce good, smooth joints on castings. Manufacturers of fine machine tools use them exclusively.

Number	1	2	3	4	5
Fits hole, inches	$\frac{3}{16}$	$\frac{5}{16}$	$\frac{7}{16}$	$\frac{9}{16}$	$\frac{11}{16}$
Size pin, inches	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$
Price per 100 pair	\$5.00	\$7.00	\$11.00	\$16.00	\$22.00
Price per dozen pair	.80	1.15	1.75	2.65	3.60

Gyratory Foundry Riddle



It has the true gyratory sifting motion which gives it double the sifting capacity of any other foundry riddle of same size.

It is an all metal machine. The motor is fully enclosed and direct connected. All bearings are dust proof.

It is of rigid construction, compact and light in weight.

The sieve is 20 inches in diameter and is held in place by a special clamping device which enables the operator to remove, dump and replace it.

The motor is 1-6 horse power, making cost of current inappreciable.

It weighs only 90 pounds and is easily portable by one man. It can be suspended from any hook or support. Screw the plug into any lamp socket and it is ready for work wherever wanted.

It gyrates with a steady pull in one direction, no sudden stops and starts, no jars or jerks.

It will sift sand faster than one man can shovel and faster than ten men can sift with hand riddles.

There are no legs. A wheelbarrow can be run right under it, or it can be suspended over and sift right into the flask. Placed between two moulding machines it will supply both with plenty of sand.

Supplied with motor for 110 or 220 volt direct current, or 110 or 220 volt 25, 30 or 60 cycle alternating current.

Price for direct current \$134.00

Price for alternating current 147.00

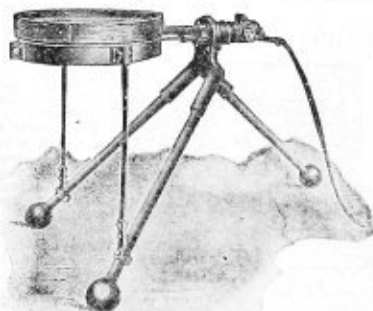
Foundry Riddles

Plain reinforced hardwood frame; two heavy wire bottom braces. Diameter, 18 inches; depth, 4 1/4 inches. Weight about 25 pounds per dozen. By "mesh" is meant the number of openings to the lineal inch. For example, 1 square inch of 4-mesh wire cloth contains 16 openings.

Steel and galvanized iron wire bottom riddles are furnished in 2, 4, 6, 8 and 10 mesh.

Brass wire bottom riddles are furnished in 2, 4, 6, 8, 10, 12, 14, 16, 18 and 20 mesh.

Style	Galv. Iron	Steel	Brass
Price per dozen	\$15.00	\$13.00	\$32.00
Price each	1.50	1.25	3.20

Chicago Pneumatic Sand Sifter
No. 1—For Foundries

Light weight and superior workmanship and construction. Weight 125 pounds.

Price \$75.00

No. 01 Machinists' Tool Chest



Made of chestnut with chestnut moldings and panels. It is fitted with a brass cylinder lock, drop handles, and a patent locking device which locks the drawers by the closing of the lid. Chest weighs about 30 pounds. Outside dimensions 20 7/8 inches long, 13 1/4 inches wide, 10 1/2 inches high. Inside dimensions are:

Receptacle under lid	18	x	10 1/4	x	3 1/2	in. deep
First drawer	16 1/2	x	9 3/4	x	1 1/2	in. deep
Second drawer	16 1/2	x	9 3/4	x	2 1/2	in. deep
Price each						\$7.25

No. 75 Machinists' Tool Chest

This case can be conveniently carried from place to place. Made of chestnut nicely finished. Has four drawers 17 1/2 x 6 1/2 inches wide, three of them 1 inch deep and one 3 1/4 inches deep. Fitted with brass Yale patent lock, leather handle, metal corners. Lid locks at bottom and when open can be slid back over the drawers like the lid of a sectional bookcase. Outside dimensions 19 1/4 x 9 x 11 inches high. Weight about 14 pounds.



Price each.....\$9.50

Carpenter's New Hand Tool Case



Made of well seasoned stock, nicely finished. Opens at the side as shown in illustration. Provided with brass lock, metal clasps and corners, saw rack for holding four saws, and partitioned tray for bits, chisels and small tools. Approximate weight 17 lbs.

No. 3. Size 26x7x12 inches.	Price each.....	\$7.25
No. 11. Size 32x7x12 inches.	Price each.....	7.50

Empty Carpenter's Tool Chests



Strongly made of hardwood, filled and varnished.

Each chest has two trays and a lock and key, a handsomely paneled lid and heavy band moldings. Ends are fitted with drop handles.

No. 260. Size 28x15x14 inches, weight 65 pounds crated.

Price each.....\$10.00

No. 260 1/2. Size 31x15x14, will take a 20-inch hand saw. Weight 70 lbs.

Price each.....\$12.50

No. 270. Size, 33x18x16 inches. Will take 28-inch saw. Weight about 100 pounds.

Price each.....\$15.00



No. 515 Machinists' Steel Tool Case

Finished with three coats black baked enamel. Brass Corbin two key notch lock. Genuine cowhide handles with steel core. Case will not swell, warp, crack, split, or go to pieces. Front slides under bottom drawer. Dimensions, 15 1/2 inches long by 7 inches wide by 12 1/2 inches high.

Price each.....\$14.00

Inside dimensions:

Till under lid	15 1/2	x	6 1/2	x	12 1/2
Large deep drawer	14 1/2	x	6 1/2	x	12 1/2
Large shallow drawer	14 1/2	x	6 1/2	x	11 1/2
Shoet deep drawer	6 1/2	x	6 1/2	x	11 1/2
Shoet shallow drawer	6 1/2	x	6 1/2	x	10 1/2

Kennedy Steel Kits

For electrical workers, mechanics, railroad men, construction men, repair men, installation men and contractors. Made of prepared steel but are no heavier than other bags and tool kits. Built to stand the wear and tear of hard usage. Re-enforced throughout, fitted with brass side catches, strong two-lumber Yale locks, steel leather covered handles and



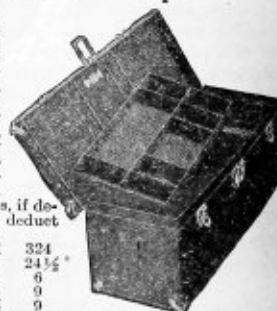
riveted so that they cannot pull out. Protected by solid brass corner irons. Finished in three coats baked enamel of brown or black, they present an appearance neat and attractive and look like leather traveling bags. Material, special construction and overlapping features make these kits wear-proof, waterproof, and weather proof. They are thief-proof because they can be locked and chained and cannot be cut open. Price, without tray, deduct \$0.35.

Number	114	116	118	120	122
Length, inches	14	16	18	20	22
Width, inches	7	9	10	11	11
Height, inches	9	11	13	13	13
Weight, pounds	5 1/2	6 1/2	7 1/2	8	11 1/2
Price each	\$4.25	\$4.50	\$4.75	\$5.00	\$5.25

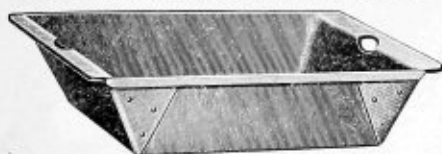
Electricians' Steel Grips

Designed to meet all the requirements of an electrician's tool kit and of the right size for carrying the average equipment. They have a divided opening at one end for blow torch and ledge rests at top of grip for tray to carry drills, bits, small parts, etc. They have ample space at bottom for heavy tools, material, etc. Fitted with loops at each end for straps, if desired. Price without tray, deduct \$0.35.

Style	319	321	324
Length, inches	19	21	24 1/2
Width, inches	8	8	6
Height, inches	9	9	9
Weight, lbs.	7 1/2	9 1/2	9
Price each	\$4.50	\$4.75	\$5.00



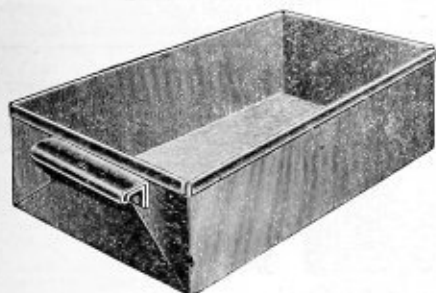
Steel Shop Pans or Taper Boxes



For use in machine shops and factories under machines for catching borings, also for handling small parts and castings. Made of heavy steel with handles attached. Corners heavily reinforced. Top edge is smooth finished and stiffened by one-half inch overlap. Handles are provided with holes for pull rod. All sides are tapered to nest.

No.	Price Each	Gauge of Steel	Dimensions, Inches			Weight, Lbs.
			Length	Width	Height	
118	\$2.25	18	22 1/8	11 1/8	6	10
116	2.50	16	22 1/8	11 1/8	6	12 1/2

Steel Tote Boxes



These boxes are heavily reinforced at ends and edges. Sides are formed around the ends and the handles are securely riveted through both thicknesses. Handles cannot cut or slip out of the fingers.

They are a durable and satisfactory means for handling small castings, machined parts, etc.

No.	Price Each	Gauge of Steel	Dimensions, Inches		
			Length	Width	Depth
420	\$2.50	18	17 1/8	11 1/8	4 7/8
426	3.00	18	17 1/8	11 1/8	7 1/4

Channon Steel Barrels



The bottoms of these barrels are cold drawn from one piece of steel. They lap the body and are closely riveted with machine driven rivets. We can furnish any size or style, but for general use we recommend our number 608 as illustrated.

Size, 18-inch diameter, 30-inch height. Sides of No. 16 gauge and bottom of No. 14 gauge sheet steel. Weight, approximately 45 pounds.

Price each.....\$9.25

Steel Tool Boxes



Light weight but strong. Cannot be pried open. Body formed from one piece of 18 gauge steel. Ends double folded. Top edge finished by forming one-half inch over lap. Cover is stamped from one piece 18 gauge steel and formed with one-half inch tight fitting flange. Handle lies flat in pocket. Hinges riveted on inside of cover for security and adds much to the appearance of the box. No projections or sharp corners to catch and scratch. Tray is formed in one piece and is 1 1/2-inch deep.

No.	Price Each	Length, Inches	Width, Inches	Height, Inches
71	\$3.00	18	6	6
72	3.00	19	5	5
73	3.50	19	7	6
74	4.00	20	7	6

Steel Bench Drawers



Made of heavy steel, securely riveted and welded. Sides reinforced at corners and edges. Front and back stiffened by rolling top and bottom edges. Impossible to jerk drawer from guides. Fitted with either Yale flat key lock or for padlock. Guide frame and guides formed in one piece, insuring an easy sliding drawer which will not bind or stick. Only eight wood screws are necessary to attach drawer to bench.

No.	Price Each	Dimensions, Inches			Weight, Pounds
		Length	Width	Depth	
81	\$4.00	20	12	4	14
82	4.25	22	12	4	16
83	4.50	22	12	5	17
84	4.75	24	14	4	19
85	5.00	28	14	5	22

Trays—Size 4x4 inches. Price each.....\$1.00
Trays—Size 9x4 inches. Price each.....1.10

Padlocks

Yale Pin Tumbler Padlocks



These locks are of unusually heavy bronze construction; the shackles are of steel, and are locked with two bolts, one engaging with either end of shackle. Being constructed with pin tumbler mechanism possess the greatest security and practically unlimited number of changes. Two keys furnished.

Any number up to 350 can be furnished with keys all different and all controlled by one master-key, or a number divided into groups, each group controlled by a master-key, and all controlled by one good master-key, no two padlocks having keys alike.

No. 830. As illustrated, with 5 pin tumblers.	
Price per dozen	\$28.80
Price each	2.85
No. 830½. Same as above, except with 9 inches No. 68 chain.	
Price per dozen	\$31.80
Price each	3.15
No. 850. 2-inch, same construction as No. 830.	
Price per dozen	\$43.70
Price each	4.35
No. 850½. Same as No. 850, except with 9 inches No. 8B Chain.	
Price per dozen	\$47.70
Price each	4.75
Prices for master-keying upon application.	

Yale Standard Padlocks

Made entirely of bronze metal. Into the hollow external case or shell is inserted, from the bottom, a filling block which carries the double acting lever tumblers, the bolt, the plunger, and all working parts, making the lock when assembled practically a solid block of bronze. The action of locking or unlocking is automatic. Each lock is furnished with two keys.



Number	823	833	853	863
Size, inches	1¼	1½	2	2½
Number of tumblers	3	5	4	4
Price per dozen	\$22.00	\$25.00	\$31.00	\$38.50
Price each	2.20	2.50	3.10	3.85

With 9 Inches of Chain

Number	823½	833½	853½	863½
Price per dozen	\$24.40	\$29.20	\$35.20	\$42.70
Price each	2.44	2.92	3.52	4.27



Yale Seamless Steel Padlock

No. 563. 1½-inch seamless steel padlock. Case steel, dull black finished shackle, steel, nickel-plated. Can be furnished with 48 changes. Three lever tumblers. Two nickel-plated flat keys with each lock.

Price per dozen	\$13.05
Price each	1.30

Yale Automobile or Motorcycle Padlocks

No. 2565. 2-inch seamless steel padlock, same as above, except with a shackle 6 inches long. This lock provides secure method of leaving a machine at the curb without fear of it being stolen or used without the owner's consent.

Price per dozen	\$19.85
Price each	2.00

Bronze Railway Switch Padlocks



For use on railway switches or other places where a strong, heavy brass lock is required. Made of cast brass throughout. Will not corrode, rust or stick as all working parts are made of brass. Key-hole is covered by an automatic drop, preventing rain or dirt from getting into the mechanism. There are 12 changes of tumblers to the dozen. Two keys and 9 inches of chain furnished regularly with each lock. When locks are desired for railway switches 15 inches of chain are usually required.

Locks are furnished rough or ground finish.

No. 5. Size 2-inch, with 9 inches of chain.	
Rough finish, per dozen	\$12.00
Price each	1.20
Ground finish, per dozen	13.00
Price each	1.30
No. 6. Size 2½-inch, with 9 inches of chain.	
Rough finish, per dozen	\$14.00
Price each	1.40
Ground finish, per dozen	15.00
Price each	1.50

These locks can also be furnished with 15 inches of chain.

Yale Monitor Padlocks



No. 8454. 2-inch seamless steel padlock. Four lever tumblers. Case and shackle dull black finish. Can furnish 144 changes. Two keys furnished.

Price per dozen	\$20.65
Price each	2.03

No. 8454½. Same as above, except with 9 inches chain.

Price per dozen	\$23.65
Price each	2.33

Brass and Steel Secure Lever Padlocks

Self-locking, cast spring shackle, 6 secure levers, all different in a dozen. Can be made with 149 changes to master keys. Made in three styles, as follows:

No. 4010. Steel, ivory black case.	
Price per dozen	\$7.00
Price each	.70
No. 4010I. Brass, buffed case.	
Price per dozen	\$16.00
Price each	1.60
No. 4010-C. Steel, ivory black case, heavy iron chain 9 inches long.	
Price per dozen	\$9.00
Price each	.90



Yale Wrought Padlocks



No. 671J. Size 1 inch. Two lever tumblers. Case made of steel, ivory black. Shackle of steel, bright finish. Can furnish 12 changes of keys. Two keys furnished.

Price per dozen	\$3.35
Price each	.34

No. 671J½. Same as above, except with 9 inches chain.

Price per dozen	\$3.75
Price each	.38

Padlocks

Security Combination Padlock



Has three number combination that affords more than 51,000 combinations, giving utmost security. Manufactured from only five pieces of solid milled brass.

No tumblers, rivets, springs, pins nor bolts, in fact, nothing to get out of order.

Absolutely non-rustable and non-freezable. Every lock is so carefully adjusted that no moisture can get into it. It is filled with an especially compounded lubricating fluid which will not freeze in winter nor rust in summer.

No. F.—For general purposes. Solid brass lock with steel case casing 1 3/4 inches diameter, 5/8-inch hasp. Inside measurements of hasp, 3/4 inch wide, 7/8 inch long. Weight, 5 1/2 ounces.

Price each \$1.45

No. E.—Dimensions and cut same as No. F, only made with steel case and hasp; working parts made of brass. Has brightly finished brass combination knob. Weight, 5 ounces.

Price each \$1.10

No. EE.—Automobile lock. Same as No. E, only has a 2-inch hasp. Weight, 6 ounces.

Price each \$1.25

No. EEE.—Automobile lock. Same as No. E, only has a 3-inch hasp. Weight, 6 1/2 ounces.

Price each \$1.25

No. AAS.—Motorcycle lock. All steel with brass working parts. Casing 1 3/4 inches diameter, 5/8-inch copperized steel bent hasp. Inside measurements of hasp, 1 1/2 inches wide, 6 1/2 inches long. Weight, 10 ounces.

Price each \$1.25

Mastodon Padlock

Steel, self-locking spring shackle, 8 secure levers and 2 double-bitted nickel-plated keys. Made regularly with 12 changes of keys. Also made with 780 changes, all different, to one master key, at an extra charge. Casing, 2 1/2-inch.



No.	Finish	Price		Wt. per Doz., Lbs.
		Each	Per Doz.	
4132	Bright	\$0.95	\$ 9.60	8 1/2
4132 H	Galv.	1.30	13.35	8 1/2

Cast Bronze

No. 04204



Self-locking, spring shackle, 3 secure levers, two keys. 3000 changes or 2500 changes with master keys.

Number 04204

Size, inches 2

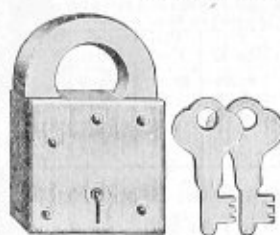
Weight dozen, pounds 5

Price each \$ 1.65

Price per dozen 16.50

Prices for padlocks with master keys will be quoted on application.

Padlock No. 4508*



Steel, self-locking. Spring shackle. Five secure levers. Two nickel-plated flat steel keys each. Twelve changes of keys. Can be made with 3000 changes of keys, all different, to master key at an extra charge. Casing 1 1/2-inches. Price each \$0.85 Price per dozen 8.70

No. 4010

Self-locking. Spring shackle. Six secure levers. Two double-bitted nickel plated keys each. Twelve changes of keys.

No.	Material	Price		Wt. per Doz., Lbs.
		Each	Per Doz.	
4010	Iron	\$0.70	\$ 7.05	5
04010	Brass	1.55	15.90	5



Cast Bronze No. 04230

Self-locking. Spring shackle. Two nickel-plated steel push keys each. Unlimited number of key changes. Casing, 2 1/4 inches. Six levers.



Price each \$ 1.90

Price dozen 19.20

No. 4180

Self-locking. Malleable iron spring shackle. Two secure levers. Three wards. Two nickel-plated flat steel keys each. Twelve changes of keys. Asterisk (*) after number denotes iron lock—ivory black case, brass plated finish. Double asterisk (**) denotes brass case, black nickel shackle.



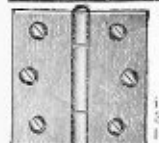
No.	Size, Inches	Price	
		Each	Dozen
4178*	1 1/4	\$0.25	\$ 2.70
04178**	1 1/4	.45	4.60
4179*	1 1/2	.25	2.85
04179**	1 1/2	.45	4.95
4180*	1 3/4	.30	3.30
04180**	1 3/4	.55	5.70
4181*	2	.40	4.05
04181**	2	.70	7.20
4163*	2 1/2	.50	5.40
04163**	2 1/2	1.00	10.35
4169*	3	.60	6.00
04169**	3	1.50	15.00

Wrought Steel Loose Pin Butts No. 731



Japanned wrought steel butts. Ball tips. Large sizes have five knuckles in joint; smaller sizes three. 2x2 and 2½x2½-inch, 3 pairs in a box with screws. Larger one pair in box.

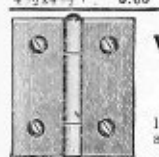
Size, Inches	Per Doz. Pr.	Per Pair	Screw Holes	Wt. per Pr., Oz.
2 x 2	\$1.70	\$0.17	4	5
2½ x 2½	2.00	.20	6	6
3 x 3	2.15	.22	6	9
3½ x 3½	2.40	.24	6	18
4 x 4	2.90	.29	8	22
4½ x 4½	4.00	.40	8	30



Wrought Steel Broad Butts No. 808

Broad bright steel fast joint butts. 3½x3½-inch have five knuckles, the smaller, three. 3½-inch and smaller packed 12 pair in a box, larger 6 pair in a box.

Size, Inches	Per Doz. Pair	Per Pair	Screw Holes	Size Screw	Wt. per Pair, Oz.
2 x 2	\$1.20	\$0.12	4	7	4
2½ x 2½	1.60	.16	6	8	5
3 x 3	2.40	.24	6	9	8
3½ x 3½	3.50	.35	6	10	16
4 x 4	4.30	.43	8	10	20
4½ x 4½	5.60	.56	8	11	30



Wrought Steel Narrow Butts No. 800

Bright steel narrow butts. 3-inch and larger have five knuckles in joint; the smaller sizes, three. Packed 12 pair in a box.

Length, inches.	1½	1½	1½	2	2½	3	3½	4
Per doz. pair	\$0.50	\$0.65	\$0.80	\$0.90	\$1.10	\$1.45	\$2.00	\$2.85
Per pair	.05	.07	.08	.09	.11	.15	.20	.29
Screw holes	4	4	4	4	6	6	6	8
Width, open	1½	1½	1½	1½	1½	2½	2½	2½
Weight per pair, ounces	2	2	2½	3	4½	6½	11	15



Light T-Hinges No. 904

Wrought steel light T-hinges. Suitable for light service.

Lgth. of Strap	Per Doz. Pair	Per Pair	Wd. Strap	Lgth. Joint	Wt. per Pr. Oz.
3	\$0.75	\$0.08	1½	2½	3½
4	.80	.08	1½	2½	5
5	1.00	.10	1½	3	6½
6	1.20	.12	1½	3½	8½

Heavy T-Hinges No. 906



Wrought steel heavy T-hinges. 1 gauge heavier than No. 904 and larger in dimensions.

Lgth. of Strap	Per Doz. Pair	Per Pair	Wd. Strap	Lgth. Joint	Wt. per Pr. Oz.
4	\$0.90	\$0.09	1½	3	6½
5	1.05	.11	1½	3½	9
6	1.25	.13	1½	3½	11½
8	1.55	.16	1½	4	16
10	2.30	.23	2	4½	25



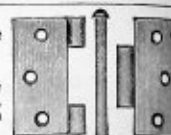
Wrought Steel Hasps No. 915

When hasp is locked, screw holes are concealed, preventing theft. Staple is movable to allow for shrinking of doors.

Lgth. of Strap, ins.	Price Doz.	Price Each	Width of Joint	No. of Screws	Wt. per Pr. Oz.
3	\$0.90	\$0.09	1½	7	4½
4½	1.20	.12	1½	7	5½
6	1.70	.17	1½	8	11½

Wrought Steel Reversible Butts No. 804

Bright steel reversible butts. Large sizes five knuckles in joint; smaller sizes, three. 3x3-inch and smaller, 12 pair in box. Larger 6 pair in box.



Size, Inches	Per Doz. Pr.	Per Pair	Screw Holes	Size Screw	Wt. per Pr. Oz.
2 x 2	\$1.40	\$0.14	4	7	4
2½ x 2½	1.80	.18	6	8	5
3 x 3	2.60	.26	6	9	9
3½ x 3½	3.80	.38	6	10	16
4 x 4	4.70	.47	8	10	20
4½ x 4½	6.50	.65	8	11	30

Light Strap Hinges



No. 900. Made of the best wrought steel.

Length Leaf, ins.	Per Doz. Pair	Per Pair	No. Screw	Width at Joint	Av. Weight per Pr., Oz.
3	\$0.85	\$0.10	6	1½	3
4	1.10	.11	7	1½	5½
5	1.35	.14	8	1½	8½
6	1.70	.17	9	1½	12
8	2.40	.24	10	1½	18

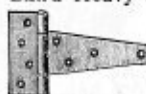
Heavy Strap Hinges



No. 902 Wrought Steel

Length Leaf, ins.	Per Doz. Pair	Per Pair	No. Screw	Width at Joint, ins.	Wt. Pair, Pounds
4	\$1.60	\$0.16	9	1½	2½
5	2.15	.22	10	1½	1½
6	2.80	.28	11	2½	1½
8	4.50	.45	12	3	2 6/5
10	6.80	.68	14	3½	4½
12	10.40	1.04	16	4	6½
14	12.20	1.22	16	4½	7½
16	14.00	1.40	16	4½	8½

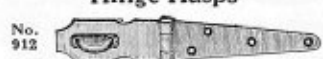
Extra Heavy T-Hinges No. 908



Extra heavy wrought steel T-hinges for heavy service. Type most commonly used.

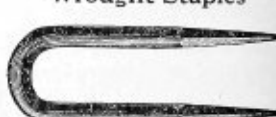
Lgth. of Strap	Per Doz. Pair	Per Pair	Wd. Strap	Lgth. Joint	Wt. per Pr. Oz.
5	\$2.45	\$0.25	1½	4	1½
6	3.00	.30	2½	4½	3½
8	5.00	.50	2½	5½	3
10	7.40	.74	3½	7	4½
12	10.70	1.07	3½	7½	6½
14	11.80	1.18	3½	7½	7
16	12.60	1.26	3½	7½	9

Hinge Hasps



Lgth. of Strap	Price Doz.	Price Each	Wd. Strap	No. of Screws	Wt. per Pr. Oz.
3	\$0.50	\$0.05	1½	6	2½
4½	.60	.06	1½	7	3½
6	.80	.08	1½	9	6½
8	1.05	.11	1½	10	10½
10	1.50	.15	2½	10	16½

Wrought Staples

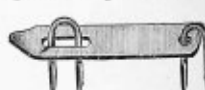


Size, Inches	Plain per Gr.	Size, Inches	Plain per Gross
1	\$1.20	2½	\$3.35
1½	1.20	3	3.20
1½	1.25	3½	3.70
1½	1.50	4	5.25
2	1.70		

Assorted

Sizes, ins. 1½ 1¾ 2 2½ 3
Price per gross, \$2.00

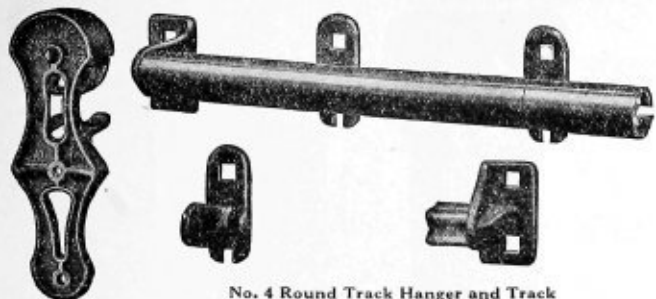
Wrought Hasp and Staples



No. 980

Size, inches	5	6	8	10
Price per dozen	\$0.90	\$1.00	\$1.30	\$2.00
Price each	.09	.10	.13	.20

The Channon Round Track Door Hangers



No. 4 Round Track Hanger and Track

No. 14 Hanger

It is made of the best refined malleable iron. The frame is in one solid piece, positively rigid and durable. The safety guard prevents derailment and insures the hanger remaining in position at all times.

The wheels are $3\frac{1}{2}$ -inch diameter, machine turned on tread, causing the hanger to run smoothly and are equipped with roller bearings.

The Track is a heavy steel tube with $\frac{3}{8}$ -inch slot in back for placing track brackets. The hollow tube with brackets properly spaced assures ample carrying capacity. Made in 6, 8 and 10-foot lengths. Brackets are of malleable iron and fit inside of track tightly. Hangers are packed one pair in carton with two end brackets and bolts for doors 2 inches thick and under.

No.	Description	Shipping Weight	List Price
14	Hanger.....	8 lbs. per pair.....	\$1.60 per pair
14	Track, brackets every two feet.....	115 lbs. per 100 feet.....	.14 per foot
14X	Track—without brackets.....	97 lbs. per 100 feet.....	.12 per foot
14C	Extra center brackets for track.....	40 lbs. per 100 feet.....	.06 each

Nos. 3 and 6 Warehouse Door Hangers and Track are the strongest and most durable made and are recommended for heavy doors, or doors subjected to rougher treatment than the No. 14 hanger and track are intended to carry. Hanger frames, lower wheels and track brackets are malleable iron. The hanger wheels are $4\frac{1}{4}$ inches in diameter and have steel roller bearings packed in graphite lubricant. The lower wheel prevents derailing and binding. The No. 6 hanger has a $2\frac{1}{4}$ -inch vertical and $1\frac{1}{2}$ -inch horizontal adjustment. The track is of the same type as for No. 14 hanger, except that it is much larger in diameter and of much heavier steel. Furnished in 6, 8 and 10-foot lengths. Brackets are also larger and heavier. Two end brackets and bolts for hangers furnished with each pair of hangers.

No. 3 hangers, non-adjustable, for doors $1\frac{1}{2}$ inches to $2\frac{1}{2}$ inches thick. Weight 20 pounds per pair. List price per pair.....\$4.20

No. 6 hangers, adjustable, for doors $1\frac{1}{2}$ inches to $3\frac{1}{2}$ inches thick. Weight 30 pounds. List price per pair.....\$6.00

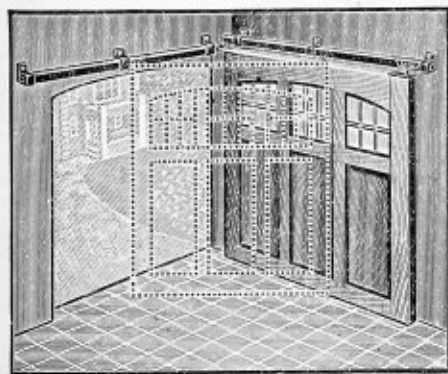
No. 3 track with brackets every two feet, for use with both No. 3 and No. 6 hangers, $1\frac{1}{2}$ inch diameter. Weight 225 pounds per 100 feet. List price per foot.....\$0.30

End and center brackets for Nos. 3 and 6 track, end 162, center 149 pounds per 100. Each \$0.20

Above equipment for parallel doors on application.



No. 6 Adjustable Hanger



Right Angle Door Hanger No. 235

Trolley Right Angle Door Hangers

Made in Two Sizes and Five Styles

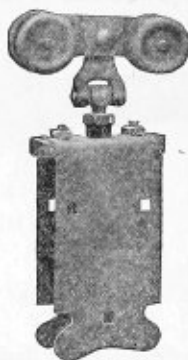
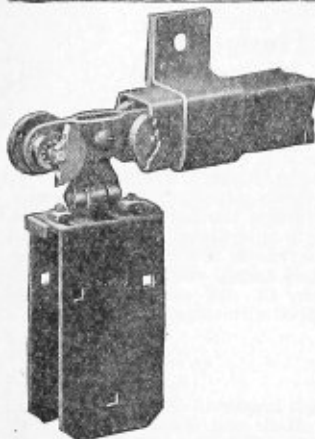
To use where, for lack of room, right angle doors are necessary. As shown above, track on side wall is set over track above the opening. This requires that the outer end hanger have an extra long pendant. Track over opening must be slotted part way through at point where pendant of rear hanger on door comes, when door is in closed position. Blue print showing erection details furnished with each order.

Directions for ordering: State size of opening; distance between jamb and side wall; if doors are single or double; if double, do they slide right and left, or both one way; distance door laps on jamb; always send sketch of door plan with above dimensions inserted.

Prices quoted upon application.

H. Channon Company Chicago

Trolley Track and Hangers



No. 63

No. 68

Hangers packed one pair in a box, including one center and two end brackets with lag screws for brackets and bolts for hangers

LIST PRICES

For Doors weighing up to 400 pounds and from 1 1/4 to 2 1/4 Inches Thick

No. 61 hangers, adjustable in and out. Weight 11 lbs. per pair. Price per pair.....	\$2.20
No. 63 hangers, adjustable in and out and up and down. Weight 11 lbs. per pair. Price per pair.....	2.20
No. 60X track, without brackets, 16 gauge. Weight 1 1/2 lbs. per foot. Price per foot.....	.18
No. 60C extra center brackets. List price, each.....	.18

For Doors up to 1000 lbs. and from 2 1/4 to 3 1/4 Inches Thick

This hanger has both vertical and lateral adjustments. The pendant is 12 inches long and the wheels 3 inches in diameter. Track is made of 13 gauge high carbon steel. Furnished in 6, 8 and 10-foot lengths. Brackets should be spaced about 30 inches apart for very heavy doors.

No. 68 hanger. Weight 20 lbs. per pair. List per pair.....	\$6.50
No. 67X track, without brackets. Weight 3 1/2 lbs. per foot. List per foot.....	.50
No. 67 brackets, end or center. List, each.....	.50

Trolley Parallel Door Brackets

If doors are to slide by each other use the parallel brackets shown here with tracks and hangers listed above. Brackets should be spaced about 30 inches apart for very heavy doors.

Nos. 60CD and 60ED parallel center and end side brackets for use with 60X track and 61 or 63 hangers. List price, each.....

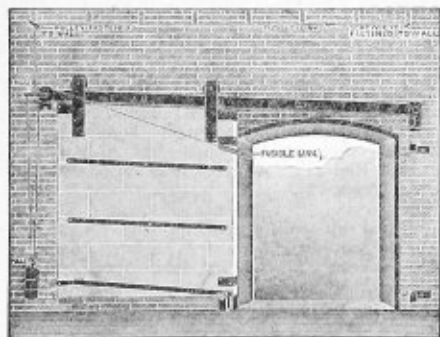
Nos. 60COD and 60EOD parallel center and end overhead brackets for use with 60X track and 61 or 63 hangers. List price, each.....

Nos. 67CD and 67ED parallel center and end side brackets for use with 67X track and 68 hangers. List price, each.....

Nos. 67COD and 67EOD parallel center and end overhead brackets for use with 67X track and 68 hangers. List price, each.....

No. 60COD parallel overhead center bracket same as above.

Nos. 60ED and 67ED same as CD and Nos. 60EOD and 67EOD same as COD, excepting they are end brackets and fitted with stop plates to prevent track from moving endwise.

No. 67CD
No. 67EDNo. 67COD
No. 67EOD

Fire Door Fixtures

Approved by National Board of Fire Underwriters

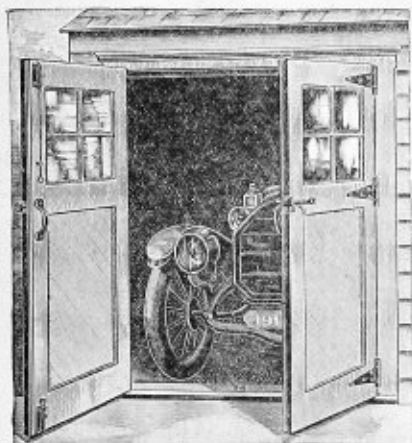
Showing manner of applying and arrangement of cord and fusible links. One link is constantly in opening exposed to both sides of doorway, the other above opening near ceiling. Fusing of either link releases weights and allows door to close. When doors are on both sides of wall, cord passes through wall and forms a similar arrangement, thus exposing four fusible links, the breaking of any one releasing weights which closes both doors. Special arrangement of cords to comply with insurance or other boards can be made.

In ordering state width of opening. Door must lap four inches on each side of opening.

Set includes hangers, track and fixtures complete with screws and bolts for attaching parts to door (excepting wall bolts) on one side of wall only. If doors are used on both sides, double sets will be required.

Prices quoted upon application.

Hardware for Garage Doors



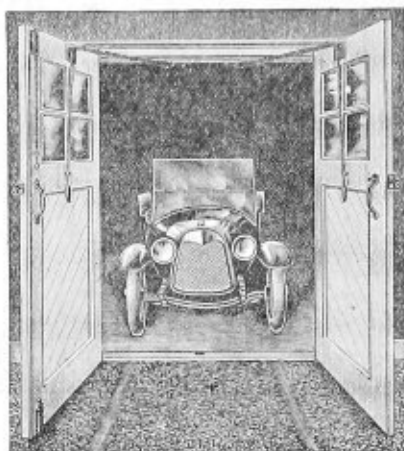
Door trimmed with Set 1776

Garage Door Set No. 1776

For Light Garage Doors

Comprises three pair No. 960 10-inch reversed pad extra heavy T hinges. One No. 1055 6-inch chain bolt with staples. One No. 1056 6-inch foot bolt including floor plate. One No. 1260 size 4 heavy thumb latch. One No. 1257 No. 4 heavy door handle.

Dead Black Finish Per Set \$4.00



Inside view of doors trimmed with Set 1777

For completely equipping medium or lighter weight Garage Doors

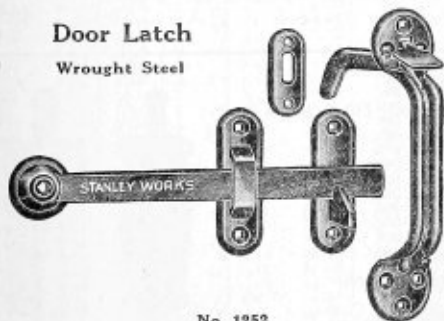
Garage Door Set No. 1777

Comprises two pair No. 960 16-inch reversed pad extra heavy T hinges. One pair No. 960, 12-inch reversed pad extra heavy T hinges. One pair No. 1774 garage door holders. One No. 1055 6-inch chain bolt with staples. One No. 1056 6-inch foot bolt including floor plate. One No. 1260 size 4 heavy thumb latch. One No. 1257 size 4 heavy door handle.

Dead Black Finish Per Set \$9.25

Door Latch

Wrought Steel



No. 1252

No. 1252 Extra Heavy Door Latch. These latches will not break and are consequently greatly superior to the old style cast iron latches. They have combination screw holes to permit the use of bolts and nuts and are countersunk for wood screws. Packed one in a box with screws. Handle is 10½ inches long.

Per dozen.....\$17.50

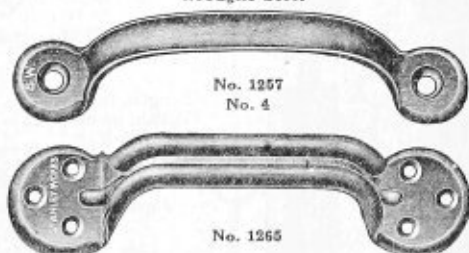
The escutcheon plate shown fits over the thumb latch on the outside of the door covering the hole and giving the latch a finished appearance.

No. 1257, Size 4 Heavy Door Handle or Pull for use on inside opposite door.
Per dozen.....\$33.00

No. 1265 Extra Heavy Door Handle matches No. 1252.
Per dozen.....\$5.00

Door Pulls

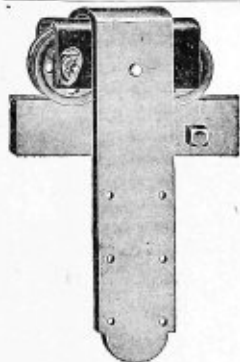
Wrought Steel



No. 1257
No. 4

No. 1265

H.Channon Company Chicago

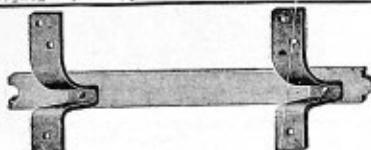


**Roller-Bearing
Barn and Ware-
house Hanger
No. 44**

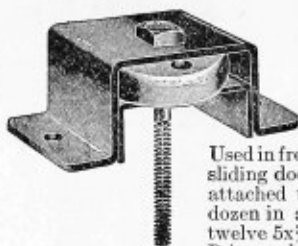
Runs on all standard rails. Made in four sizes and to suit doors of any size or weight. Nos. 1 and 2 packed one dozen pairs in a crate; Nos. 2½ and 3 packed one-half dozen pairs in a crate.

No.	Pendants, Inches	Diam. Wheels, Inches	Price per Dozen Pairs	Price per Pair
1	14x2¼x¾	3¼	\$20.00	\$2.00
2	16x3½x¾	3¾	30.00	3.00
2½	22x3½x¾	4	50.00	5.00
3	22x3½x¾	4½	70.00	7.00

**Steel
Barn
Door
Rail**



No.	Size, Inches	Wgt. per 100 Feet	Price per 100 Feet
61	¾x1	70 lbs.	\$ 7.50
63	¾x1¼	100 lbs.	10.00



**Steel Barn
Door Stay
Roller
No. 54**

Wheel is covered.

Used in freight houses and inside sliding doors where stay can be attached to floor. Packed one dozen in a box, complete with twelve 5x¾-inch lag bolts.

Price each.....\$0.35
Price per dozen.....3.00

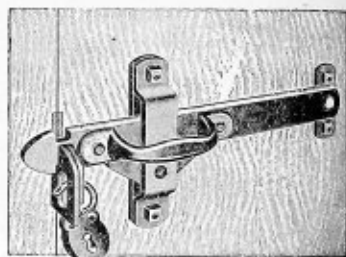
**Sliding
Door
Latch
No. 152**

Operated from other side of door.

For swing-
ing or sliding
doors.

Length of latch 13 inches, width 1½ inches, thickness ½ inch. For right or left doors. Combination lock and latch. Adjustable for doors of varying thickness. Weight per dozen, 65 pounds. Packed one dozen sets in a box.

Price each.....\$1.17
Price per dozen.....11.70



Fusible Link for Fire Doors

These links are furnished with fire door fixtures. They are adapted for use on all doors and windows which are constructed to close automatically by heat.

The links melt at a temperature of 160 degrees Fahrenheit.

No. 96 links. Price each.....\$0.30
No. 96½ links. Price each.....0.15



Chain Bolts

Japanned steel chain, 2½ inches. Diameter of bolt, ¾ inch.

No. 1055J

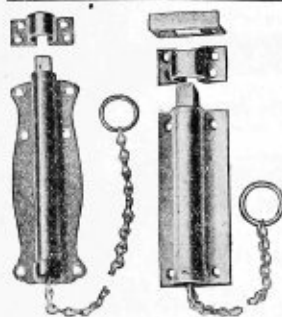
Length, inches.....6 10
Width, inches.....2 2½
Price each.....\$1.30 \$3.10

Foot Bolts

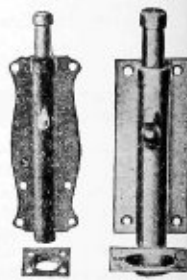
Japanned steel, diameter bolt, ¾ inch.

No. 1056J

Length, inches.....6 10
Width, inches.....2 2½
Price each.....\$1.30 \$3.10



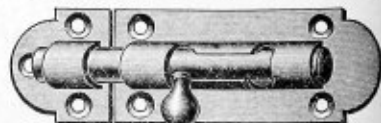
Scroll Square
No. 1055J



Scroll Square
No. 1056J

Sizes, inches.....	2	2½	3	4	5	6
Weight, per dozen, lbs.....	1	1½	2½	3	5	5½
Price per dozen.....	\$1.50	\$1.65	\$2.10	\$2.35	\$2.75	\$3.20

Sizes, inches.....	4	5	6	8
Weight per dozen, pounds.....	4½	6	7½	16
Price per dozen.....	\$2.70	\$3.30	\$3.70	\$7.10



No. 1078 Light No. 1084 Heavy.
Wrought Steel Japanned Plate, Polished
Bolt, Brass Knob, with Strike.

Spring Cotters

All Measurements Made Under the Eye



Our spring cotters are perfectly made and will run at least 10% better than any others because of superior heading and pointing and the fact that they are hand inspected and all culls, dirt and imperfect cotters thrown out.

Size, Ins.	Price per 1000	Quantity in Package	Approx. Wgt. per 1000	Size, Ins.	Price per 1000	Quantity in Package	Approx. Wgt. per 1000
			lbs. ozs.				lbs. ozs.
$\frac{3}{8} \times 1 \frac{1}{2}$	\$ 3.50	1000	9	$\frac{3}{8} \times 1 \frac{1}{2}$	\$ 7.00	1000	4 6
$\frac{3}{8} \times 1 \frac{3}{4}$	3.50	1000	11	$\frac{3}{8} \times 1 \frac{3}{4}$	8.15	1000	7 10
$\frac{3}{8} \times 1 \frac{1}{2}$	3.50	1000	13	$\frac{3}{8} \times 1 \frac{1}{2}$	9.30	1000	7 0
$\frac{3}{8} \times 1 \frac{1}{2}$	3.50	1000	13	$\frac{3}{8} \times 1 \frac{1}{2}$	10.45	1000	8 5
$\frac{3}{8} \times 1 \frac{1}{2}$	4.15	1000	13	$\frac{3}{8} \times 1 \frac{1}{2}$	11.60	1000	9 5
$\frac{3}{8} \times 1 \frac{1}{2}$	4.15	1000	14	$\frac{3}{8} \times 1 \frac{1}{2}$	12.75	1000	9 13
$\frac{3}{8} \times 1 \frac{1}{2}$	4.15	1000	14	$\frac{3}{8} \times 1 \frac{1}{2}$	13.90	500	10 14
$\frac{3}{8} \times 1 \frac{1}{2}$	4.15	1000	14	$\frac{3}{8} \times 1 \frac{1}{2}$	15.05	500	13 8
$\frac{3}{8} \times 1 \frac{1}{2}$	4.80	1000	1	$\frac{3}{8} \times 1 \frac{1}{2}$	16.20	500	14 0
$\frac{3}{8} \times 1 \frac{1}{2}$	4.80	1000	1	$\frac{3}{8} \times 1 \frac{1}{2}$	8.00	1000	5 8
$\frac{3}{8} \times 1 \frac{1}{2}$	4.80	1000	1	$\frac{3}{8} \times 1 \frac{1}{2}$	9.30	1000	6 11
$\frac{3}{8} \times 1 \frac{1}{2}$	5.45	1000	1	$\frac{3}{8} \times 1 \frac{1}{2}$	10.60	1000	8 1
$\frac{3}{8} \times 1 \frac{1}{2}$	5.45	1000	1	$\frac{3}{8} \times 1 \frac{1}{2}$	11.90	1000	9 7
$\frac{3}{8} \times 1 \frac{1}{2}$	6.10	1000	1	$\frac{3}{8} \times 1 \frac{1}{2}$	13.20	1000	11 2
$\frac{3}{8} \times 1 \frac{1}{2}$	6.10	1000	1	$\frac{3}{8} \times 1 \frac{1}{2}$	14.50	1000	12 5
$\frac{3}{8} \times 1 \frac{1}{2}$	6.75	1000	1	$\frac{3}{8} \times 1 \frac{1}{2}$	15.80	500	14 0
$\frac{3}{8} \times 1 \frac{1}{2}$	6.75	1000	2	$\frac{3}{8} \times 1 \frac{1}{2}$	17.10	500	15 6
$\frac{3}{8} \times 1 \frac{1}{2}$	7.40	1000	2	$\frac{3}{8} \times 1 \frac{1}{2}$	18.40	500	16 12
$\frac{3}{8} \times 1 \frac{1}{2}$	8.05	1000	2	$\frac{3}{8} \times 1 \frac{1}{2}$	11.10	1000	8 0
$\frac{3}{8} \times 1 \frac{1}{2}$	8.70	1000	2	$\frac{3}{8} \times 1 \frac{1}{2}$	12.80	1000	9 5
$\frac{3}{8} \times 1 \frac{1}{2}$	9.35	500	3	$\frac{3}{8} \times 1 \frac{1}{2}$	14.50	1000	10 10
$\frac{3}{8} \times 1 \frac{1}{2}$	10.00	500	3	$\frac{3}{8} \times 1 \frac{1}{2}$	16.20	1000	13 8
$\frac{3}{8} \times 1 \frac{1}{2}$	10.65	500	3	$\frac{3}{8} \times 1 \frac{1}{2}$	17.90	500	14 4
$\frac{3}{8} \times 1 \frac{1}{2}$	11.30	500	3	$\frac{3}{8} \times 1 \frac{1}{2}$	19.60	500	16 8
$\frac{3}{8} \times 1 \frac{1}{2}$	3.50	1000	11	$\frac{3}{8} \times 1 \frac{1}{2}$	21.30	500	17 10
$\frac{3}{8} \times 1 \frac{1}{2}$	3.50	1000	14	$\frac{3}{8} \times 1 \frac{1}{2}$	23.00	500	20 0
$\frac{3}{8} \times 1 \frac{1}{2}$	3.50	1000	14	$\frac{3}{8} \times 1 \frac{1}{2}$	24.70	500	21 2
$\frac{3}{8} \times 1 \frac{1}{2}$	3.50	1000	1	$\frac{3}{8} \times 1 \frac{1}{2}$	26.40	500	22 14
$\frac{3}{8} \times 1 \frac{1}{2}$	4.15	1000	1	$\frac{3}{8} \times 1 \frac{1}{2}$	28.10	1000	10 0
$\frac{3}{8} \times 1 \frac{1}{2}$	4.15	1000	1	$\frac{3}{8} \times 1 \frac{1}{2}$	14.00	1000	12 0
$\frac{3}{8} \times 1 \frac{1}{2}$	4.15	1000	1	$\frac{3}{8} \times 1 \frac{1}{2}$	15.00	1000	12 14
$\frac{3}{8} \times 1 \frac{1}{2}$	4.80	1000	1	$\frac{3}{8} \times 1 \frac{1}{2}$	16.00	1000	15 10
$\frac{3}{8} \times 1 \frac{1}{2}$	4.80	1000	1	$\frac{3}{8} \times 1 \frac{1}{2}$	20.00	500	20 0
$\frac{3}{8} \times 1 \frac{1}{2}$	5.45	1000	1	$\frac{3}{8} \times 1 \frac{1}{2}$	22.00	500	20 8
$\frac{3}{8} \times 1 \frac{1}{2}$	5.45	1000	2	$\frac{3}{8} \times 1 \frac{1}{2}$	24.00	500	22 10
$\frac{3}{8} \times 1 \frac{1}{2}$	6.10	1000	2	$\frac{3}{8} \times 1 \frac{1}{2}$	26.00	500	24 11
$\frac{3}{8} \times 1 \frac{1}{2}$	6.75	1000	2	$\frac{3}{8} \times 1 \frac{1}{2}$	28.00	250	26 13
$\frac{3}{8} \times 1 \frac{1}{2}$	7.40	1000	2	$\frac{3}{8} \times 1 \frac{1}{2}$	30.00	250	28 14
$\frac{3}{8} \times 1 \frac{1}{2}$	8.05	1000	3	$\frac{3}{8} \times 1 \frac{1}{2}$	18.00	500	15 7
$\frac{3}{8} \times 1 \frac{1}{2}$	8.70	1000	3	$\frac{3}{8} \times 1 \frac{1}{2}$	20.80	500	17 3
$\frac{3}{8} \times 1 \frac{1}{2}$	9.35	1000	4	$\frac{3}{8} \times 1 \frac{1}{2}$	23.60	500	20 15
$\frac{3}{8} \times 1 \frac{1}{2}$	10.00	1000	4	$\frac{3}{8} \times 1 \frac{1}{2}$	26.40	500	20 4
$\frac{3}{8} \times 1 \frac{1}{2}$	10.65	1000	4	$\frac{3}{8} \times 1 \frac{1}{2}$	29.20	250	25 3
$\frac{3}{8} \times 1 \frac{1}{2}$	11.30	1000	4	$\frac{3}{8} \times 1 \frac{1}{2}$	32.00	250	27 10
$\frac{3}{8} \times 1 \frac{1}{2}$	4.15	1000	2	$\frac{3}{8} \times 1 \frac{1}{2}$	34.80	250	30 1
$\frac{3}{8} \times 1 \frac{1}{2}$	4.80	1000	2	$\frac{3}{8} \times 1 \frac{1}{2}$	37.60	250	32 8
$\frac{3}{8} \times 1 \frac{1}{2}$	5.45	1000	2	$\frac{3}{8} \times 1 \frac{1}{2}$	40.40	250	34 15
$\frac{3}{8} \times 1 \frac{1}{2}$	6.10	1000	2	$\frac{3}{8} \times 1 \frac{1}{2}$	43.20	500	17 13
$\frac{3}{8} \times 1 \frac{1}{2}$	6.75	1000	4	$\frac{3}{8} \times 1 \frac{1}{2}$	23.50	500	20 8
$\frac{3}{8} \times 1 \frac{1}{2}$	7.40	1000	4	$\frac{3}{8} \times 1 \frac{1}{2}$	27.00	500	23 0
$\frac{3}{8} \times 1 \frac{1}{2}$	8.05	1000	4	$\frac{3}{8} \times 1 \frac{1}{2}$	30.50	500	26 8
$\frac{3}{8} \times 1 \frac{1}{2}$	8.70	1000	2	$\frac{3}{8} \times 1 \frac{1}{2}$	34.00	250	29 0
$\frac{3}{8} \times 1 \frac{1}{2}$	9.35	1000	3	$\frac{3}{8} \times 1 \frac{1}{2}$	37.50	250	32 8
$\frac{3}{8} \times 1 \frac{1}{2}$	10.00	1000	3	$\frac{3}{8} \times 1 \frac{1}{2}$	41.00	250	35 0
$\frac{3}{8} \times 1 \frac{1}{2}$	10.65	1000	3	$\frac{3}{8} \times 1 \frac{1}{2}$	44.50	250	36 4
$\frac{3}{8} \times 1 \frac{1}{2}$	11.30	1000	4	$\frac{3}{8} \times 1 \frac{1}{2}$	48.00	250	40 2
$\frac{3}{8} \times 1 \frac{1}{2}$	7.00	1000	5	$\frac{3}{8} \times 1 \frac{1}{2}$	51.50	250	43 1
$\frac{3}{8} \times 1 \frac{1}{2}$	7.75	1000	5	$\frac{3}{8} \times 1 \frac{1}{2}$	55.00	250	46 0
$\frac{3}{8} \times 1 \frac{1}{2}$	8.50	1000	6	$\frac{3}{8} \times 1 \frac{1}{2}$	58.50	250	48 15
$\frac{3}{8} \times 1 \frac{1}{2}$	9.25	1000	6	$\frac{3}{8} \times 1 \frac{1}{2}$	62.00	150	51 13
$\frac{3}{8} \times 1 \frac{1}{2}$	10.00	1000	7	$\frac{3}{8} \times 1 \frac{1}{2}$	65.50	500	29 8
$\frac{3}{8} \times 1 \frac{1}{2}$	10.75	1000	7	$\frac{3}{8} \times 1 \frac{1}{2}$	69.00	250	34 1
$\frac{3}{8} \times 1 \frac{1}{2}$	11.50	1000	8	$\frac{3}{8} \times 1 \frac{1}{2}$	72.50	250	38 0
$\frac{3}{8} \times 1 \frac{1}{2}$	12.25	1000	8	$\frac{3}{8} \times 1 \frac{1}{2}$	76.00	250	41 0
$\frac{3}{8} \times 1 \frac{1}{2}$	13.00	1000	9	$\frac{3}{8} \times 1 \frac{1}{2}$	79.50	250	44 0
$\frac{3}{8} \times 1 \frac{1}{2}$	13.75	1000	9	$\frac{3}{8} \times 1 \frac{1}{2}$	83.00	250	47 0
$\frac{3}{8} \times 1 \frac{1}{2}$	14.50	1000	10	$\frac{3}{8} \times 1 \frac{1}{2}$	86.50	250	50 0
$\frac{3}{8} \times 1 \frac{1}{2}$	15.25	1000	10	$\frac{3}{8} \times 1 \frac{1}{2}$	90.00	250	53 0
$\frac{3}{8} \times 1 \frac{1}{2}$	16.00	1000	11	$\frac{3}{8} \times 1 \frac{1}{2}$	93.50	250	56 0
$\frac{3}{8} \times 1 \frac{1}{2}$	16.75	1000	11	$\frac{3}{8} \times 1 \frac{1}{2}$	97.00	250	59 0
$\frac{3}{8} \times 1 \frac{1}{2}$	17.50	1000	12	$\frac{3}{8} \times 1 \frac{1}{2}$	100.50	250	62 0
$\frac{3}{8} \times 1 \frac{1}{2}$	18.25	1000	12	$\frac{3}{8} \times 1 \frac{1}{2}$	104.00	250	65 0
$\frac{3}{8} \times 1 \frac{1}{2}$	19.00	1000	13	$\frac{3}{8} \times 1 \frac{1}{2}$	107.50	250	68 0
$\frac{3}{8} \times 1 \frac{1}{2}$	19.75	1000	13	$\frac{3}{8} \times 1 \frac{1}{2}$	111.00	250	71 0
$\frac{3}{8} \times 1 \frac{1}{2}$	20.50	1000	14	$\frac{3}{8} \times 1 \frac{1}{2}$	114.50	250	74 0
$\frac{3}{8} \times 1 \frac{1}{2}$	21.25	1000	14	$\frac{3}{8} \times 1 \frac{1}{2}$	118.00	250	77 0
$\frac{3}{8} \times 1 \frac{1}{2}$	22.00	1000	15	$\frac{3}{8} \times 1 \frac{1}{2}$	121.50	250	80 0
$\frac{3}{8} \times 1 \frac{1}{2}$	22.75	1000	15	$\frac{3}{8} \times 1 \frac{1}{2}$	125.00	250	83 0
$\frac{3}{8} \times 1 \frac{1}{2}$	23.50	1000	16	$\frac{3}{8} \times 1 \frac{1}{2}$	128.50	250	86 0
$\frac{3}{8} \times 1 \frac{1}{2}$	24.25	1000	16	$\frac{3}{8} \times 1 \frac{1}{2}$	132.00	250	89 0
$\frac{3}{8} \times 1 \frac{1}{2}$	25.00	1000	17	$\frac{3}{8} \times 1 \frac{1}{2}$	135.50	250	92 0
$\frac{3}{8} \times 1 \frac{1}{2}$	25.75	1000	17	$\frac{3}{8} \times 1 \frac{1}{2}$	139.00	250	95 0
$\frac{3}{8} \times 1 \frac{1}{2}$	26.50	1000	18	$\frac{3}{8} \times 1 \frac{1}{2}$	142.50	250	98 0
$\frac{3}{8} \times 1 \frac{1}{2}$	27.25	1000	18	$\frac{3}{8} \times 1 \frac{1}{2}$	146.00	250	101 0
$\frac{3}{8} \times 1 \frac{1}{2}$	28.00	1000	19	$\frac{3}{8} \times 1 \frac{1}{2}$	149.50	250	104 0
$\frac{3}{8} \times 1 \frac{1}{2}$	28.75	1000	19	$\frac{3}{8} \times 1 \frac{1}{2}$	153.00	250	107 0
$\frac{3}{8} \times 1 \frac{1}{2}$	29.50	1000	20	$\frac{3}{8} \times 1 \frac{1}{2}$	156.50	250	110 0
$\frac{3}{8} \times 1 \frac{1}{2}$	30.25	1000	20	$\frac{3}{8} \times 1 \frac{1}{2}$	160.00	250	113 0
$\frac{3}{8} \times 1 \frac{1}{2}$	31.00	1000	21	$\frac{3}{8} \times 1 \frac{1}{2}$	163.50	250	116 0
$\frac{3}{8} \times 1 \frac{1}{2}$	31.75	1000	21	$\frac{3}{8} \times 1 \frac{1}{2}$	167.00	250	119 0
$\frac{3}{8} \times 1 \frac{1}{2}$	32.50	1000	22	$\frac{3}{8} \times 1 \frac{1}{2}$	170.50	250	122 0
$\frac{3}{8} \times 1 \frac{1}{2}$	33.25	1000	22	$\frac{3}{8} \times 1 \frac{1}{2}$	174.00	250	125 0
$\frac{3}{8} \times 1 \frac{1}{2}$	34.00	1000	23	$\frac{3}{8} \times 1 \frac{1}{2}$	177.50	250	128 0
$\frac{3}{8} \times 1 \frac{1}{2}$	34.75	1000	23	$\frac{3}{8} \times 1 \frac{1}{2}$	181.00	250	131 0
$\frac{3}{8} \times 1 \frac{1}{2}$	35.50	1000	24	$\frac{3}{8} \times 1 \frac{1}{2}$	184.50	250	134 0
$\frac{3}{8} \times 1 \frac{1}{2}$	36.25	1000	24	$\frac{3}{8} \times 1 \frac{1}{2}$	188.00	250	137 0
$\frac{3}{8} \times 1 \frac{1}{2}$	37.00	1000	25	$\frac{3}{8} \times 1 \frac{1}{2}$	191.50	250	140 0
$\frac{3}{8} \times 1 \frac{1}{2}$	37.75	1000	25	$\frac{3}{8} \times 1 \frac{1}{2}$	195.00	250	143 0
$\frac{3}{8} \times 1 \frac{1}{2}$	38.50	1000	26	$\frac{3}{8} \times 1 \frac{1}{2}$	198.50	250	146 0
$\frac{3}{8} \times 1 \frac{1}{2}$	39.25	1000	26	$\frac{3}{8} \times 1 \frac{1}{2}$	202.00	250	149 0
$\frac{3}{8} \times 1 \frac{1}{2}$	40.00	1000	27	$\frac{3}{8} \times 1 \frac{1}{2}$	205.50	250	152 0
$\frac{3}{8} \times 1 \frac{1}{2}$	40.75	1000	27	$\frac{3}{8} \times 1 \frac{1}{2}$	209.00	250	155 0
$\frac{3}{8} \times 1 \frac{1}{2}$	41.50	1000	28	$\frac{3}{8} \times 1 \frac{1}{2}$	212.50	250	158 0
$\frac{3}{8} \times 1 \frac{1}{2}$	42.25	1000	28	$\frac{3}{8} \times 1 \frac{1}{2}$	216.00	250	161 0
$\frac{3}{8} \times 1 \frac{1}{2}$	43.00	1000	29	$\frac{3}{8} \times 1 \frac{1}{2}$	219.50	250	164 0
$\frac{3}{8} \times 1 \frac{1}{2}$	43.75	1000	29	$\frac{3}{8} \times 1 \frac{1}{2}$	223.00	250	167 0
$\frac{3}{8} \times 1 \frac{1}{2}$	44.50	1000	30	$\frac{3}{8} \times 1 \frac{1}{2}$	226.50	250	170 0
$\frac{3}{8} \times 1 \frac{1}{2}$	45.25	1000	30	$\frac{3}{8} \times 1 \frac{1}{2}$	230.00	250	173 0
$\frac{3}{8} \times 1 \frac{1}{2}$	46.00	1000	31	$\frac{3}{8} \times 1 \frac{1}{2}$	233.50	250	176 0
$\frac{3}{8} \times 1 \frac{1}{2}$	46.75	1000	31	$\frac{3}{8} \times $			

H. Channon Company Chicago



Assorted Spring Cotters

For the convenience of our customers, we pack spring cotters in four special assortments as listed below.

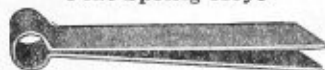
Assortments Nos. 1, 2 and 3 are especially adapted for agricultural trade and Assortment No. 5 for automobile trade.

Each assortment is packed in a neat cardboard box, 12 boxes to the carton.

Price per Box

Asst. No.	Contains	Price	Asst. No.	Contains	Price
1	100 Cotters—10 each of the following: $\frac{3}{8} \times 1 \frac{1}{4}$ — $\frac{3}{8} \times 1 \frac{1}{2}$ $\frac{3}{8} \times 1 \frac{3}{4}$ — $\frac{3}{8} \times 1 \frac{1}{2}$ $\frac{3}{8} \times 1 \frac{1}{2}$ — $\frac{3}{8} \times 2$ $\frac{3}{8} \times 2$ — $\frac{3}{8} \times 2 \frac{1}{2}$	\$4.00	3	25 Cotters—3 each of the following: $\frac{3}{8} \times \frac{3}{4}$ — $\frac{3}{8} \times 1$ — $\frac{3}{8} \times 1 \frac{1}{4}$ $\frac{3}{8} \times 1 \frac{1}{4}$ — $\frac{3}{8} \times 2$ And 2 each: $\frac{3}{8} \times 1 \frac{1}{2}$ — $\frac{3}{8} \times 1 \frac{3}{4}$ — $\frac{3}{8} \times 2$ — $\frac{3}{8} \times 2 \frac{1}{2}$	\$1.60
2	50 Cotters—5 each of the following: $\frac{3}{8} \times 1 \frac{1}{4}$ — $\frac{3}{8} \times 1 \frac{1}{2}$ — $\frac{3}{8} \times 1 \frac{3}{4}$ — $\frac{3}{8} \times 2$ $\frac{3}{8} \times 2$ — $\frac{3}{8} \times 2 \frac{1}{2}$	\$2.25	5	100 Cotters: 10 each— $\frac{3}{8} \times \frac{3}{4}$ — $\frac{3}{8} \times 1$ — $\frac{3}{8} \times 1 \frac{1}{4}$ 20 each— $\frac{3}{8} \times 1 \frac{1}{4}$ — $\frac{3}{8} \times 1 \frac{1}{2}$ 15 each— $\frac{3}{8} \times \frac{3}{4}$ — $\frac{3}{8} \times 1 \frac{1}{4}$ 10 each— $\frac{3}{8} \times \frac{3}{4}$ — $\frac{3}{8} \times 1 \frac{1}{4}$	\$3.40

Flat Spring Keys



Size, Inches	Price per 1000	Approx. Weight per 1000, Pounds	Size, Inches	Price per 1000	Approx. Weight per 1000, Pounds
$\frac{3}{8} \times 1 \frac{1}{4}$	\$39.00	17	$\frac{3}{8} \times 1 \frac{3}{4}$	\$ 78.00	43
$\frac{3}{8} \times 1 \frac{1}{2}$	44.50	21	$\frac{3}{8} \times 2$	84.50	45
$\frac{3}{8} \times 1 \frac{3}{4}$	50.00	26	$\frac{3}{8} \times 2 \frac{1}{4}$	91.00	50
$\frac{3}{8} \times 2$	55.50	29	$\frac{3}{8} \times 2 \frac{1}{2}$	97.00	55
$\frac{3}{8} \times 2 \frac{1}{4}$	61.00	31	$\frac{3}{8} \times 2 \frac{3}{4}$	104.00	58
$\frac{3}{8} \times 2 \frac{1}{2}$	66.50	33	$\frac{3}{8} \times 3$	110.50	62
$\frac{3}{8} \times 2 \frac{3}{4}$	72.00	37	$\frac{3}{8} \times 3 \frac{1}{4}$	117.00	65
$\frac{3}{8} \times 3$	77.50	39	$\frac{3}{8} \times 3 \frac{1}{2}$	123.50	70
$\frac{3}{8} \times 1 \frac{1}{4}$	52.00	35	$\frac{3}{8} \times 2$	104.00	50
$\frac{3}{8} \times 1 \frac{1}{2}$	58.00	38	$\frac{3}{8} \times 2 \frac{1}{4}$	111.00	57
$\frac{3}{8} \times 1 \frac{3}{4}$	64.00	42	$\frac{3}{8} \times 2 \frac{1}{2}$	118.00	63
$\frac{3}{8} \times 2$	70.00	44	$\frac{3}{8} \times 2 \frac{3}{4}$	125.00	65
$\frac{3}{8} \times 2 \frac{1}{4}$	76.00	46	$\frac{3}{8} \times 3$	132.00	69
$\frac{3}{8} \times 2 \frac{1}{2}$	82.00	48	$\frac{3}{8} \times 3 \frac{1}{4}$	139.00	73
$\frac{3}{8} \times 2 \frac{3}{4}$	88.00	51	$\frac{3}{8} \times 3 \frac{1}{2}$	146.00	77
$\frac{3}{8} \times 3$	94.00	55			

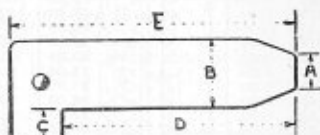
Furnished in bulk.

Flat Riveted Keys



Used largely by railroads and car builders. Made of two pieces of flat steel (8, 10, 12, 14, 16 and 18-gauge) riveted together. Sixty-five different sizes and patterns. Prices and special catalogue upon application.

In ordering, give dimensions as indicated in sketch below and total thickness of two pieces.



Gib Head Square Machine Keys

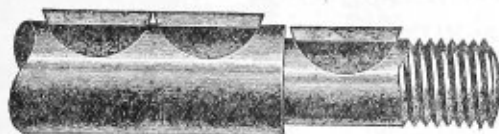
Made of high grade steel, finished and ground accurately to size. Star* indicates stock sizes. Machine keys of special taper and dimensions furnished, with or without gib head. Regular taper $\frac{1}{8}$ -inch to the foot.

Price per Hundred

Length Under Head in Inches	Thickness Under Head, Inches													Length Under Head in Inches
	$\frac{3}{8}$	$\frac{7}{16}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1	$1 \frac{1}{8}$	$1 \frac{1}{4}$	$1 \frac{1}{2}$	$1 \frac{3}{4}$	2	$2 \frac{1}{2}$	
1	\$ 9.10	\$ 9.25	\$ 9.50	\$10.00	\$11.00	\$12.50	\$14.50	\$17.00	\$20.00	\$23.50				1
1 $\frac{1}{2}$	9.70	*9.90	10.20	10.75	11.90	13.55	15.80	18.60	21.95	25.90	\$30.35			1 $\frac{1}{2}$
2	10.30	10.55	*10.90	11.50	12.80	14.60	17.10	20.20	23.90	28.30	33.20	\$44.55		2
2 $\frac{1}{2}$	10.90	11.20	11.60	*12.25	13.70	15.65	18.40	21.80	25.55	30.70	36.05	48.55	\$63.20	2 $\frac{1}{2}$
3	11.50	11.85	12.30	13.00	*14.60	16.70	19.70	23.40	27.80	33.10	38.90	52.55	68.60	3
3 $\frac{1}{2}$	12.10	12.50	13.00	13.75	15.50	*17.75	21.00	25.00	29.75	35.50	41.75	56.55	74.00	3 $\frac{1}{2}$
4	12.70	13.15	13.70	14.50	16.40	18.80	*22.30	26.50	31.70	37.90	44.60	60.55	79.40	4
4 $\frac{1}{2}$	13.30	13.80	14.40	15.25	17.30	19.85	23.60	*28.20	33.65	40.30	47.45	64.55	84.80	4 $\frac{1}{2}$
5	13.90	14.45	15.10	16.00	18.20	20.90	24.90	29.30	*35.60	42.70	50.30	68.55	90.20	5
5 $\frac{1}{2}$			15.80	16.75	19.10	21.95	26.20	31.40	37.55	45.10	53.15	72.55	95.60	5 $\frac{1}{2}$
6			16.50	17.50	20.00	23.00	27.50	33.00	39.50	47.50	*56.00	76.55	101.00	6
6 $\frac{1}{2}$				18.25	20.90	24.05	28.80	34.60	41.45	49.90	58.85	80.55	106.40	6 $\frac{1}{2}$
7				19.00	21.80	25.10	30.10	36.20	43.40	52.30	61.70	*84.55	111.80	7
7 $\frac{1}{2}$					22.70	26.15	31.40	37.80	45.35	54.70	64.55	88.55	117.20	7 $\frac{1}{2}$
8					23.60	27.20	32.70	39.40	47.30	57.10	67.40	92.55	*122.60	8
8 $\frac{1}{2}$					24.50	28.25	34.00	41.00	49.25	59.50	70.25	96.55	128.00	8 $\frac{1}{2}$
9						29.30	35.30	42.60	51.20	61.90	73.10	100.55	133.40	9
9 $\frac{1}{2}$						30.35	36.60	44.20	53.15	64.30	75.95	104.55	138.80	9 $\frac{1}{2}$
10						31.40	37.90	45.80	55.10	66.70	78.80	108.55	144.20	10

* Sizes Carried in Stock.

Woodruff Patent Steel Machine Keys



Packed 100 in a Box—Price Full Box per 100

Key and Cutter Nos.	Size of Keys and Cutters, in Inches	Price of Keys per 100 Regular Steel	Key and Cutter Nos.	Size of Keys and Cutters, in Inches	Price of Keys per 100 Regular Steel
1	$\frac{1}{2} \times \frac{1}{4}$	\$0.88	16	$1\frac{1}{2} \times \frac{3}{4}$	\$1.75
2	$\frac{1}{2} \times \frac{3}{8}$	.90	17	$1\frac{1}{2} \times \frac{1}{2}$	1.78
3	$\frac{1}{2} \times \frac{1}{2}$	.93	18	$1\frac{1}{2} \times \frac{3}{8}$	1.82
4	$\frac{1}{2} \times \frac{3}{4}$	.94	C	$1\frac{1}{2} \times \frac{1}{2}$	1.89
5	$\frac{1}{2} \times \frac{1}{2}$	.97	19	$1\frac{1}{2} \times \frac{3}{8}$	2.06
6	$\frac{1}{2} \times \frac{3}{4}$	.99	20	$1\frac{1}{2} \times \frac{1}{2}$	2.10
7	$\frac{1}{2} \times \frac{1}{2}$	1.03	21	$1\frac{1}{2} \times \frac{3}{8}$	2.14
8	$\frac{1}{2} \times \frac{3}{4}$	1.06	D	$1\frac{1}{2} \times \frac{1}{2}$	2.21
9	$\frac{1}{2} \times \frac{1}{2}$	1.09	E	$1\frac{1}{2} \times \frac{3}{8}$	2.29
10	$\frac{1}{2} \times \frac{3}{4}$	1.29	22	$1\frac{1}{2} \times \frac{1}{2}$	2.40
11	$\frac{1}{2} \times \frac{1}{2}$	1.32	23	$1\frac{1}{2} \times \frac{3}{8}$	2.47
12	$\frac{1}{2} \times \frac{3}{4}$	1.34	F	$1\frac{1}{2} \times \frac{1}{2}$	2.55
A	$\frac{1}{2} \times \frac{1}{2}$	1.37	24	$1\frac{1}{2} \times \frac{3}{8}$	2.63
13	$1 \times \frac{1}{2}$	1.50	25	$1\frac{1}{2} \times \frac{1}{2}$	2.72
14	$1 \times \frac{3}{4}$	1.53	G	$1\frac{1}{2} \times \frac{3}{8}$	2.81
15	$1 \times \frac{1}{2}$	1.55	129	$2\frac{1}{2} \times \frac{3}{8}$	2.21
B	$1 \times \frac{3}{4}$	1.61	V	$2\frac{1}{2} \times \frac{1}{2}$	3.60

Woodruff Keys

Assorted Sizes



This assortment contains 100 of the most commonly used keys for automobile, transmission and machine use. All Woodruff keys are made of carbon steel. They have been carefully selected as to the most popular sizes. Price per box.....\$3.00

Steel Taper Pins

Taper One-Quarter Inch
to the Foot
Packed 100 in a box
Price per 100



Diameter at Large End	.156	.172	.193	.219	.250	.289	.341	.409	.492	.591	.706
Approximate Fractional Sizes	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	$1\frac{1}{8}$	$1\frac{1}{4}$	$1\frac{1}{2}$	$1\frac{3}{4}$	$2\frac{1}{4}$
Number	0	1	2	3	4	5	6	7	8	9	10
$\frac{3}{4}$	\$1.80	\$2.00	\$2.10	\$2.30	\$2.50	\$2.75	\$3.00	\$3.25	\$3.75		
1	2.05	2.25	2.35	2.55	2.75	3.00	3.25	3.50	4.00	\$ 4.65	
$1\frac{1}{4}$	2.30	2.50	2.60	2.80	3.00	3.25	3.50	4.00	4.50	5.40	\$ 7.00
$1\frac{1}{2}$	2.55	2.75	2.85	3.05	3.25	3.50	3.75	4.25	4.75	5.80	7.50
$1\frac{3}{4}$	2.80	3.00	3.10	3.30	3.50	3.75	4.00	4.50	5.00	6.25	8.00
2		3.25	3.35	3.55	3.75	4.05	4.35	4.75	5.25	6.50	8.50
$2\frac{1}{4}$			3.60	3.80	4.00	4.40	4.75	5.25	5.75	7.00	9.25
$2\frac{1}{2}$				4.05	4.25	4.75	5.20	5.75	6.25	7.50	9.75
$2\frac{3}{4}$				4.30	4.50	5.10	5.70	6.25	6.75	8.00	10.25
3				4.55	4.75	5.45	6.25	6.75	7.25	8.50	10.75
$3\frac{1}{4}$							6.75	7.25	7.75	9.00	11.25
$3\frac{1}{2}$							7.25	7.75	8.25	9.50	11.75
$3\frac{3}{4}$							7.75	8.25	8.75	10.00	12.25
4							8.25	8.75	9.25	10.50	12.75
$4\frac{1}{4}$									10.80	12.00	14.25
$4\frac{1}{2}$									11.40	12.60	14.75
$4\frac{3}{4}$										13.00	15.25
5										14.00	16.25
$5\frac{1}{4}$										15.40	17.25
$5\frac{1}{2}$										16.10	18.25
$5\frac{3}{4}$										16.80	19.25
6											20.25

Order by number and length.

Taper Pin Assortment

- No. 1. Assortment contains 50 taper pins, Nos. 0 to 4, lengths $\frac{3}{4}$ to $1\frac{3}{4}$ inches. Price.....\$1.50
 No. 2. Assortment contains 100 taper pins, Nos. 0 to 6, lengths up to 3 inches. Price.....4.50

Hammer handles are priced on another page—see index.

Slotted Rivets

Copper Plated



No. 151

No. 151 Slotted Clinch Rivets. Oval Head, $\frac{1}{8}$ -inch Diameter, Body $\frac{10}{64}$ -inch Diameter.

Length, inch.....	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$
Per carton of 12 boxes of 50 each.....	\$0.43	\$0.45	\$0.48	\$0.52	\$0.52
Per box of 1000.....	.77	.77	.77	.87	.87
Length, inch.....	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$
Per carton of 12 boxes of 50 each.....	\$0.52	\$0.57	\$0.57		
Per box of 1000.....	.87	.97	.97	\$1.07	\$1.07

In assorted lengths from $\frac{1}{4}$ to $\frac{1}{2}$ -inch:

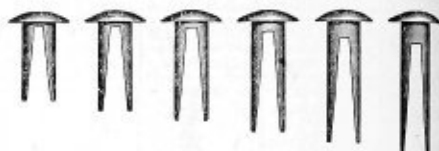
1 carton (12 boxes) 50 rivets, each.....	\$0.43
1 carton (12 boxes) 100 rivets, each.....	.60

No. 208

No. 208 Slotted Clinch Rivets, Oval Head, $\frac{3}{8}$ -inch Diameter, Body $\frac{1}{4}$ -inch Diameter

In assorted lengths from $\frac{1}{2}$ to $\frac{3}{4}$ -inch.

1 carton (12 boxes) 100 rivets, each.....	\$2.25
-------------------------------------------	--------



No. 208

Copper Plated



No. 213

No. 213

Slotted clinch rivets. Oval head, $\frac{1}{4}$ -inch diameter, body $\frac{1}{4}$ -inch diameter. Packed 1000 of any one length to the box.

Lengths, inch.....	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{3}{4}$
Price per 1000.....	\$1.62	\$1.62	\$1.87	\$1.87	\$2.12	\$2.12
Lengths, in.....	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$
Price per 1000.....	\$2.37	\$2.37	\$2.62	\$2.62	\$2.87	

Brake Band Slotted Rivets

Same style as No. 151 shown above. Solid brass. Packed 1000 in box.

Price per 1000, $\frac{1}{8}$ -inch.....	\$2.50	$\frac{1}{4}$ -inch.....	\$3.00	$\frac{3}{8}$ -inch.....	\$4.00
------------------------------------------	--------	--------------------------	--------	--------------------------	--------

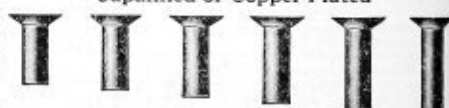
Flat head, $\frac{1}{8}$ -inch diameter, body $\frac{3}{8}$ -inch diameter.

Length, inch.....	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{3}{4}$
Per carton of 12 boxes of 50 each.....	\$0.68	\$0.68	\$0.68	\$0.72	\$0.78	
Per carton of 12 boxes of 100 each.....	1.25	1.25	1.25	1.35	1.45	
Per box of 1000.....	.95	.95	.95	1.05	1.15	
Length, inch.....	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{3}{4}$
Per carton of 12 boxes of 50 each.....	\$0.86	\$0.94	\$1.00	\$1.08	\$1.16	
Per carton of 12 boxes of 100 each.....	1.60	1.75	1.85	1.95	2.05	
Per box of 1000.....	1.25	1.35	1.45	1.55	1.65	

In assorted lengths from $\frac{1}{2}$ to $\frac{1}{2}$ -inch:	
1 carton (12 boxes) 50 rivets, each.....	\$0.45
1 carton (12 boxes) 100 rivets, each.....	.80

No. 253 Tubular Rivets

Japanned or Copper Plated



No. 253

Pony Riveting Machine



Made of malleable iron with case-hardened steel working parts. Black japan finish, trimmed in gold. Takes either tubular or slotted rivets.

The "Pony" adjusts itself automatically to the different lengths of rivets. The "Best Yet" takes rivets up to $\frac{1}{2}$ -inch without adjustment.

Price each, Pony.....	\$2.00
Price each, Best Yet.....	2.50

Best Yet Riveting Machine



Copper Belt Rivets and Burrs



Packed
with Burrs
in One-
Pound
Papers

Price per Pound in any of the Following Sizes

1/4, 5/16, 3/8, 7/16, 1/2, 5/8, 3/4, 7/8, 1, 1 1/8, 1 1/4, 1 1/2, 1 3/4, 2			
No. 12	\$0.58	No. 7	\$0.49
No. 10	.54	No. 6	.49
No. 9	.52	No. 5	.49
No. 8	.50		

Assorted 3/8 to 3/4-inch. In 1-lb. Papers

Number.....	8	9	10	12
Price.....	\$0.53	\$0.55	\$0.57	\$0.61

Approximate Number of Copper Rivets and Burrs to the Pound

Wire		$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{7}{16}$	$\frac{1}{2}$	$\frac{5}{8}$	Burrs	
No. 7	.....	272	250	228	180	164	160	345
No. 8	.....	276	248	208	200	178	172	390
No. 9	.....	340	280	272	248	228	220	610
No. 10	.....	544	418	384	340	304	300	716
No. 12	.....	588	512	452	404	364	334	985
No. 13	.....	996	852	532	440	400		1630
Wire		$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	1	$1\frac{1}{8}$	$1\frac{1}{4}$	$1\frac{1}{2}$	Burrs
No. 7	148	112	116	100	84	80	69	345
No. 8	152	136	110	104	96	84	72	390
No. 9	184	176	156	136				610
No. 10	272	238	204					716
No. 12	304	272						985

Copper Burrs

Number.....	4	5	6	7	8
Outside diam., ins.....	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{7}{16}$	$\frac{1}{2}$
Hole.....	$\frac{1}{8}$	$\frac{3}{16}$	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$
Price per pound.....	\$0.49	\$0.49	\$0.49	\$0.49	\$0.50
Number.....	9	10	12		
Outside diameter, inches.....	$\frac{9}{16}$	1	$1\frac{1}{8}$		
Hole.....	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$		
Price per pound.....	\$0.52	\$0.54	\$0.58		

Swedes Iron Burrs

Black Finish

Price per Pound in 1-lb. Packages

Number or size.....	3/8	1/2	5/8	1	1 1/8	1 1/4	1 1/2
Outside diameter.....	3/8	1/2	5/8	1	1 1/8	1 1/4	1 1/2
Price per pound.....	\$0.36	\$0.36	\$0.36	\$0.36	\$0.36	\$0.36	\$0.36
Number.....	4	5	6	7	8	9	10
Outside diameter.....	1/2	5/8	3/4	7/8	1	1 1/8	1 1/4
Price per pound.....	\$0.37	\$0.38	\$0.42	\$0.42	\$0.43	\$0.44	\$0.44
Number.....	9	10	11	12	13	14	15
Outside diameter.....	1 1/8	1 1/4	1 1/2	1 3/4	2	2 1/8	2 1/4
Price per pound.....	\$0.45	\$0.47	\$0.50	\$0.60	\$0.70	\$0.80	\$0.80
Tinned, extra, per pound, net.....							\$0.04



Upholsters' Tacks



Size, Oz.	Length, In.	Price, per Lb.	Per 25-Lb. Box
2	4/16	\$0.24	\$5.75
2 1/2	5/16	.21	5.00
3	6/16	.18	4.25
4	7/16	.16	3.70
6	8/16	.15	3.50
8	9/16	.14	3.25
10	10/16	.14	3.25
12	11/16	.13	3.00
14	12/16	.13	3.00
16	13/16	.13	3.00

Bill Posters' or Railroad Tacks



Size, Oz.	Length, In.	Price, per Lb.	Per 25-Lb. Box
4	7/16	\$0.15	\$3.50
6	8/16	.14	3.25
8	9/16	.13	3.00

Copper Tacks



Packed in 1-pound Papers

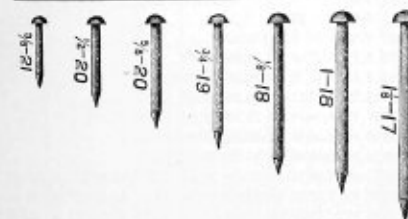
Length, Inches	Price per Pound	Length, Inches	Price per Pound
3/4	\$1.00	5/8	\$0.85
7/8	.95	3/4	.80
1 1/2	.90	1	.75

Brass Escutcheon Pins

Brass escutcheon pins are extensively used as rivets. They are the only brass pins readily obtainable from stock.

Price per Pound

Inch	3/8	1/2	5/8	3/4	7/8	1	1 1/8	1 1/4	1 1/2
No. 10.....	\$0.75	\$0.73	\$0.72	\$0.71	\$0.70	\$0.69	\$0.68	\$0.67	\$0.66
11.....	.76	.74	.73	.72	.71	.70	.69	.68	.67
12.....	.77	.75	.74	.73	.72	.71	.70	.69	.68
13.....	.78	.76	.75	.74	.73	.72	.71	.70	.69
14.....	\$0.83	.80	.77	.76	.75	.74	.73	.72	.71
15.....	.85	.82	.78	.77	.76	.75	.74	.73	.72
16.....	.90	.85	.82	.80	.78	.76	.75	.74	.74
17.....	1.00	.92	.89	.87	.85	.83	.81	.80	.80
18.....	1.10	1.00	.96	.94	.92	.90	.90	.90	.92
19.....	1.20	1.15	1.10	1.05	1.00	1.00	1.03	1.03	1.05
20.....	1.35	1.25	1.20	1.15	1.10	1.10	1.15	1.15	1.15

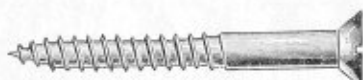


H.Channon Company Chicago

Iron Wood Screws

Flat Head—Bright Finish

Round Head—Blue Finish



Price per Gross. One Gross in a Box

No.	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	20	22	24	26	28	30
1/4-inch	\$0.72	\$0.72	\$0.72	\$0.72	\$0.72	\$0.75	\$0.78	\$0.82	\$0.88	\$0.94															
3/8-inch	.72	.72	.72	.72	.75	.78	.80	.84	.90	.96	\$1.05	\$1.10	\$1.20												
1/2-inch		.72	.72	.72	.75	.78	.82	.86	.92	.98	1.07	1.12	1.20	\$1.25	\$1.30										
5/8-inch			.72	.75	.78	.82	.85	.90	.95	1.00	1.10	1.15	1.25	1.35	1.50	\$1.65	\$1.80								
3/4-inch			.74	.78	.82	.85	.90	.94	1.00	1.05	1.15	1.25	1.35	1.45	1.55	1.75	2.00								
1-inch				.80	.84	.87	.92	.98	1.05	1.10	1.20	1.30	1.40	1.60	1.70	2.00	2.50	\$2.70	\$2.80	\$3.50					
1 1/4-inch				.88	.92	.98	1.05	1.10	1.15	1.20	1.30	1.40	1.55	1.70	1.90	2.15	2.30	2.75	3.30	4.00	\$4.80	\$5.40			
1 1/2-inch				.98	1.05	1.10	1.15	1.20	1.30	1.35	1.40	1.50	1.65	1.80	2.00	2.35	2.80	3.20	3.80	4.30	5.10	5.90			
1 3/4-inch					1.30	1.35	1.45	1.50	1.55	1.60	1.70	1.80	2.00	2.25	2.60	2.90	3.50	4.00	4.50	5.20	6.00				
2-inch					1.45	1.50	1.55	1.60	1.65	1.75	1.85	2.00	2.20	2.45	2.75	3.10	3.70	4.20	4.80	5.50	6.40				
2 1/4-inch					1.55	1.60	1.65	1.75	1.85	1.95	2.05	2.20	2.35	2.65	3.10	3.50	3.85	4.55	5.30	6.10	6.90				
2 1/2-inch					1.90	2.00	2.10	2.20	2.30	2.40	2.50	2.60	2.70	2.90	3.30	3.65	4.20	4.70	5.80	6.70	7.50				
2 3/4-inch					2.40	2.60	2.70	2.80	2.90	3.00	3.10	3.20	3.30	3.40	3.50	3.60	3.90	4.50	5.00	6.10	7.20	8.50			
3-inch					2.95	3.00	3.05	3.10	3.15	3.20	3.30	3.40	3.50	3.60	3.80	4.20	4.80	5.50	6.50	7.50	8.70	\$10.50			
3 1/4-inch							3.90	4.00	4.10	4.20	4.30	4.40	4.50	4.75	4.95	5.40	6.15	7.30	8.70	10.20	12.00				
4-inch							4.90	5.10	5.20	5.30	5.40	5.60	5.90	6.20	6.50	7.00	7.60	8.60	9.70	11.20	14.00	\$16.00	\$18.50		
4 1/4-inch											7.00	7.20	7.60	7.95	8.15	8.60	9.15	9.85	11.20	13.50	16.00	18.50	21.00		
5-inch											8.10	8.30	8.60	9.10	9.70	10.10	11.00	11.50	13.00	15.00	18.00	21.00	24.00		
6-inch											10.00	10.30	11.00	11.60	12.40	13.00	14.50	16.00	18.00	20.00	23.00	27.00	30.00		

Brass Wood Screws

Flat Head

Round Head



Price per Gross. One Gross in a Box

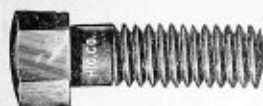
No.	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	20	22	24	26	28	30
1/4-inch	\$0.84	\$0.84	\$0.88	\$0.92	\$0.97	\$1.04																			
3/8-inch	.84	.87	.92	.97	1.04	1.12	\$1.20	\$1.35	\$1.50																
1/2-inch		.92	.96	1.02	1.08	1.20	1.30	1.45	1.65	\$1.90	\$2.15														
5/8-inch		.96	1.00	1.08	1.15	1.30	1.40	1.60	1.85	2.10	\$2.65	\$3.00	\$3.35	\$3.70	\$4.10	\$4.55	\$5.00								
3/4-inch		1.12	1.18	1.25	1.30	1.55	1.75	2.00	2.30	2.65	3.00	3.35	3.70	4.10	4.55	5.00	5.60								
1-inch		1.40	1.50	1.55	1.60	1.65	1.90	2.20	2.50	2.90	3.35	3.70	4.10	4.55	5.00	5.60									
1 1/4-inch			1.65	1.70	1.75	1.80	2.10	2.45	2.80	3.15	3.65	4.10	4.55	5.05	5.60										
1 1/2-inch			2.10	2.20	2.25	2.35	2.65	2.85	3.20	3.50	4.10	4.65	5.35	5.85	6.55	7.20	\$7.85	9.35	\$10.45						
1 3/4-inch				2.95	3.05	3.10	3.20	3.30	3.65	4.25	4.65	5.35	5.95	6.65	7.60	8.35	9.15	10.85	12.65	\$14.50					
2-inch							3.95	4.00	4.10	4.20	4.70	5.35	6.05	6.70	7.35	8.65	9.50	10.45	12.40	14.50	\$16.85	\$18.90			
2 1/4-inch						5.15	5.20	5.25	5.30	5.40	6.15	6.85	7.55	8.45	9.75	10.70	11.70	13.90	16.30	18.90	\$21.00				
2 1/2-inch							6.85	6.95	7.05	7.25	7.90	8.80	9.80	10.75	11.90	13.00	15.40	18.00	20.95	23.30					
2 3/4-inch								9.40	9.50	9.60	9.70	9.85	10.75	11.85	13.00	14.30	16.95	19.85	23.00	25.50					
3-inch									11.50	11.65	11.80	11.95	12.10	12.25	13.00	14.20	15.65	18.40	21.60	25.00	28.00				
3 1/4-inch									13.70	13.85	14.00	14.10	14.30	14.60	15.40	16.80	19.95	23.40	27.10	31.15	\$35.85	\$41.15	\$47.45		
3 1/2-inch									15.85	16.00	16.15	16.30	16.45	16.60	17.70	19.40	22.75	26.90	31.20	35.80	41.20	47.45	54.55		
4-inch											18.60	18.80	19.00	19.25	20.35	22.30	26.90	30.80	35.00	40.70	47.35	54.55	62.70		
4 1/4-inch											22.60	22.80	23.40	24.05	25.75	30.90	35.40	41.40	46.80	54.40	62.70	72.15			
5-inch															26.90	29.60	35.50	40.70	47.60	53.30	62.60	72.15	82.95		
6-inch																31.60	34.05	40.80	46.80	54.75	61.90	72.95	82.95	92.95	

Hexagon and Square Head Cap Screws

"V" or "U. S." Std. Form of Thread

Price Full Box, Per 100

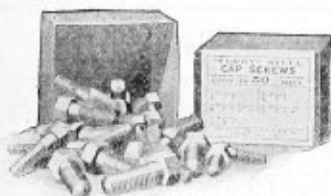
Length is measured from under head to extreme point of screw.



Diameter of Screw	1/4	5/16	3/8	7/16	1/2	5/8	3/4	7/8	1	1 1/4	1 1/2
Threads to Inch	20	18	16	14	12-13	12	11	10	9	8	7
Diameter of Square Head	3/8	1/2	5/8	3/4	1	1 1/4	1 1/2	1 3/4	2	2 1/4	2 1/2
Diameter of Hexagon Head	3/8	1/2	5/8	3/4	1	1 1/4	1 1/2	1 3/4	2	2 1/4	2 1/2
Length under Head to Extreme Point	3/8	1/2	5/8	3/4	1	1 1/4	1 1/2	1 3/4	2	2 1/4	2 1/2
1	\$3.00	\$3.25	\$3.75	\$4.50	\$5.70	\$	\$	\$	\$	\$	\$
1 1/8	3.15	3.40	3.90	4.70	5.80						
1 1/4	3.25	3.50	4.00	4.90	5.90	9.25	9.25				
1 1/2	3.50	3.75	4.25	5.30	6.50	9.50	9.50	12.50			
1 3/4	3.75	4.00	4.50	5.70	7.10	10.00	10.00	13.50	18.400		
2	4.00	4.25	4.85	6.10	7.70	10.75	10.75	14.50	19.70	22.75	
2 1/8	4.25	4.50	5.20	6.60	8.30	11.50	11.50	15.50	21.00	25.00	34.00
2 1/4	4.70	5.35	5.55	7.15	8.90	12.60	12.60	16.50	22.40	27.25	36.75
2 1/2	5.25	5.80	6.00	7.50	9.50	13.60	13.60	17.50	23.70	29.50	39.50
3	5.75	6.30	6.85	8.40	10.70	14.40	14.40	19.00	25.00	31.75	42.25
3 1/8	6.25	6.80	7.20	9.15	11.60	15.20	15.20	20.60	26.40	34.00	45.00
3 1/4				9.75	12.30	16.00	16.00	22.10	28.20	36.25	47.75
3 1/2				10.50	13.10	17.30	17.30	23.70	30.00	38.50	50.50
4				11.10	13.90	18.60	18.60	25.30	31.80	40.75	53.25
4 1/8						19.90	19.90	26.90	33.60	43.00	56.00
4 1/4						21.20	21.20	28.50	35.40	45.25	58.75
4 1/2						22.60	22.60	30.10	37.20	47.50	61.50
5								31.70	39.00	49.75	64.25
									40.80	52.00	67.00
										67.00	80.50

Sizes above heavy line packed 100 in a box, below 50 in a box.

Assortments



50 S. A. E. Standard Cap Screws

Length	1	1 1/4	1 1/2	1 3/4	2	2 1/4	2 1/2
Diameter	Number of Screws						
1/4	3	3	3	4			
5/16	3	4	4	3			
3/8		3	3	3	3	3	3
1/2			3	3	3	3	3

Price per box \$3.50

50 Hexagon Head Cap Screws U. S. Std. Thread

Length	1/2	3/4	1	1 1/4	1 1/2
Diameter	Number of Screws				
1/4	3	3	4		
5/16		4	4		
3/8		7	6	3	3
1/2		2	2	2	4
5/8			3	4	4

Price per box \$3.75

100 Cup Point Set Screws U. S. Std. Thread

Length	1/2	3/4	1	1 1/4	1 1/2	1 3/4	2
Diameter	Number of Screws						
1/4	3	3	3	3			
5/16	3	3	3	3			
3/8	3	10	10	10	5		
1/2	3	3	3	3	3		
5/8		5	8	5	5	3	3

Price per box \$3.50

S. A. E. Standard Hexagon Head

Cap Screws



Price, Full Box, Per 100

Diam. Head	3/8	1/2	5/8	3/4	7/8	1	1 1/4	1 1/2
Length Head	1 1/8	1 1/4	1 1/2	1 3/4	2	2 1/4	2 1/2	2 3/4
Threads to inch	28	24	24	20	20	18	18	16
Diam. Screw	1/4	5/16	3/8	1/2	5/8	3/4	1	1 1/4
1/4	\$3.45	\$4.10	\$4.70	\$6.50	\$7.00			
5/16	3.65	4.30	4.90	6.60	7.20			
3/8	3.85	4.50	5.10	6.80	7.40			
1/2	4.10	4.80	5.35	7.25	8.15	\$11.80		
5/8	4.40	5.10	5.65	8.00	8.90	12.50	\$14.70	\$16.90
3/4	4.70	5.45	6.05	8.65	9.65	13.45	15.80	18.15
1	5.00	6.05	6.50	9.25	10.40	14.40	16.90	19.40
1 1/4	5.30	6.70	6.95	10.05	11.15	15.75	18.20	20.65
1 1/2	5.65	7.25	7.50	10.65	11.90	17.00	19.45	21.90
2	6.20	7.90	8.30	11.25	12.60	18.00	20.90	23.80
2 1/4	7.80	8.50	9.00	11.85	13.40	19.00	22.40	25.75
2 1/2				12.90	14.40	20.00	23.90	27.65
2 3/4				13.80	15.40	21.00	24.90	28.65
3				14.75	16.40	22.00	25.95	29.65
3 1/4				15.65	17.40	23.00	26.95	30.65
3 1/2								
3 3/4								
4								
4 1/4								
4 1/2								
4 3/4								
5								



Flat and Fillister Head Cap Screws

"V" or "U. S." Std. Form of Thread

Flat Head—Finished Heads—Price Full Box, Per 100

V. or U. S. S. form of thread



Diameter of Screw	$\frac{1}{8}$	$\frac{3}{16}$	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{7}{8}$	$\frac{1}{2}$	$\frac{3}{4}$
Length Over All								
1	\$2.25	\$2.50	\$3.10	\$4.00	\$5.00	\$6.60	.....	.....
1 1/4	2.50	2.75	3.35	4.25	5.30	6.90	9.00	.....
1 1/2	2.75	3.00	3.60	4.50	5.60	7.20	9.50	\$12.00
1 3/4	3.00	3.25	3.85	4.75	5.90	7.50	10.00	12.50
2	3.25	3.50	4.10	5.00	6.20	7.80	10.75	13.00
2 1/4	.....	3.75	4.35	5.50	6.75	8.00	11.60	13.75
2 1/2	.....	.....	4.75	6.00	7.25	8.50	12.00	14.50
2 3/4	.....	.....	.....	6.50	7.75	9.00	12.75	15.25
3	.....	.....	.....	7.00	8.25	9.50	13.50	16.00
3 1/4	.....	.....	.....	.....	8.75	10.00	.....	.....
Diameter of Head	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	1
Threads to Inch	40	24	20	18	16	14	12	12
Packed 100 in a box								

Fillister Head, Price Full Box, Per 100

Diameter of Screw	$\frac{1}{8}$	$\frac{3}{16}$	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{7}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{3}{4}$
Length Under Head to Extreme Point										
1	\$2.00	\$2.25	\$2.50	\$3.00	\$3.50	\$4.00	\$5.00	.....	.....	.....
1 1/4	2.25	2.50	2.75	3.25	3.75	4.25	5.30	\$6.60	.....	.....
1 1/2	2.50	2.75	3.00	3.50	4.00	4.50	5.60	6.90	9.00	.....
1 3/4	2.75	3.00	3.25	3.75	4.25	4.75	5.90	7.20	9.50	\$12.00
2	3.00	3.25	3.50	4.00	4.50	5.00	6.20	7.50	10.00	12.50
2 1/4	3.25	3.50	3.75	4.35	5.00	5.50	6.75	8.00	10.75	13.00
2 1/2	3.50	3.75	4.00	4.75	5.50	6.00	7.25	8.50	11.50	13.75
2 3/4	3.75	4.00	4.25	5.15	6.00	6.50	7.75	9.00	12.00	14.50
3	.....	4.25	4.50	5.55	6.50	7.00	8.25	9.50	12.75	15.25
3 1/4	.....	.....	4.75	5.95	7.00	7.50	8.75	10.00	13.50	16.00
3 1/2	.....	.....	.....	6.35	7.50	8.00	9.25	10.50	14.25	16.75
3 3/4	.....	.....	.....	.....	8.00	8.50	9.75	11.00	15.00	17.50
4	.....	.....	.....	.....	.....	9.00	10.25	11.50	15.75	18.25
Diameter of Head	$\frac{1}{2} \times \frac{1}{4}$	$\frac{1}{2} \times \frac{3}{8}$	$\frac{1}{2} \times \frac{1}{2}$	$\frac{1}{2} \times \frac{5}{8}$	$\frac{1}{2} \times \frac{3}{4}$	$\frac{1}{2} \times \frac{1}{2}$	$\frac{1}{2} \times \frac{3}{4}$	$\frac{1}{2} \times \frac{1}{2}$	$\frac{1}{2} \times \frac{3}{4}$	$\frac{1}{2} \times 1$
Threads to Inch	40	24	20	18	16	14	13-12	12	11	10
Packed 100 in a box										

Malleable Iron Thumb Screws—Blank or Threaded

Our thumb screws are uniform in size and much stronger than cast iron. The blanks are easily threaded. Prices on blanks are governed by quantity required. Quotations made on application.

Prices Full Box Per Hundred

Length Under Head, Inches	Diameter, Inches						
	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$
1 1/4	\$2.10	\$1.20	\$1.50	\$2.00	\$2.70	.....	.....
1 1/2	2.60	1.45	1.80	2.35	3.00	.....	.....
1	3.10	1.70	2.10	2.70	3.40	\$4.60	\$5.80
1 1/4	.....	1.95	2.40	3.05	3.80	5.20	6.50
1 1/2	.....	2.20	2.70	3.40	4.20	5.50	7.20
2	.....	2.80	3.30	4.10	5.00	7.00	8.60
2 1/4	.....	.....	4.30	5.20	6.20	8.60	10.40
3	.....	.....	5.30	6.30	7.40	10.20	12.20
Threads to Inch	40	24	20	18	16	14	12
Packed 100 in a box							

Drop Forged Thumb Screws and Blanks

Price Per Hundred—Threaded

Length Under Head, Inches	Diameter in Inches and Standard Threads per Inch									
	$\frac{1}{2}$ 32	$\frac{3}{4}$ 24	$\frac{1}{2}$ 20	$\frac{5}{8}$ 18	$\frac{3}{4}$ 16	$\frac{7}{8}$ 14	$\frac{1}{2}$ 12-13	$\frac{3}{4}$ 12	$\frac{5}{8}$ 11	$\frac{3}{4}$ 10
1 1/4	\$5.40	\$5.70	\$6.25	\$7.00	\$8.10	.....	.....	.....	.....	.....
1 1/2	5.65	5.95	6.50	7.25	8.35	\$9.60	\$11.30	\$14.75	.....	.....
1 3/4	5.90	6.20	6.75	7.50	8.60	9.95	11.65	15.15	.....	.....
2	6.20	6.50	7.05	7.80	8.90	10.35	12.05	15.55	\$20.05	\$31.60
2 1/4	6.50	6.80	7.35	8.10	9.20	10.80	12.55	16.30	20.85	31.80
2 1/2	6.85	7.15	7.70	8.50	9.60	11.35	13.10	17.00	21.70	32.70
2 3/4	.....	7.50	8.05	8.95	10.05	11.90	13.75	17.75	22.60	33.75
3	.....	7.95	8.50	9.40	10.50	12.45	14.40	18.65	23.65	34.95
3 1/4	.....	.....	8.95	9.85	11.00	13.05	15.10	19.60	24.80	36.30
3 1/2	.....	.....	9.40	10.30	11.50	13.65	15.80	20.60	26.00	37.80
3 3/4	.....	.....	9.85	10.80	12.05	14.25	16.55	21.65	27.25	39.50
4	.....	.....	10.30	11.30	12.60	14.90	17.44	22.75	28.60	41.35

Blank Drop Forged Thumb Screws are about 1-3 less in price. Prices on application.

Write for catalog on tents and canvas goods.

H. Channon Company Chicago

271



Square Head Cup Point

Iron Set Screws



Headless Cup Point

Price Full Box per Hundred

Length Under Hd to Extreme Point	Diameter of Screw, Inches											
	$\frac{1}{8}$	$\frac{3}{16}$	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1	1 $\frac{1}{8}$	1 $\frac{1}{4}$
$\frac{1}{8}$	\$1.80	\$2.00	\$2.35									
$\frac{1}{4}$	1.90	2.10	2.45	\$2.80	\$3.30							
$\frac{3}{8}$	2.00	2.20	2.50	2.90	3.40	\$5.00	\$5.00					
$\frac{1}{2}$	2.10	2.30	2.60	3.00	3.60	5.50	5.50					
1	2.15	2.35	2.65	3.10	3.80	5.75	5.75	\$10.00				
1 $\frac{1}{4}$	2.30	2.50	2.85	3.50	4.30	6.50	6.50	11.00	\$15.50			
1 $\frac{1}{2}$	2.50	2.70	3.10	4.00	4.80	7.25	7.25	12.00	16.20	\$22.00		
1 $\frac{3}{4}$	2.75	3.00	3.50	4.50	5.40	8.00	8.00	12.50	17.70	24.00	\$41.70	
2	3.25	3.50	4.00	5.15	6.00	8.50	8.50	13.50	19.20	26.00	45.00	\$54.00
2 $\frac{1}{4}$	3.75	4.00	4.50	5.75	6.75	9.60	9.60	14.50	20.70	28.00	48.30	58.30
2 $\frac{1}{2}$	4.25	4.50	5.00	6.35	7.50	10.40	10.40	15.40	22.20	30.00	51.60	62.60
2 $\frac{3}{4}$	4.75	5.00	5.50	6.75	8.25	11.20	11.20	16.20	23.70	32.00	54.90	66.90
3	5.25	5.50	6.00	7.20	9.00	12.00	12.00	17.30	25.20	34.00	58.20	71.20
3 $\frac{1}{4}$				7.50	9.75	12.75	12.75	18.40	26.70	36.00	61.50	75.50
3 $\frac{1}{2}$				8.00	10.50	13.50	13.50	19.50	28.20	38.00	64.80	79.80
3 $\frac{3}{4}$				8.50	11.25	14.30	14.30	20.75	29.70	40.00	68.10	84.10
4				9.00	12.00	15.10	15.10	22.00	31.20	42.00	71.40	88.40
4 $\frac{1}{4}$								15.90	23.50	32.70	74.70	92.70
4 $\frac{1}{2}$								16.70	25.00	34.20	76.00	97.00
4 $\frac{3}{4}$									26.50	35.70	48.00	101.30
5										37.20	50.00	105.60
Threads to inch	20	18	16	14	12	12	11	10	9	8	7	7
Add for ea. $\frac{1}{4}$ inch	\$0.50	\$0.60	\$0.70	\$0.80	\$0.90	\$1.10	\$1.10	\$1.50	\$1.70	\$2.25	\$3.30	\$4.30

For list price of steel set screws, add 25 per cent to the above.

Safety Hollow Set Screws



On revolving shafting, the use of ordinary set screws is not only dangerous, but criminal, unless protectors or hubs are provided, that the head may not catch on workmen's clothing, endangering their lives and limbs.

By using safety hollow set screws, these disadvantages are entirely overcome. One length will answer for every size hole. As shown in the accompanying illustration, the wrench fits into the recess as far as necessary to tighten the screw. Deep holes need only be threaded at the bottom and as far up as the diameter of the hollow set screw, the balance of the hole can be counterbored. A further advantage is that no shoulder is needed on collars and no countersinking is necessary, effecting a saving of material and labor. The recess may be filled with wax to prevent rust which adapts them for use on propeller shafting.

Diameter, inches	$\frac{1}{8}$	$\frac{3}{16}$	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1
Length, inches	$\frac{1}{8}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{1}{4}$
Number of threads per inch	18	16	14	13	12	11	10	9	8	7
Number of screws in box	100	100	50	50	25	25	25	25	25	25
Price full box, per 100	\$3.30	\$3.30	\$3.60	\$3.90	\$4.70	\$5.40	\$6.40	\$8.40	\$12.50	\$16.75
Extra wrenches, price per 100	1.15	1.15	1.45	1.75	1.75	2.30	3.50	3.50	3.50	4.90

We furnish $\frac{1}{4}$ -inch screws with 12 and 13 threads and unless otherwise ordered we always furnish 13.

One wrench is packed with each box of screws.

Mac-It Safety Set Screws

Length, inches	$\frac{1}{8}$	$\frac{3}{16}$	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	1
Made from an especially heat treated steel. They are far superior to the ordinary tool steel or nickel steel type.	$\frac{1}{8}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{1}{4}$
	5.00	6.00	7.00	7.00	8.00	10.00	12.00	15.00
	5.00	6.00	7.00	7.00	8.00	10.00	12.00	15.00
	6.00	7.00	7.00	7.00	8.00	10.00	12.00	15.00
	6.00	7.00	7.00	7.00	8.00	10.00	12.00	15.00
	7.00	8.00	8.00	8.00	9.00	11.00	13.00	16.00
	7.00	8.00	8.00	8.00	9.00	11.00	13.00	16.00
	7.25	9.00	11.00	11.00	11.50	13.00	14.00	15.00
	7.50	9.50	11.00	12.00	12.00	14.00	16.00	18.00
	7.75	10.00	11.50	13.00	13.00	16.00	20.00	24.00
	8.00	10.50	12.00	14.50	18.00	22.00	26.00	28.00
	8.25	11.00	13.00	16.00	20.00	24.00	32.00	32.00
Extra wrenches each	\$0.05	\$0.08	\$0.08	\$0.09	\$0.09	\$0.10	\$0.12	\$0.14

All set screws furnished in U. S. S. thread unless otherwise ordered. Can also be supplied in V. or A. L. A. M. thread.



Allen Safety Set Screws

The Allen safety set screw is conceded to be the best set screw of its type made. The whole is not broached, leaving a false bottom as in most socket screws. It is drilled and the hexagon formed by a secret process which makes it more than 30 per cent stronger.

For those desiring the best, or where safety features are essential, we recommend the Allen set screw.

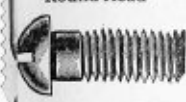


Sizes and Prices

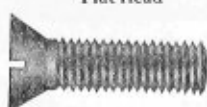
Diameter, inches.....	$\frac{1}{16}$	$\frac{1}{8}$	$\frac{3}{16}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	$1\frac{1}{8}$	$1\frac{1}{2}$	$1\frac{3}{4}$	2	$2\frac{1}{2}$	3	4	5	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60	62	64	66	68	70	72	74	76	78	80	82	84	86	88	90	92	94	96	98	100	102	104	106	108	110	112	114	116	118	120	122	124	126	128	130	132	134	136	138	140	142	144	146	148	150	152	154	156	158	160	162	164	166	168	170	172	174	176	178	180	182	184	186	188	190	192	194	196	198	200	202	204	206	208	210	212	214	216	218	220	222	224	226	228	230	232	234	236	238	240	242	244	246	248	250	252	254	256	258	260	262	264	266	268	270	272	274	276	278	280	282	284	286	288	290	292	294	296	298	300	302	304	306	308	310	312	314	316	318	320	322	324	326	328	330	332	334	336	338	340	342	344	346	348	350	352	354	356	358	360	362	364	366	368	370	372	374	376	378	380	382	384	386	388	390	392	394	396	398	400	402	404	406	408	410	412	414	416	418	420	422	424	426	428	430	432	434	436	438	440	442	444	446	448	450	452	454	456	458	460	462	464	466	468	470	472	474	476	478	480	482	484	486	488	490	492	494	496	498	500	502	504	506	508	510	512	514	516	518	520	522	524	526	528	530	532	534	536	538	540	542	544	546	548	550	552	554	556	558	560	562	564	566	568	570	572	574	576	578	580	582	584	586	588	590	592	594	596	598	600	602	604	606	608	610	612	614	616	618	620	622	624	626	628	630	632	634	636	638	640	642	644	646	648	650	652	654	656	658	660	662	664	666	668	670	672	674	676	678	680	682	684	686	688	690	692	694	696	698	700	702	704	706	708	710	712	714	716	718	720	722	724	726	728	730	732	734	736	738	740	742	744	746	748	750	752	754	756	758	760	762	764	766	768	770	772	774	776	778	780	782	784	786	788	790	792	794	796	798	800	802	804	806	808	810	812	814	816	818	820	822	824	826	828	830	832	834	836	838	840	842	844	846	848	850	852	854	856	858	860	862	864	866	868	870	872	874	876	878	880	882	884	886	888	890	892	894	896	898	900	902	904	906	908	910	912	914	916	918	920	922	924	926	928	930	932	934	936	938	940	942	944	946	948	950	952	954	956	958	960	962	964	966	968	970	972	974	976	978	980	982	984	986	988	990	992	994	996	998	1000	1002	1004	1006	1008	1010	1012	1014	1016	1018	1020	1022	1024	1026	1028	1030	1032	1034	1036	1038	1040	1042	1044	1046	1048	1050	1052	1054	1056	1058	1060	1062	1064	1066	1068	1070	1072	1074	1076	1078	1080	1082	1084	1086	1088	1090	1092	1094	1096	1098	1100	1102	1104	1106	1108	1110	1112	1114	1116	1118	1120	1122	1124	1126	1128	1130	1132	1134	1136	1138	1140	1142	1144	1146	1148	1150	1152	1154	1156	1158	1160	1162	1164	1166	1168	1170	1172	1174	1176	1178	1180	1182	1184	1186	1188	1190	1192	1194	1196	1198	1200	1202	1204	1206	1208	1210	1212	1214	1216	1218	1220	1222	1224	1226	1228	1230	1232	1234	1236	1238	1240	1242	1244	1246	1248	1250	1252	1254	1256	1258	1260	1262	1264	1266	1268	1270	1272	1274	1276	1278	1280	1282	1284	1286	1288	1290	1292	1294	1296	1298	1300	1302	1304	1306	1308	1310	1312	1314	1316	1318	1320	1322	1324	1326	1328	1330	1332	1334	1336	1338	1340	1342	1344	1346	1348	1350	1352	1354	1356	1358	1360	1362	1364	1366	1368	1370	1372	1374	1376	1378	1380	1382	1384	1386	1388	1390	1392	1394	1396	1398	1400	1402	1404	1406	1408	1410	1412	1414	1416	1418	1420	1422	1424	1426	1428	1430	1432	1434	1436	1438	1440	1442	1444	1446	1448	1450	1452	1454	1456	1458	1460	1462	1464	1466	1468	1470	1472	1474	1476	1478	1480	1482	1484	1486	1488	1490	1492	1494	1496	1498	1500	1502	1504	1506	1508	1510	1512	1514	1516	1518	1520	1522	1524	1526	1528	1530	1532	1534	1536	1538	1540	1542	1544	1546	1548	1550	1552	1554	1556	1558	1560	1562	1564	1566	1568	1570	1572	1574	1576	1578	1580	1582	1584	1586	1588	1590	1592	1594	1596	1598	1600	1602	1604	1606	1608	1610	1612	1614	1616	1618	1620	1622	1624	1626	1628	1630	1632	1634	1636	1638	1640	1642	1644	1646	1648	1650	1652	1654	1656	1658	1660	1662	1664	1666	1668	1670	1672	1674	1676	1678	1680	1682	1684	1686	1688	1690	1692	1694	1696	1698	1700	1702	1704	1706	1708	1710	1712	1714	1716	1718	1720	1722	1724	1726	1728	1730	1732	1734	1736	1738	1740	1742	1744	1746	1748	1750	1752	1754	1756	1758	1760	1762	1764	1766	1768	1770	1772	1774	1776	1778	1780	1782	1784	1786	1788	1790	1792	1794	1796	1798	1800	1802	1804	1806	1808	1810	1812	1814	1816	1818	1820	1822	1824	1826	1828	1830	1832	1834	1836	1838	1840	1842	1844	1846	1848	1850	1852	1854	1856	1858	1860	1862	1864	1866	1868	1870	1872	1874	1876	1878	1880	1882	1884	1886	1888	1890	1892	1894	1
-----------------------	----------------	---------------	----------------	---------------	---------------	---------------	---------------	----------------	----------------	----------------	-----	----------------	-----	-----	-----	-----	-----	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	-----

Brass Machine Screws—Round, Flat and Fillister Head

Round Head



Flat Head



Fillister Head



Price Per Gross

Thread to Inch	48 56	48 56	32 36	32 36	32 36	32 36	32 36	32 36	24 30	20 24	18 20	16 18	16 18	16 18	14 16	14 16	14 16	12 13
No.	2	3	4	5	6	7	8	9	10	12	14	16	18	20	24	28	30	34
1/8	\$0.30	\$0.30	\$0.30	\$0.35	\$0.35	\$0.40	\$0.40											
3/16	.30	.30	.30	.35	.35	.40	.40	\$0.60	\$0.60									
1/4	.30	.30	.30	.35	.35	.40	.40	.60	.60	\$0.70	\$0.85							
5/16	.32	.32	.32	.37	.37	.44	.44	.65	.65	.75	.90	\$1.15						
3/8	.32	.32	.32	.37	.37	.44	.44	.65	.65	.75	.90	\$1.15	\$1.50	\$1.90	\$2.30			
7/16	.34	.34	.34	.39	.39	.48	.48	.70	.70	.80	.95	1.20	1.60	2.00	2.40			
1/2	.34	.34	.34	.39	.39	.48	.48	.70	.70	.80	.95	1.20	1.60	2.00	2.40			
5/8	.37	.37	.37	.42	.42	.52	.52	.75	.75	.85	1.00	1.25	1.70	2.10	2.50			
3/4	.37	.37	.37	.42	.42	.52	.52	.75	.75	.85	1.00	1.25	1.70	2.10	2.50			
7/8	.41	.41	.41	.46	.46													
1	.41	.41	.41	.46	.46	.56	.56	.80	.80	.90	1.05	1.30	1.80	2.20	2.60	\$3.20	\$4.00	\$5.10
1 1/8	.45	.45	.45	.50	.50	.60	.60	.85	.85	.95	1.15	1.40	1.90	2.30	2.70	3.30	4.25	5.85
1 1/4			.50	.55	.55													
1 1/2			.50	.55	.55	.65	.65	.90	.90	1.00	1.25	1.60	2.00	2.40	2.80	3.75	4.50	6.60
1 3/4			.55	.60	.60	.70	.70	1.00	1.00	1.10	1.35	1.60	2.00	2.40	2.80	3.00	4.00	7.00
2			.60	.65	.65	.75	.75	1.10	1.10	1.20	1.45	1.70	2.10	2.50	3.00	3.40	4.50	7.35
2 1/4			.65	.70	.70	.80	.80	1.20	1.20	1.30	1.55	1.90	2.30	2.80	3.40	4.00	5.00	8.00
2 1/2			.70	.75	.75	.85	.85	1.30	1.30	1.40	1.65	2.10	2.60	3.20	3.60	4.50	6.00	8.00
2 3/4			.80	.85	.85	.95	.95	1.40	1.40	1.50	1.75	2.20	2.70	3.30	3.80	4.50	6.00	8.00
3			.90	.95	.95	1.05	1.05	1.50	1.50	1.60	1.85	2.30	2.80	3.40	4.00	4.50	6.00	8.00
3 1/4						1.15	1.15	1.60	1.60	1.70	2.00	2.50	3.00	3.60	4.20	4.80	6.35	7.00
3 1/2			1.00	1.05	1.05	1.15	1.15	1.70	1.70	1.80	2.20	2.70	3.30	3.90	4.50	5.00	6.35	7.00
3 3/4			1.10	1.15	1.15	1.25	1.25	1.80	1.80	1.90	2.30	2.80	3.40	4.00	4.60	5.20	6.35	7.00
4						1.45	1.45	1.90	1.90	2.00	2.40	2.90	3.50	4.10	4.70	5.30	6.35	7.00
4 1/4						1.65	1.65	2.20	2.20	2.30	2.70	3.20	3.80	4.40	5.00	5.60	6.35	7.00
4 1/2						1.90	1.90	2.50	2.50	2.60	3.00	3.50	4.10	4.70	5.30	5.90	6.35	7.00
4 3/4						2.30	2.30	2.90	2.90	3.00	3.40	3.90	4.50	5.10	5.70	6.35	7.00	8.00
5								3.30	3.30	3.40	3.80	4.30	4.90	5.50	6.10	6.35	7.00	8.00
5 1/4								3.75	3.75	3.80	4.20	4.70	5.30	5.90	6.50	7.00	8.00	9.00
5 1/2										4.00	4.50	5.10	5.70	6.30	6.90	7.00	8.00	9.00
5 3/4										4.50	5.00	5.60	6.20	6.80	7.40	7.00	8.00	9.00
6										5.00	5.50	6.10	6.70	7.30	7.90	7.00	8.00	9.00
6 1/4										5.50	6.00	6.60	7.20	7.80	8.40	7.00	8.00	9.00
6 1/2										6.00	6.50	7.10	7.70	8.30	8.90	7.00	8.00	9.00
6 3/4										6.50	7.00	7.60	8.20	8.80	9.40	7.00	8.00	9.00
7										7.00	7.50	8.10	8.70	9.30	9.90	7.00	8.00	9.00

Packed one gross in a carton.

Iron Machine Screws—Round, Flat and Fillister Head

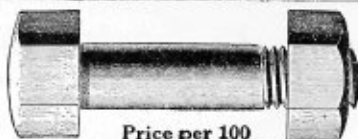
Price Per Gross

Thread to Inch	48 56	48 56	32 36	32 36	32 36	32 36	32 36	32 36	24 30	20 24	18 20	16 18	16 18	16 18	14 16	14 16	14 16	12 13
No.	2	3	4	5	6	7	8	9	10	12	14	16	18	20	24	28	30	34
1/8	\$0.32	\$0.32	\$0.36	\$0.46	\$0.46	\$0.70	\$0.70											
3/16	.32	.32	.36	.46	.46	.70	.70	\$1.00	\$1.00									
1/4	.32	.32	.36	.46	.46	.70	.70	1.00	1.00	\$1.25	\$1.65							
5/16	.34	.34	.38	.49	.49	.75	.75	1.05	1.05	1.35	1.75							
3/8	.36	.36	.40	.52	.52	.80	.80	1.10	1.10	1.45	1.85	\$2.90	\$3.70	\$4.60	\$5.50			
7/16	.38	.38	.42	.55	.55	.85	.85	1.15	1.15	1.55	2.00	3.05	3.90	4.80	5.60			
1/2	.40	.40	.44	.58	.58	.90	.90	1.25	1.25	1.65	2.15	3.20	4.10	5.00	5.75			
5/8	.43	.43	.47	.62	.62	.95	.95	1.35	1.35	1.75	2.30	3.35	4.30	5.25	6.00			
3/4	.46	.46	.50	.66	.66	1.00	1.00	1.45	1.45	1.85	2.45	3.50	4.50	5.50	6.50			
7/8	.49	.49	.53	.70	.70													
1	.52	.52	.56	.74	.74	1.10	1.10	1.65	1.65	2.05	2.75	3.80	4.90	6.00	7.00			15.75
1 1/8	.55	.55	.59	.78	.78													
1 1/4	.58	.58	.62	.82	.82	1.20	1.20	1.85	1.85	2.25	3.05	4.10	5.20	6.30	7.40	11.25		17.10
1 1/2			.65	.86	.86													
1 3/4			.70	.90	.90	1.30	1.30	2.05	2.05	2.45	3.35	4.40	5.50	6.60	7.70	8.50	13.00	15.75
2			.80	1.05	1.05	1.45	1.45	2.20	2.20	2.65	3.55	4.60	5.70	6.80	7.90	9.00		
2 1/4			.90	1.20	1.20	1.60	1.60	2.35	2.35	2.85	3.75	4.90	6.00	7.10	8.20	9.30	15.40	15.75
2 1/2			1.00	1.35	1.35	1.75	1.75	2.50	2.50	3.05	3.95	5.10	6.20	7.30	8.40	9.50	15.40	15.75
2 3/4			1.10	1.50	1.50	1.90	1.90	2.65	2.65	3.25	4.15	5.30	6.40	7.50	8.60	9.70	18.35	22.50
3			1.25	1.70	1.70	2.10	2.10	2.85	2.85	3.50	4.40	5.50	6.60	7.70	8.80	9.90	18.35	22.50
3 1/4			1.40	1.90	1.90	2.30	2.30	3.05	3.05	3.75	4.65	5.70	6.80	7.90	9.00	10.10	20.40	24.25
3 1/2			1.55	2.10	2.10	2.50	2.50	3.25	3.25	4.00	4.90	5.90	7.00	8.10	9.20	10.30	20.40	24.25
3 3/4			1.70	2.30	2.30	2.70	2.70	3.45	3.45	4.25	5.15	6.20	7.30	8.40	9.50	10.60	20.40	24.25
4				2.70	2.70	3.10	3.10	3.85	3.85	4.75	5.65	6.70	7.80	8.90	10.00	11.10	20.40	24.25
4 1/4								4.65	4.65	5.60	6.50	7.60	8.70	9.80	10.90	12.00	20.40	24.25
4 1/2								5.00	5.00	6.00	7.00	8.10	9.20	10.30	11.40	12.50	20.40	24.25
4 3/4								5.35	5.35	6.40	7.50	8.60	9.70	10.80	11.90	13.00	20.40	24.25
5								5.70	5.70	6.80	7.90	9.00	10.10	11.20	12.30	13.40	20.40	24.25
5 1/4								6.05	6.05	7.20	8.30	9.40	10.50	11.60	12.70	13.80	20.40	24.25
5 1/2								6.40	6.40	7.60	8.70	9.80	10.90	12.00	13.10	14.20	20.40	24.25
5 3/4								6.75	6.75	8.00	9.10	10.20	11.30	12.40	13.50	14.60	20.40	24.25
6								7.10	7.10	8.40	9.50	10.60	11.70	12.80	13.90	15.00	20.40	24.25
6 1/4								7.45	7.45	8.80	9.90	11.00	12.10	13.20	14.30	15.40	20.40	24.25
6 1/2								7.80	7.80	9.20	10.30	11.40	12.50	13.60	14.70	15.80	20.40	24.25
6 3/4								8.15	8.15	9.60	10.70	11.80	12.90	14.00	15.10	16.20	20.40	24.25
7								8.50	8.50	10.00	11.10	12.20	13.30	14.40	15.50	16.60	20.40	24.25

Packed one gross in a carton.

H. Channon Company Chicago

Coupling Bolts



The bodies of these bolts are milled, and their heads and nuts faced true with body.

		Price per 100				
Diameter of Bolt, inches.		1/2	3/4	1	1 1/4	1 1/2
Length under head to extreme point, 2 inches.	2	\$20.00	\$25.00			
Length under head to extreme point, 2 1/4 inches.	2 1/4	20.50	25.75	\$32.00		
Length under head to extreme point, 2 1/2 inches.	2 1/2	21.00	26.50	32.00	\$38.75	
Length under head to extreme point, 2 3/4 inches.	2 3/4	21.50	27.25	33.00	39.75	\$56.00
Length under head to extreme point, 3 inches.	3	22.00	28.00	34.00	40.75	56.00
Length under head to extreme point, 3 1/4 inches.	3 1/4	22.50	28.75	35.00	41.75	57.00
Length under head to extreme point, 3 1/2 inches.	3 1/2	23.00	29.50	36.00	42.75	58.00
Length under head to extreme point, 3 3/4 inches.	3 3/4	23.50	30.25	37.00	43.75	59.00
Length under head to extreme point, 4 inches.	4	24.00	31.00	38.00	44.75	60.00
Length under head to extreme point, 4 1/4 inches.	4 1/4	24.50	31.75	39.00	45.75	61.00
Length under head to extreme point, 4 1/2 inches.	4 1/2	25.00	32.50	40.00	46.75	62.00
Length under head to extreme point, 4 3/4 inches.	4 3/4	25.50	33.25	41.00	47.75	63.00
Length under head to extreme point, 5 inches.	5	26.00	34.00	42.00	48.75	64.00
Diameter of Head, inches.		1 1/8	1 1/4	1 1/2	1 3/4	1 7/8
Length of Head, inches.		1 1/2	1 3/4	1 7/8	2	2 1/8
Thickness of Nut, inches.		1 1/2	1 3/4	1 7/8	2	2 1/8
Short Diameter of Nut, inches.		1 1/8	1 1/4	1 1/2	1 3/4	1 7/8

Coupling Bolts of larger diameter and longer sizes can be furnished upon application.

Milled Iron Studs



Price per 100

Lgth., Inches.	Diameter, Inches						
	3/8	1/2	5/8	3/4	7/8	1	
1 1/4	\$3.35	\$4.05	\$4.40				
1 1/2	3.50	4.20	4.60	\$6.10			
1 3/4	3.65	4.35	4.80	6.30			
2	3.80	4.50	5.00	6.50	\$8.80		
2 1/4	3.95	4.65	5.20	6.70	9.10		
2 1/2	4.10	4.80	5.40	6.90	9.40	\$12.00	
2 3/4	4.25	4.95	5.60	7.10	9.70	12.50	
3	4.40	5.10	5.80	7.30	10.00	13.00	\$17.00
3 1/4		5.25	6.00	7.50	10.30	13.50	17.75
3 1/2		5.40	6.20	7.70	10.60	14.00	18.50
3 3/4		5.55	6.40	7.90	10.90	14.50	19.25
4		5.75	6.60	8.10	11.20	15.00	20.00
Thds. to in.	16	14	12	11	10	9	8

Tap end of stud is threaded large to make a steam tight fit.

Less quantity 20% additional.

Length of threads on regular studs. Other threadings are special and made to order, only.

"N" is nut end. "T" is tap end.

Length Inches	Diameter, Inches											
	3/8	1/2	5/8	3/4	7/8	1	1 1/4	1 1/2	1 3/4	1 7/8	2	2 1/4
1 1/4	N T	N T	N T	N T	N T	N T	N T	N T	N T	N T	N T	N T
1 1/2	N T	N T	N T	N T	N T	N T	N T	N T	N T	N T	N T	N T
1 3/4	N T	N T	N T	N T	N T	N T	N T	N T	N T	N T	N T	N T
2	N T	N T	N T	N T	N T	N T	N T	N T	N T	N T	N T	N T
2 1/4	N T	N T	N T	N T	N T	N T	N T	N T	N T	N T	N T	N T
2 1/2	N T	N T	N T	N T	N T	N T	N T	N T	N T	N T	N T	N T
2 3/4	N T	N T	N T	N T	N T	N T	N T	N T	N T	N T	N T	N T
3	N T	N T	N T	N T	N T	N T	N T	N T	N T	N T	N T	N T
3 1/4	N T	N T	N T	N T	N T	N T	N T	N T	N T	N T	N T	N T
3 1/2	N T	N T	N T	N T	N T	N T	N T	N T	N T	N T	N T	N T
3 3/4	N T	N T	N T	N T	N T	N T	N T	N T	N T	N T	N T	N T
4	N T	N T	N T	N T	N T	N T	N T	N T	N T	N T	N T	N T



Planer Head Bolts, Nuts and Washers



All Planer Head Bolts are made from Bessemer steel and have 12 threads to the inch. Other threads special.

Bolts—Price per 100

Diameter of Screw		1/2	3/4	1	1 1/4
Lgth. under head to Ext. Pnt.	1 1/4	\$12.50			
	1 1/2	13.25	\$15.00	\$16.75	\$18.75
Dimensions of Head.		13.25	15.25	17.60	17.60

Planer Head Bolt Nuts

All have 12 threads to the inch. Other threads special.

Diameter of Screw		1/2	3/4	1	1 1/4	1 1/2
Short Diam. Nuts.		1 1/8	1 1/8	1 1/4	1 1/4	1 1/2
Thickness of Nuts.		3/8	3/8	3/8	3/8	3/8
Price per 100		\$10.00	\$12.00	\$15.00	\$16.00	\$18.00

Planer Head Bolt Washers

For Plnr. Hd. Bolts		1/2	3/4	1	1 1/4	1 1/2
Price per 100		\$3.00	\$3.00	\$3.50	\$4.00	\$4.50
Diam. of Washers.		1 1/8	1 1/8	1 1/4	1 1/4	1 1/2
Thick. of Washers.		1/8	1/8	1/8	1/8	1/8

Boiler Patch Bolts

Price Per 100, Turned and Threaded

Diam.		1/2	3/4	1	1 1/4	1 1/2
Lgth. from largest dia. of Base Point	3/4	\$3.75	\$4.25			
	1	4.00	4.50	\$6.00		
	1 1/4	4.25	4.80	6.50	\$9.50	\$13.50
	1 1/2	4.50	5.10	6.80	9.85	14.00
	1 3/4	4.75	5.50	7.25	10.25	14.75
Thds. to in.		14	12	12	12	12



Standard Kegs



Paper Package 1/2 x 8 and smaller



Standard Cases

The square head and nut "machine" bolt is by far the most popular style of bolt on the market and this style is always sent where "bolts" only are specified.

We carry an enormous stock at all times (up into the millions) from 1/4 x 3/4 to 1 x 30. We carry 1/4-inch variations in lengths 4 inches and shorter, 1/2-inch variations in lengths 4 to 10-inch, 1-inch variations to 20-inch and 2-inch variations to 30-inch.

For our contracting trade we carry large diameter bolts in long lengths—these sizes are seldom if ever obtainable from hardware or supply house stocks.

As a great many bolt users usually specify so many "cases" or "kegs" of machine bolts of a size we give below the approximate numbers contained in these packages.

Standard Machine Bolt Information

Diameter, Inches	1/4	5/16	3/8	7/16	1/2	5/8	3/4	7/8
U. S. Std. Threads per inch	20	18	16	14	13	12	11	10
Diam. at root of thread	1.85	.24	.294	.345	.4	.454	.507	.62
Width and Thick. of square heads	3/8 x 3/8	1/2 x 1/2	5/8 x 5/8	3/4 x 3/4	1 x 1	1 1/8 x 1 1/8	1 1/2 x 1 1/2	1 3/4 x 1 3/4
Tensile strength at 12,500 lbs. sq. in.	336	508	848	1166	1571	2026	2523	3775
Extreme Length of thread, inches	3 1/2	3	2 1/2	2	1 1/2	1 1/4	1 1/2	2 1/2
For each add 1/4-inch Thread per 100	\$0.02	\$0.02	\$0.02 1/2	\$0.03	\$0.04	\$0.06	\$0.08	\$0.10
								\$0.12

Diameter, Inches	1	1 1/8	1 1/4	1 3/8	1 1/2	1 5/8	1 3/4	1 7/8	2
U. S. Std. Threads per inch	8	7	7	6	6	5 1/2	5	5	4 1/2
Diam. at root of thread	.838	.939	1.064	1.139	1.284	1.389	1.49	1.615	1.711
Width and Thickness of square head	1 1/2 x 1 1/2	1 5/8 x 1 5/8	1 7/8 x 1 7/8	2 1/8 x 1 1/2	2 1/4 - 1 1/8	2 1/2 x 1 1/2	2 3/4 x 1 1/2	2 5/8 x 1 1/2	3 x 1 1/2
Tensile strength at 12,500 lbs. sq. in.	6888	8664	11,124	13,176	16,173	18,936	21,801	25,613	28,751
Extreme Length of thread, inches	3	3 1/4	3 1/2						
For each add 1/4-inch Thread, per 100	\$0.12	\$0.14	\$0.16						

Approx. Contents Full Cases

Length, Inches	Diameter, Inches					
	1/4	5/16	3/8	7/16	1/2	5/8
1	6500	3800	4900	2700	2400	1200
1 1/4	6400	3100	4200	2600	2000	800
1 1/2	5400	2700	3600	2400	1800	750
1 3/4	4500	4900	3200	2000	1700	900
2	4000	4400	3000	2000	1600	900
2 1/4	3600	4200	2700	1700	1600	900
2 1/2	2600	3600	3000	1700	1600	850
2 3/4	3000	4000	3100	1800	1600	850
3	3200	4000	2700	1700	1600	800
3 1/4	3600	3700	2400	1600	1200	700
3 1/2	3600	3700	2400	800	1200	600
3 3/4	3200	3200	2400	800	1200	600
4	3600	3000	2000	600	1200	600
4 1/2	2800	2600	2000	600	1000	650
5	2000	2000	1700	550	900	450
6		2000	1400	550	850	425
7			1200	400	700	400
8			1000		600	400
9			900		600	350
10			800		400	250
12			750		400	200
13			650		400	200
14			600		200	200
15					200	100

Approx. Contents Full Kegs

Length, Inches	Diameter, Inches					
	3/8	1/2	5/8	3/4	7/8	1
1	3000	1300	750	500	250	
1 1/4	2600	1200	700	475	250	
1 1/2	2500	1110	700	425	250	
2	2400	1000	575	400	250	200
2 1/4	2200	950	550	375	200	175
2 1/2	2000	900	525	350	200	175
2 3/4	1800	850	475	325	175	150
3	1700	800	450	300	175	125
3 1/4	1600	700	425	275	175	125
3 1/2	1500	650	400	275	175	125
3 3/4	1400	625	375	250	175	100
4	1400	600	350	250	175	100
4 1/4		575	325	225	150	100
4 1/2		550	325	225	150	100
4 3/4		525	300	200	150	90
5	900	500	300	200	125	80
5 1/4		450	275	200	125	75
5 1/2		425	275	175	100	75
6		400	250	175	100	
6 1/2		375	250	175	100	
7		350	225	150		
7 1/2		350	225	150		
8		350	225	150		

H. Channon Company Chicago

Standard Machine Bolts

With Square Heads and Square Nuts, Finished Points, R. H. U. S. S. Threads



Measured from Under Head to Point
Price per Hundred

Std. List of
Aug. 1, 1912

L/4th Inch	List Price 100	W/ght 100 Bolts	L/4th Inch	List Price 100	W/ght 100 Bolts	L/4th Inch	List Price 100	W/ght 100 Bolts	L/4th Inch	List Price 100	W/ght 100 Bolts	L/4th Inch	List Price 100	W/ght 100 Bolts	L/4th Inch	List Price 100	W/ght 100 Bolts
1/4-inch Diameter			3/8-inch Diameter			1/2-inch Diameter			3/4-inch Diameter			1-inch Diameter			1 1/4-inch Diameter		
1	\$ 1.70	2.9	6	\$ 3.84	22.5	10	\$ 5.82	65.0	14	\$ 7.70	51.4	7	\$18.20	179	26	\$59.20	660
1 1/4	1.70	3.2	7	4.00	24.1	11	5.84	70.5	15	7.70	54.3	8	18.90	187	28	62.80	703
1 1/2	1.70	3.5	8	4.16	25.7	12	5.96	76	16	8.25	57.2	9	19.60	195	30	65.40	746
1 3/4	1.78	3.9	8	4.48	28.9	14	10.10	87	20	8.80	62.9	9	21.00	211			
2	1.78	4.2	8 1/2	4.80	30.5	15	10.62	93	21	8.80	65.7	9 1/2	22.40	220			
2 1/4	1.86	4.5	9	4.80	32.1	16	11.14	98	22	9.35	68.6	10	22.40	228	3	\$26.10	210
2 1/2	1.86	4.8	9 1/2	5.12	33.7	17	11.66	104	3	9.35	71.4	11	23.80	244	3 1/2	27.30	224
2 3/4	1.94	5.2	10	5.12	35.3	18	12.18	109	3 1/2	9.90	74.3	12	25.20	260	4	28.50	238
3	1.94	5.5	11	5.44	38.5	19	12.70	115	3 3/4	9.90	77.1	13	26.60	276	4 1/2	29.70	252
3 1/2	2.02	6.1	12	5.76	41.7	20	13.22	120	3 3/4	10.45	80.0	14	28.00	293	5	30.90	266
4	2.10	6.8				22	14.26	131	4	10.45	82.8	15	29.40	310	5 1/2	32.10	279
4 1/2	2.18	7.4				24	15.30	142	4 1/2	11.00	89	16	30.80	326	6	33.30	293
5	2.26	8.1							5	11.55	95	17	32.20	343	7	35.70	321
1/2-inch Diameter			3/4-inch Diameter			1-inch Diameter			1 1/4-inch Diameter			1 1/2-inch Diameter			1 3/4-inch Diameter		
1	\$ 2.00	4.5	1 1/4	\$ 2.80	13.2	1	\$ 5.20	20.2	1 1/4	\$ 7.70	51.4	1	\$10.50	83	1	\$13.50	61
1 1/4	2.00	5.0	1 1/2	2.80	14.2	1 1/2	5.20	32.3	1 1/2	8.25	57.2	1 1/2	11.20	87	1 1/2	14.50	68
1 1/2	2.00	5.5	1 3/4	3.00	16.2	1 3/4	5.20	34.3	1 3/4	8.80	62.9	1 3/4	11.90	95	1 3/4	15.50	74
1 3/4	2.12	6.5	2	3.40	20.2	2	5.58	36.4	2	9.35	71.4	2	12.60	108	2	16.50	81
2	2.12	7.0	2 1/4	3.60	23.2	2 1/4	5.68	38.4	2 1/4	9.90	74.3	2 1/4	13.20	114	2 1/4	17.50	88
2 1/4	2.24	7.5	2 1/2	3.80	25.2	2 1/2	5.96	40.5	2 1/2	10.45	80.0	2 1/2	13.80	120	2 1/2	18.00	94
2 1/2	2.24	8.0	2 3/4	4.00	27.2	2 3/4	6.24	44.0	2 3/4	11.00	82.8	2 3/4	14.40	126	2 3/4	18.50	100
2 3/4	2.36	8.5	3	4.20	29.2	3	6.34	46.7	3	11.55	89	3	15.00	132	3	19.00	106
3	2.36	9.0	3 1/4	4.40	31.2	3 1/4	6.72	48.8	3 1/4	12.10	92.8	3 1/4	15.60	138	3 1/4	20.00	110
3 1/4	2.48	9.5	3 1/2	4.60	33.2	3 1/2	6.72	50.8	3 1/2	12.65	95.8	3 1/2	16.10	144	3 1/2	20.50	114
3 1/2	2.48	10.0	3 3/4	4.80	35.2	3 3/4	7.10	52.9	3 3/4	13.20	98.8	3 3/4	16.60	150	3 3/4	21.00	118
3 3/4	2.60	10.5	4	5.00	37.2	4	7.10	55	4	13.75	102	4	17.10	156	4	21.50	122
4	2.60	11.0	4 1/4	5.20	39.2	4 1/4	7.48	60	4 1/4	14.30	105	4 1/4	17.60	162	4 1/4	22.00	126
4 1/4	2.72	12.0	4 1/2	5.40	41.2	4 1/2	7.86	64	4 1/2	14.85	108	4 1/2	18.10	168	4 1/2	22.50	130
4 1/2	2.84	13.0	4 3/4	5.60	43.2	4 3/4	8.24	68	4 3/4	15.40	111	4 3/4	18.60	174	4 3/4	23.00	134
5	2.96	14.0	5	5.80	45.2	5	8.62	72	5	15.95	114	5	19.10	180	5	23.50	138
5 1/4	3.08	15.0	5 1/4	6.00	47.2	5 1/4	9.00	76	5 1/4	16.50	117	5 1/4	19.60	186	5 1/4	24.00	142
5 1/2	3.20	16.0	5 1/2	6.20	49.2	5 1/2	9.38	80	5 1/2	17.05	120	5 1/2	20.10	192	5 1/2	24.50	146
5 1/2	3.32	17.0	5 3/4	6.40	51.2	5 3/4	9.76	84	5 3/4	17.60	123	5 3/4	20.60	198	5 3/4	25.00	150
5 3/4	3.44	18.0	6	6.60	53.2	6	10.14	88	6	18.15	126	6	21.10	204	6	25.50	154
6	3.56	19.0	6 1/4	6.80	55.2	6 1/4	10.52	92	6 1/4	18.70	129	6 1/4	21.60	210	6 1/4	26.00	158
3/4-inch Diameter			1-inch Diameter			1 1/4-inch Diameter			1 1/2-inch Diameter			1 3/4-inch Diameter			2-inch Diameter		
1	\$ 2.40	6.8	1 1/4	\$ 3.60	17.0	1	\$ 7.86	64	1 1/4	\$ 10.50	83	1	\$13.50	61	1	\$16.50	41
1 1/4	2.40	7.5	1 1/2	3.60	18.3	1 1/2	8.24	68	1 1/2	11.20	87	1 1/2	14.50	68	1 1/2	17.50	47
1 1/2	2.40	8.3	1 3/4	3.80	19.6	1 3/4	8.62	72	1 3/4	11.90	95	1 3/4	15.50	74	1 3/4	18.50	51
1 3/4	2.56	9.8	2	4.00	20.9	2	9.00	76	2	12.60	108	2	16.50	81	2	19.50	55
2	2.56	10.5	2 1/4	4.20	23.2	2 1/4	9.38	80	2 1/4	13.20	114	2 1/4	17.50	88	2 1/4	20.50	59
2 1/4	2.72	11.3	2 1/2	4.40	25.2	2 1/2	9.76	84	2 1/2	13.80	120	2 1/2	18.00	94	2 1/2	21.50	63
2 1/2	2.72	12.0	2 3/4	4.60	27.2	2 3/4	10.14	88	2 3/4	14.40	126	2 3/4	18.50	100	2 3/4	22.00	67
2 3/4	2.88	12.8	3	4.80	29.2	3	10.52	92	3	15.00	132	3	19.00	106	3	22.50	71
3	2.88	13.5	3 1/4	5.00	31.2	3 1/4	10.90	96	3 1/4	15.60	138	3 1/4	19.50	110	3 1/4	23.00	75
3 1/4	3.04	14.3	3 1/2	5.20	33.2	3 1/2	11.28	100	3 1/2	16.10	144	3 1/2	20.00	114	3 1/2	23.50	79
3 1/2	3.04	15.0	3 3/4	5.40	35.2	3 3/4	11.66	104	3 3/4	16.60	150	3 3/4	20.50	118	3 3/4	24.00	83
3 3/4	3.20	15.8	4	5.60	37.2	4	12.04	108	4	17.10	156	4	21.00	122	4	24.50	87
4	3.20	16.5	4 1/4	5.80	39.2	4 1/4	12.42	112	4 1/4	17.60	162	4 1/4	21.50	126	4 1/4	25.00	91
4 1/4	3.36	18.0	4 1/2	6.00	41.2	4 1/2	12.80	116	4 1/2	18.15	168	4 1/2	22.00	130	4 1/2	25.50	95
4 1/2	3.52	19.5	4 3/4	6.20	43.2	4 3/4	13.18	120	4 3/4	18.65	174	4 3/4	22.50	134	4 3/4	26.00	99
5	3.68	21.0	5	6.40	45.2	5	13.56	124	5	19.15	180	5	23.00	138	5	26.50	103

We aim to carry bolts by 1/4-inch variations in length to 4 inches, by 1/2-inch to 10 inches, by 1 inch to 20 inches and by 2-inch variations to 30 inches.

We do not carry 1 1/4 and 1 1/2-inch bolts but can supply them usually in 3 to 4 yards. Larger and specially long bolts, or rods quoted upon request.

We reserve the right to ship 1/2-inch where 1/4-inch variations in lengths are specified; for instance, 3/4x1 1/4 we send 3/4x1 1/2 should we be out of 3/4x1 1/4.

All intermediate lengths charged for at next longer length as per list above.

These list prices apply only on lots of not less than 100 bolts of a size, and for bolts with square heads and hot pressed square nuts.

Discount changes on 3/4x4 smaller and shorter, and applies to full standard packages only. Broken packages charged at extra price depending upon sizes and quantities.

All special bolts charged for at special lot prices, depending upon size, size and quantity which include charge for changing and setting up bolt machine.

Standard Extras: For mill orders only: Bolts with hexagonal heads or hexagonal nuts 10% extra. We do not carry bolts with hexagonal heads but can supply hexagonal nuts from stock separately at additional cost.

If both hexagonal heads and hexagonal nuts, 20% extra, depending, however, upon the size of the order.

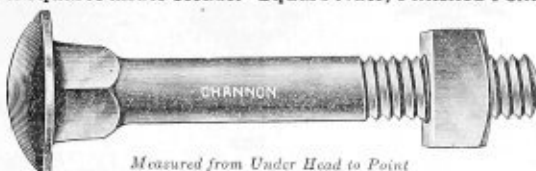
Bolts fitted with U. S. S. Square Nuts add 5%, with U. S. S. Hexagon Nuts, 15%.

Extra long threads, see opposite page.

"V" or Whitworth Threads to special order.

Standard Carriage Bolts

Oval Heads with short full Squares under Heads. Square Nuts, Finished Points, U. S. S. Threads, R. H.



Measured from Under Head to Point

Price Per Hundred

(Std. List Nov. 1, 1912)

[illegible]

Carriage bolts are not anywhere near as popular as Machine bolts and we do not carry as large a stock—used for woodwork—the square under the head holds bolt from turning when tightening up.

We do not carry $\frac{3}{4}$ -inch diameter bolts in stock but can supply in 3 or 4 days. We carry very few $\frac{5}{8}$ and $\frac{1}{2}$ bolts in stock as these are not popular sizes, $\frac{1}{2}$ size at same price as $\frac{3}{8}$, to order only.

Where $\frac{1}{4}$ -inch variations are specified we reserve the right to ship next $\frac{1}{4}$ -inch longer.

Intermediate lengths charged for at next longer length price.

Extras—for Mill orders only:

When fitted with hexagon Nuts, add 15%.

If Hexagon nuts are desired from stock we will furnish regular bolts with square nuts and charge Hexagon Nuts separately at additional cost.

List above applies for 100 of a size only.

Extra for longer threads same as for Machine bolts.

Hot Pressed Square Nuts regularly furnished.

Packages about same as for Machine belts.
Discount changes at 3608 smaller and

Discount changes at $\frac{1}{4}\times 6$ smaller and shorter, larger and longer bolts at smaller discount.

Special Nuts supplied at prices depending upon quality.

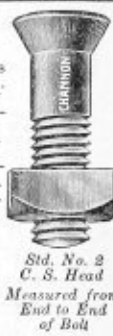
Plow Bolts

No. 2 Round Countersunk Heads—Forged Square Nuts—Finished Points

This is the only large diameter bolt with countersunk head carried in stock. There are many different styles of plow Bolt Heads but these can be furnished only for Mill shipment in good quantities. L. H. Threads 10% extra.

Price and Weight per Hundred

LENGTH Inches	½-inch Diameter		¾-inch Diameter		1-inch Diameter		1½-inch Diameter		2-inch Diameter	
	List	Weight	List	Weight	List	Weight	List	Weight	List	Weight
1	\$1.70	4.21	\$2.00	7.0	\$		\$		\$	
1½	1.70	4.71	2.00	7.56	3.50	14.56	5.70	24.00	\$	
1¾	1.80	5.22	2.10	8.25	3.70	15.75	6.00	26.00	7.70	52
2	1.80	5.72	2.20	9.00	3.90	17.18	6.30	28.00	7.98	55
2½	2.00	6.23	2.30	9.81	4.10	18.37	6.60	30.00	8.25	58
2¾	2.10	6.73	2.40	10.62	4.30	20.18	6.90	32.00	8.53	61
3	2.20	7.24	2.50	11.31	4.50	21.62	7.20	34.00	8.80	64
3½	2.30	7.74	2.60	12.18	4.70	23.62	1.50	36.00	9.08	67
4	2.40	8.25	2.70	13.00	4.90	24.00	7.80	38.25	9.35	70
4½	2.60	9.25	2.90	14.38	5.30	26.62	8.40	41.00	9.90	73
5	2.80	10.25	3.10	15.76	5.70	29.24	9.00	43.00	10.25	76



Std. No. 2
C. S. Head
Measured from
End to End
of Bolt

H.Channon Company Chicago

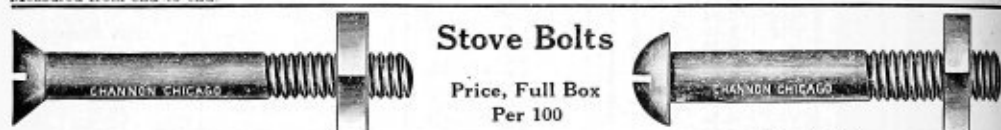
Elevator Bolts



No. 1 and 2 Heads in Stock—Other Heads Mill Shipment Only—Price per 100

Length, Inches	No. 1 Heads			DIMENSIONS OF HEADS								No. 2 Heads	
	$\frac{1}{2}$ and $\frac{3}{4}$ Diam.	$\frac{1}{2}$ Diam.	$\frac{3}{4}$ Diam.	Size	Diam.	Depth	Length of Neck	Size	Diam.	Depth	Length of Neck	Size	Length of Neck
$\frac{3}{4}$	\$2.20	\$3.00	\$4.00	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{1}{4}$
1	2.30	3.00	4.00	$\frac{1}{2}$	1	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{1}{4}$
$1\frac{1}{4}$	2.30	3.00	4.00	$\frac{1}{2}$	$1\frac{1}{4}$	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{1}{4}$
$1\frac{1}{2}$	2.40	3.20	4.30	$\frac{1}{2}$	$1\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{1}{4}$
$1\frac{3}{4}$	2.50	3.40	4.60	$\frac{1}{2}$	$1\frac{3}{4}$	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{1}{4}$
2	.....	3.60	4.90	$\frac{1}{2}$	2	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{1}{4}$
		3.80	5.20	$\frac{1}{2}$	2	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{1}{4}$

Elevator Bolts are used for attaching elevator buckets to belting and for many other purposes requiring a large thin head bolt. Measured from end to end.



Stove Bolts

Price, Full Box
Per 100

Flat Head					Round Head									
Length Inches	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	Length Inches	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	Length Inches	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{3}{4}$
$\frac{3}{4}$	\$0.85	\$1.20	.....	.....	$1\frac{1}{2}$	\$1.10	\$1.50	\$2.05	\$3.10	$3\frac{1}{2}$	\$1.70	\$2.20	\$3.00	\$4.60
$\frac{1}{2}$	.85	1.20	.....	.....	$1\frac{1}{2}$	1.15	1.55	2.15	3.20	4	1.90	2.40	3.30	5.00
$\frac{3}{4}$	.85	1.20	.....	.....	2	1.20	1.60	2.30	3.40	$4\frac{1}{2}$	2.10	2.60	3.60	5.40
$\frac{1}{2}$	.85	1.20	\$1.75	\$2.65	$2\frac{1}{4}$	1.25	1.70	2.40	3.60	5	2.30	2.85	3.90	5.80
$\frac{3}{4}$	.90	1.25	1.80	2.70	$2\frac{1}{2}$	1.30	1.80	2.50	3.80	$5\frac{1}{2}$	2.50	3.15	4.30	6.20
1	.90	1.30	1.85	2.75	$2\frac{3}{4}$	1.40	1.90	2.60	4.00	6	2.75	3.45	4.70	6.60
$1\frac{1}{2}$	1.00	1.40	1.95	2.90	3	1.50	2.00	2.70	4.20	$6\frac{1}{2}$	3.05	3.75	5.10	7.00

Tire Bolts

With Forged Nuts



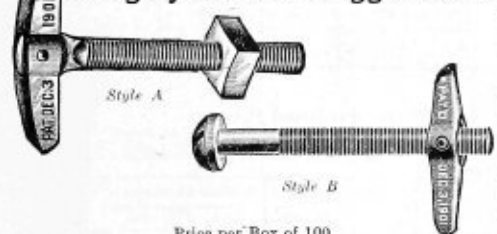
PRICE, PER 100

In 100 lots of a size

Measured End to End

Length Inches	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	Length Inches	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	Length Inches	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{3}{4}$
1	\$.60	\$.95	\$1.40	\$2.20	$2\frac{1}{4}$	\$.75	\$1.10	\$1.64	\$2.30	4	\$1.10	\$1.45	\$2.03	\$3.00
$1\frac{1}{4}$	.60	.95	1.40	2.20	$2\frac{1}{2}$	.80	1.15	1.61	2.40	$4\frac{1}{2}$	.....	1.55	2.17	3.20
$1\frac{1}{2}$	.60	.95	1.40	2.20	$2\frac{3}{4}$	.85	1.20	1.68	2.50	5	.....	1.65	2.31	3.40
$1\frac{3}{4}$	.65	1.00	1.40	2.20	3	.90	1.25	1.75	2.60	$5\frac{1}{2}$	.....	.....	2.45	3.60
2	.70	1.05	1.47	2.20	$3\frac{1}{4}$	1.00	1.35	1.89	2.80	6	.....	.....	2.59	3.80

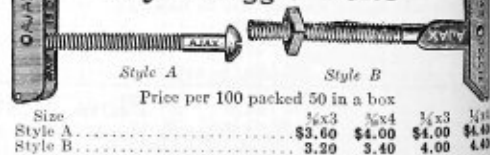
Wrigley Patent Toggle Bolts



Price per Box of 100

Diam. Bolt..	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{3}{4}$
Length Bolt..	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	5	$5\frac{1}{2}$	$5\frac{3}{4}$	6
Style A.....	\$3.30	\$3.30	\$3.30	\$3.20	\$3.60	\$5.00	\$5.50	\$5.50
Style B.....	.....	3.70	.....	3.80	.....	.....	.....	.....

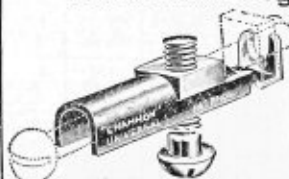
Ajax Toggle Bolts



Price per 100 packed 50 in a box

Size	$\frac{1}{2}$ x3	$\frac{3}{4}$ x4	$\frac{1}{2}$ x3	$\frac{1}{2}$ x4
Style A.....	\$3.60	\$4.00	\$4.00	\$4.40
Style B.....	3.20	3.40	4.00	4.40

Universal Toggle Heads



For use with Machine
Screws, Stove Bolts and
Threaded Rods.

Either head or nut may
be out—eliminates wash
rivets and trunion nuts.

Heads only per 100	$\frac{1}{2}$ inch.	$\frac{3}{4}$ inch.	$\frac{1}{2}$ inch.
$\frac{1}{2}$ inch.....
$\frac{3}{4}$ inch.....
$\frac{1}{2}$ inch.....

Bolt Ends

With Square Nuts and Finished Points



Measured Over All
Price Per Pound

Diam. Inches	Length Inches	Price per lb.	W't per 100	Diam. Inches	Length Inches	Price per lb.	W't per 100
$\frac{1}{8}$	6	\$0.20	14	$\frac{1}{2}$	16	\$0.11	1075
$\frac{1}{4}$	7	.18	24	$\frac{1}{2}$	17	.12	1350
$\frac{3}{8}$	8	.14	49	$\frac{1}{2}$	18	.12	1670
$\frac{1}{2}$	9	.12	84	$\frac{3}{4}$	20	.12	2400
$\frac{5}{8}$	10	.10	145	$\frac{3}{4}$	22	.14	3150
$\frac{3}{4}$	11	.10	210	$\frac{3}{4}$	24	.14	4200
1	12	.10	300	$\frac{3}{4}$	24	.16	5100
$1\frac{1}{8}$	13	.10	445	1	26	.18	6400
$1\frac{1}{4}$	14	.11	644				
$1\frac{1}{2}$	15	.11	865				

For welding on to rods. Right hand U. S. Std. threads always furnished unless otherwise specified. Left Hand threads or with Upset Ends at special prices.

With Hexagon Nuts 10% extra.
Bolt Ends shorter than above standard lengths in lots of 100 and over will be charged at machine bolt list and discount; in smaller lots extra.

This list applies only in lots of not less than 100 of a size.

Hanger Screws

One end cut with deep Wood Screw Threads. Other with standard U. S. Threads and square Nuts. Finished points.



Length over all Inches	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1
3	\$5.00	\$6.75				
4	5.50	7.50				
5		7.50	\$9.50			
6		8.00	10.50	\$13.00	\$16.00	
7		8.50	11.25	14.50	18.00	\$25.00
8		9.00	12.00	15.50	19.50	27.00
9			12.75	16.50	21.00	28.50
10			13.50	17.50	22.00	30.00
11				18.25	23.00	31.50
12				19.00	24.00	33.00
14				20.50	26.00	35.50
16				22.00	28.00	38.00

Largely used by table and other manufacturers.
List applies in lots of 100 of a size only. With hexagon nuts 10% extra.
Length is measured over-all.

Many-Use-Screws



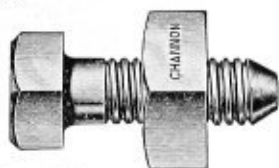
FOR HANGING PIPE, SIGNS, ETC.

Made to Operate with Our Gripwell Expansion Shields

SIZE SCREW...	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$
Length.....	2 $\frac{1}{2}$	3 $\frac{1}{2}$	4
SIZE EYE.....	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{3}{4}$
List—100.....	\$4.00	\$6.50	\$8.00

Steel Boiler Bolts

Also called Fitting Up Bolts, Erecting Bolts, Service Bolts and Setting Up Bolts.



These bolts have half cone points, swelled necks, coarse quick threads and recessed square nuts.

Made of soft steel with quite coarse (special) threads, so that the nuts can be run on and off quickly by hand. The nut is recessed—a great convenience adding to the speed in handling.

These bolts however, have special threads and cost considerably more than machine bolts used for the same purpose.

PRICE PER HUNDRED

Diam- eter in inches	Length inches	List Price per 100 bolts	Diam- eter in inches	Length inches	List Price per 100 bolts
$\frac{1}{2}$	1 $\frac{1}{2}$	\$6.00	$\frac{3}{4}$	1 $\frac{1}{2}$	12.70
$\frac{1}{2}$	1 $\frac{3}{4}$	6.35	$\frac{3}{4}$	2	13.45
$\frac{1}{2}$	2	6.35	$\frac{3}{4}$	2 $\frac{1}{2}$	14.20
$\frac{1}{2}$	2 $\frac{1}{2}$	6.70	$\frac{3}{4}$	3	14.95
$\frac{1}{2}$	3	9.00	$\frac{3}{4}$	3 $\frac{1}{2}$	19.80
$\frac{1}{2}$	3 $\frac{1}{2}$	9.55	$\frac{3}{4}$	4	20.50
$\frac{1}{2}$	4	10.10	$\frac{3}{4}$	4 $\frac{1}{2}$	21.80

Threads per inch Steel Boiler Bolts.
Diameter in inches..... $\frac{1}{2}$ $\frac{3}{4}$ $\frac{1}{2}$ $\frac{3}{4}$
Threads per inch..... 8 7 6 5

Step Bolt

Turned Heads and Finished Points



This list below also covers what are known as Fancy Head Bolts as follows:

Phila. Eagle Carriage Bolts, Oval, Bevel, Bastard, Counter-sunk Turned Heads, Cone Head, Seat Bolts, Steeple Head, Tee Head, and Elliptic Head Perch Bolts.

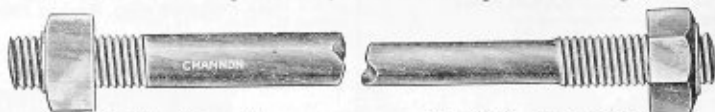
PRICE PER HUNDRED

Length Inches	Diam. $\frac{1}{2}$ & $\frac{3}{4}$ inch	Diam. $\frac{1}{2}$ inch	Diam. $\frac{1}{2}$ inch	Diam. $\frac{1}{2}$ inch	Diam. $\frac{1}{2}$ inch	Diam. $\frac{1}{2}$ inch
1	\$3.00	\$4.00	\$5.40	\$9.50		
1 $\frac{1}{4}$	3.10	4.00	5.40	9.50		
1 $\frac{1}{2}$	3.20	4.00	5.40	9.50		
1 $\frac{3}{4}$	3.30	4.00	5.40	9.80		
2	3.40	4.10	5.40	10.10	\$16.75	
2 $\frac{1}{4}$	3.50	4.20	5.60	10.35	17.25	
2 $\frac{1}{2}$	3.60	4.40	5.80	10.65	17.75	
2 $\frac{3}{4}$	3.70	4.50	6.00	10.90	18.25	
3	3.80	4.70	6.20	11.20	18.75	\$21.50
3 $\frac{1}{4}$	3.90	4.90	6.50	11.50	19.25	22.35
3 $\frac{1}{2}$	4.00	5.00	6.70	11.75	19.75	23.25
3 $\frac{3}{4}$	4.10	5.20	6.90	12.00	20.25	24.50
4	4.20	5.30	7.10	12.30	20.75	25.00
4 $\frac{1}{4}$	4.30	5.70	7.50	12.90	21.75	27.50
5	4.80	6.00	7.90	13.45	22.75	28.75
5 $\frac{1}{4}$	5.10	6.30	8.40	14.00	23.75	30.50
6	5.40	6.60	8.80	14.55	24.75	32.50
6 $\frac{1}{4}$		7.00	9.30	15.10	25.75	33.50
7		7.30	9.70	15.70	26.75	36.25
7 $\frac{1}{4}$		7.60	10.10	16.25	27.75	38.00
8		7.90	10.50	16.80	28.75	40.00
8 $\frac{1}{4}$		8.20	10.90	17.35	29.75	42.00
9		8.50	11.40	17.90	30.75	43.75
9 $\frac{1}{4}$			11.90	18.50	31.75	45.75
10			12.40	19.00	32.75	47.50

H. Channon Company Chicago

Bridge and Roof Rods

Made with Plain or Upset Ends, Fitted with Square or Hexagon Nuts



Plain Ends—Square Nuts

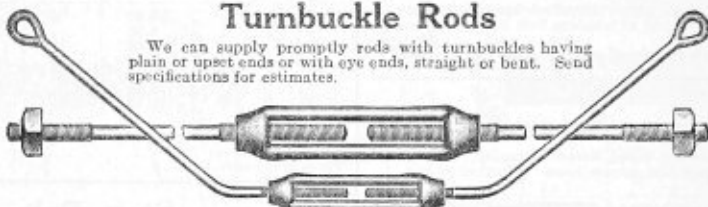
Upset Ends—Hexagon Nuts

Diam., Inches	Diam. of Upset, Inches	Length of Upset, Inches	Threads per Inch	Weight of Rod, per Foot	Diam., Inches	Diam. of Upset, Inches	Length of Upset, Inches	Threads per Inch	Weight of Rod, per Foot
$\frac{3}{8}$	1	3	8	1.503	$1\frac{1}{8}$	$2\frac{1}{8}$	6	$4\frac{1}{2}$	8.181
$\frac{7}{8}$	$1\frac{1}{8}$	$3\frac{1}{2}$	7	2.046	$1\frac{3}{4}$	$2\frac{1}{4}$	6	$4\frac{1}{2}$	9.394
1	$1\frac{3}{8}$	4	6	2.672	2	$2\frac{3}{8}$	6 to 8	4	10.69
$1\frac{1}{8}$	$1\frac{1}{2}$	4	6	3.382	2	$2\frac{1}{2}$	6 to 8	4	10.69
$1\frac{1}{4}$	$1\frac{3}{4}$	5	$5\frac{1}{2}$	4.175	$2\frac{1}{4}$	$2\frac{3}{4}$	7	4	13.52
$1\frac{3}{8}$	$1\frac{7}{8}$	5	5	5.052	$2\frac{1}{2}$	$2\frac{7}{8}$	8	$3\frac{1}{2}$	16.70
$1\frac{1}{2}$	2	6	5	6.012	$2\frac{3}{4}$	3	8	$3\frac{1}{2}$	16.70
$1\frac{3}{4}$	$2\frac{1}{8}$	6	$4\frac{1}{2}$	6.042	$2\frac{7}{8}$	$3\frac{1}{4}$	8	$3\frac{1}{2}$	20.21
$1\frac{7}{8}$	$2\frac{1}{4}$	6	$4\frac{1}{2}$	7.056	3	$3\frac{1}{2}$	8	$3\frac{1}{4}$	24.05

Usually sold by the pound or by the lot, depending upon quantity. We can furnish dock rods, foundation bolts, etc., up to 4 inches in diameter. Prices upon request. To arrive at weight of upset, add 5 to 6 inches of bar for two upsets.

Turnbuckle Rods

We can supply promptly rods with turnbuckles having plain or upset ends or with eye ends, straight or bent. Send specifications for estimates.



Pipe, Tank and Silo Bands

Any diameter, length or style. Prices quoted upon receipt of specifications.

Drift Bolts



Fig. 1915—Round, Plain



Fig. 1925—Round, Button Head Not Pointed



Fig. 1935—Swaged Head, Go's Standard Not Pointed



Fig. 1920—Round, Pointed

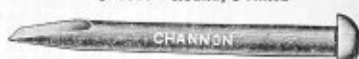


Fig. 1930—Round, Button Head Pointed



Fig. 1940—Swaged Head Pointed

Not carried in stock. In writing for prices be sure to state quantity desired, diameter of iron (usually $\frac{1}{2}$ to $1\frac{1}{2}$ inches), length and style of head and point.
Square drift bolts are practically obsolete, but can be supplied in any style.

Square Plate Washers

Made to special order. Price depends very much upon the quantity wanted. Those listed below are what are known as standard proportions.

Bolt Diameter	No. in 100 Lbs.	Width	Thickness	Hole
$\frac{3}{8}$	1300	$1\frac{1}{2}$	$\frac{1}{8}$	$\frac{1}{8}$
$\frac{7}{8}$	1100	$1\frac{3}{4}$	$\frac{1}{8}$	$\frac{1}{2}$
$\frac{1}{2}$	500	2	$\frac{1}{8}$	$\frac{3}{8}$
$\frac{3}{4}$	315	$2\frac{1}{4}$	$\frac{1}{8}$	$\frac{1}{2}$
$\frac{1}{2}$	250	$2\frac{1}{2}$	$\frac{1}{8}$	$\frac{3}{8}$
$\frac{3}{8}$	165	3	$\frac{1}{8}$	$\frac{1}{2}$
1	87	$3\frac{1}{2}$	$\frac{3}{8}$	$1\frac{1}{2}$
$1\frac{1}{8}$	65	4	$\frac{3}{8}$	$1\frac{1}{2}$
$1\frac{1}{4}$	48	$4\frac{1}{2}$	$\frac{3}{8}$	$1\frac{1}{2}$
$1\frac{3}{8}$	40	5	$\frac{3}{8}$	$1\frac{1}{2}$
$1\frac{1}{2}$	28	6	$\frac{3}{8}$	$1\frac{1}{2}$



Fig. 1945

Special Cast Washers, any style supplied promptly.

Special Bolts

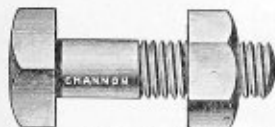


Fig. 265—Square Head, Hexagon Nut
Obtainable from stock by buying Hex. Nuts



Fig. 267—Oval or Button Head



Fig. 269—Square Head



Fig. 271—Turned Oval Head

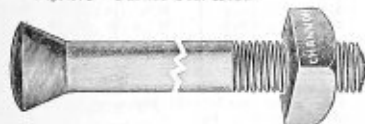


Fig. 273—Dock Rods, Swaged Head

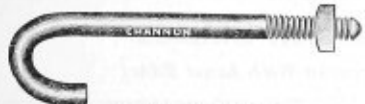


Fig. 275—Hook Bolt



Fig. 277—"U" Bolt



Fig. 279—Guy Rods, Welded Eyes

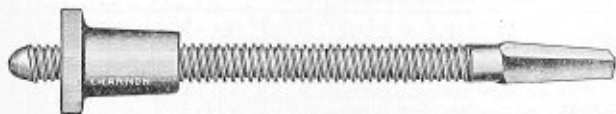


Fig. 280—Square and Acme Threads

Machine Bolts

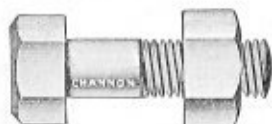


Fig. 266—Hexagon Head and Nut
Mill Shipments Only

Machine Bolts



Fig. 268—Countersunk Head

Blank Bolts



Fig. 270—Button Head

Eagle Carriage Bolts

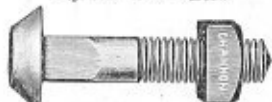


Fig. 272—Turned Bevel Head



Fig. 274—Cross Arm Bolts



Fig. 276—Double Eye Bolt



Fig. 278—Square "U" Bolt

When inquiring for prices upon special bolts, be sure to state quantity desired, diameter, length, style of head and neck, style of nuts and kind of threads.

H. Channon Company Chicago

Standard Coach or Lag Screws With Square Heads and Gimlet Points



Measured under the head to point

Price per Hundred

(Std. List Nov. 12, 1905)

Size, Inches	List Price per 100	Weight per 100 Screws	Size, Inches	List Price per 100	Weight per 100 Screws	Size, Inches	List Price per 100	Weight per 100 Screws	Size, Inches	List Price per 100	Weight per 100 Screws
$\frac{1}{8}$-inch Diameter			$\frac{1}{8}$-inch Diameter			$\frac{1}{2}$-inch Diameter—Cont'd			$\frac{3}{8}$-inch Diameter—Cont'd		
1 $\frac{1}{2}$	\$2.23	4.2	1 $\frac{1}{2}$	\$3.15	9.2	6 $\frac{1}{2}$	\$ 7.35	37.0	7	\$11.00	64.3
2	2.45	5.2	2	3.47	10.9	7	7.71	39.0	7 $\frac{1}{2}$	11.50	68.3
2 $\frac{1}{2}$	2.65	6.2	2 $\frac{1}{2}$	3.79	12.7	7 $\frac{1}{2}$	8.07	42.0	8	12.00	72.5
3	2.85	7.2	3	4.11	14.6	8	8.43	44.0	9	13.00	80.5
3 $\frac{1}{2}$	3.05	8.2	3 $\frac{1}{2}$	4.43	16.6	9	9.15	49.0	10	14.00	88.5
4	3.25	9.2	4	4.75	18.8	10	9.87	54.0	11	15.00	96.5
4 $\frac{1}{2}$	3.45	10.2	4 $\frac{1}{2}$	5.07	20.7	11	10.59	59.0	12	16.00	105.0
5	3.65	11.3	5	5.39	22.8	12	11.31	64.0	$\frac{1}{2}$-inch Diameter		
$\frac{3}{8}$-inch Diameter			5 $\frac{1}{2}$	5.71	24.9	$\frac{3}{8}$-inch Diameter			2 $\frac{1}{2}$	\$ 9.20	43.0
6			6	6.03	27.0	$\frac{3}{8}$-inch Diameter			3	9.90	48.3
$\frac{1}{2}$-inch Diameter			1 $\frac{1}{2}$	\$3.75	13.0	2	\$ 6.00	24.8	3 $\frac{1}{2}$	10.60	53.8
1 $\frac{1}{2}$	\$2.70	6.5	2	4.11	14.9	2 $\frac{1}{2}$	6.50	29.0	4	11.30	59.6
2	2.96	7.7	2 $\frac{1}{2}$	4.47	17.4	3	7.00	32.9	4 $\frac{1}{2}$	12.00	65.5
2 $\frac{1}{2}$	3.22	9.2	3	4.87	19.0	3 $\frac{1}{2}$	7.50	36.9	5	12.70	71.5
3	3.48	10.6	3 $\frac{1}{2}$	5.19	21.5	4	8.00	41.0	5 $\frac{1}{2}$	13.40	77.5
3 $\frac{1}{2}$	3.74	12.0	4	5.55	24.0	4 $\frac{1}{2}$	8.50	44.9	6	14.10	83.5
4	4.00	13.5	4 $\frac{1}{2}$	5.91	26.5	5	9.00	48.8	6 $\frac{1}{2}$	14.80	89.5
4 $\frac{1}{2}$	4.26	15.0	5	6.27	29.0	5 $\frac{1}{2}$	9.50	52.7	7	15.50	95.5
5	4.52	16.5	5 $\frac{1}{2}$	6.63	31.5	6	10.00	56.6	8	16.20	101.5
5 $\frac{1}{2}$	4.78	18.0	6	6.99	34.0	6 $\frac{1}{2}$	10.50	60.6	9	16.90	107.5
6	5.04	19.5							10	17.60	113.5

$\frac{1}{4}$ inch not carried in stock but can supply promptly. We also carry $\frac{1}{4}$ inch from 1 to 3 inches in length, price same as $\frac{1}{2}$ inch.

One point is practically obsolete. We supply for factory shipment only at extra price.

Hexagon heads to order only for mill shipment at 10 per cent extra. Less than 100 lots 10 per cent extra.

Skein screws sold at same list.

Paper packages $\frac{1}{2}$ and smaller, $\frac{1}{2}$ and $\frac{3}{8}$ in packages of 50; $\frac{3}{8}$ inch, packages of 25.

"Gripwell" Lag Screw Expansion Shields

Malleable Iron—Perfect Threads—Full Expansion With Least Effort



The Gripwell shield is the only one of its kind with guaranteed with the least effort. Comparative tests will carry conviction.

The thread is the one most important feature of a lag screw shield. In the Gripwell the thread is not only distinctly different and better, but every thread is guaranteed to be perfect.

The expansion is produced by the stock of the screw bearing on the smooth tops of the high and heavy threads.

Has tapered fins to prevent shield turning with lag screw. Lugs to clamp shield together at forward end.

perfect threads, producing full expansion under hardest service

Oval form to drive easier and cone to fill front of hole.

Threads of correct mechanical height and spacing for either cut or rolled threads.

Open throat of depth necessary to attach thin material without specially cut screws with shield flush with face of wall.

Screw starts in first thread without expansion, making engagement easier.

Price of Shields Only—Per Hundred

Diameter of lag screw, inches	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{5}{8}$	$\frac{3}{4}$
List price per 100 shields (without lag screws)	\$9.40	\$10.50	\$13.35	\$22.00	\$27.80	\$33.56
Weight per 100, pounds	100	100	100	100	50	50
Packed in box containing	100	100	100	100	50	50
Short pattern shield, length, inches	1 $\frac{1}{2}$	2	2 $\frac{3}{4}$	3 $\frac{1}{4}$	3 $\frac{1}{2}$	3 $\frac{1}{2}$
Long pattern shield, length, inches	2	2 $\frac{3}{4}$	3 $\frac{1}{4}$	3 $\frac{1}{2}$	3 $\frac{1}{2}$	3 $\frac{1}{2}$
Outside diameter of shield, inches	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{5}{8}$	$\frac{3}{4}$
Size of drill required, inches	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{5}{8}$	$\frac{3}{4}$

Specify L for long and S for short pattern. Length required is found by adding thickness of material to be attached to length of shield.

"Gripwell" Duplex Machine Bolt Expansion Cases



Expansion occurs at inner end—the proper place. This is a two part, but single unit, shield or case without prings, wires or lugs. The two parts will not separate and get lost. Positively self aligning. See sectional cut, showing tube on head end of oval nut fitting into tube at inner end of shield or case. Nut is always held in positive alignment to engage thread of bolt—a most important feature.

Price of Cases Only, Without Bolts

Diameter of bolt, inches.	1/4	5/16	3/8	1/2	5/8	3/4
S. diameter case and size of drill.	1/2	5/8	3/4	7/8	1	1 1/8
Length of case, inches.	1 1/2	2	2 1/2	3	3 1/2	3 1/2
Price per 100.	\$9.40	\$10.50	\$13.35	\$22.00	\$27.80	\$39.95

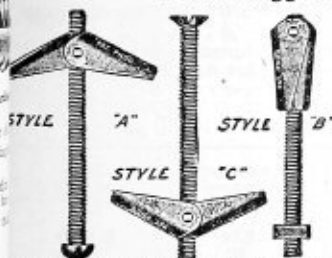
"Gripwell" Duplex Expansion Cases For Machine Screws, Stove Bolts, Etc.



These expansion cases are exactly the same as those shown above for machine bolts, only these can be used with machine screws, stove bolts and cap screws. We particularly want to call your attention to the 3/4-inch size which is combination tapped and will fit either 4-inch 20-thread cap screw, 1/4-inch 18-thread stove bolt or 14-20-thread machine screw, 1/4-inch 20-thread carriage or machine bolt.

Diam. Screw	Thread	Outside Diam. Case	Length Case	Price per 100
3/8	32	5/8	5/8	\$4.40
1/2	24	3/4	7/8	5.00
3/4	18	1	1	5.60
1		1 1/8	1 1/8	6.25

Paine Toggles



The advantage of the Paine toggle bolt is that when closed it is only about 1 inch in length of head, and will work in hollow tile with hollow of only 1 1/8 inches, while other toggles require a hollow

as great as the spread of head—about 2 inches.

This bolt folds, to insert in hole, and when the head has passed the inside of hole, the spring instantly throws the two halves of head out to a spread of 2 inches. Packed 5 in a box.

Size	Price per 100	Size	Price per 100
1/4 x 3	\$5.85	1/4 x 3	\$7.85
1/4 x 4	7.15	1/4 x 4	8.15
1/4 x 5	7.50	1/4 x 5	8.55

"Gripwell" Screw Anchors

(Expansion Shields for Wood Screws)

Composition Metal—One Piece



Die cast from a special ductile composition metal. Holds more than the wood screw.

Drives in hole—flush with face of wall.

The oval form wedges anchor tightly in hole and prevents it from rotating with screw.

Requires smaller hole than other makes.

Open throat eliminates expansion at face of wall and possibility of cracking tile or marble.

Price per Hundred (Without Screws)

Diam. of Screw	Length of Anchor	Screw Numbers	Outside Diam. of Anchor, also Diam. of Drill Required	Price per 100
1/8 x 5/8	5-6-7-8	1/8	1/8	\$4.40
1/8 x 3/4	5-6-7-8	1/8	1/8	4.40
3/8 x 5/8	9-10-11	3/8	3/8	5.00
3/8 x 3/4	9-10-11	3/8	3/8	5.00
3/8 x 1 1/2	9-10-11	3/8	3/8	6.25
1/2 x 5/8	12-13-14	1/2	1/2	5.60
1/2 x 3/4	12-13-14	1/2	1/2	5.60
1/2 x 1	12-13-14	1/2	1/2	6.75
3/4 x 1 1/2	15-16-17-18	3/4	3/4	6.25
3/4 x 1	15-16-17-18	3/4	3/4	7.50

Order as 1/4x1—1/4 is diameter of screw and 1 inch is length of anchor.

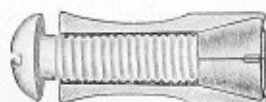
We solicit specification and inquiries from large electrical contractors and other concerns who use expansion and toggle-bolts extensively.

With our experience we are prepared to furnish materials adapted to each distinct purpose.

You will find our stock large and prices interesting.

H.Channon Company Chicago

Van Quadruplex Expansion Units



Cross Section



Normal Position



Expanded

For Stove Bolts—Machine Screws and Machine Bolts

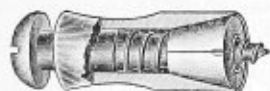
Requires less drilling because of accuracy of construction, design and size. Expansion is positive. When head of bolt bears on the work, cone-expander rides up on threads causing expansion—four ways. The cone-expander keeps it expanded, therefore cannot drop out of hole when bolt is removed. Expansion always takes place at bottom—no surplus depth of hole required. Four-way expansion gives greater contact with hole—seats the unit quickly and aligns it properly. Can be used in hollow or solid walls, tile or gypsum blocks. No force required to install. Can't turn in the hole. High safety factor—maximum holding power.

Prices Van Quadruplex Expansion Units Only

Size of Screw or Bolt, Inch	Length Unit, Inches	Size Drill to Use, Inch	For Use With	Threads per Inch	Standard Package	Price per 100
$\frac{3}{8}$	$\frac{5}{8}$	$\frac{5}{16}$	Machine screws	32	100	\$ 2.50
$\frac{3}{8}$	$\frac{7}{8}$	$\frac{5}{16}$	Machine screws	24	50	2.50
$\frac{1}{2}$	1	$\frac{7}{16}$	Stove bolts	18	50	3.50
$\frac{5}{8}$	$1\frac{1}{4}$	$\frac{9}{16}$	Stove bolts	18	25	5.00
$\frac{3}{4}$	$1\frac{1}{2}$	$\frac{5}{8}$	Machine bolts	16	25	6.50
$\frac{3}{4}$	2	$\frac{3}{4}$	Machine bolts	13	12	9.00
$\frac{3}{4}$	$2\frac{1}{2}$	$\frac{7}{8}$	Machine bolts	11	12	14.00
$\frac{3}{4}$	3	1	Machine bolts	10	12	19.00

To find the proper length of stove bolt or machine screw required for your work, add length of unit you intend using to thickness of work and the sum is the length to use.

To find proper length of machine bolt to use with sizes $\frac{3}{8}$ -inch and up, add the length of unit to thickness of work and the sum less $\frac{1}{4}$ -inch is the length to use.



Cross Section



Normal Position



Expanded

For Wood Screws—Lag Screws and Lag Bolts

The Van Unit for wood screws has all the elements of expansion and is made in exactly the same way as the Van Unit for machine screws, stove bolts and machine bolts described above.

Note the special features of the Van Expansion Unit for wood screws. Taper of the screw does **not** expand the shell by cutting its own thread. The screw enters into the hard metal cone wedge nut, which is threaded to receive it. Expansion begins when the head of screw bears on the work to be fastened.

Prices Van Quadruplex Expansion Units Only

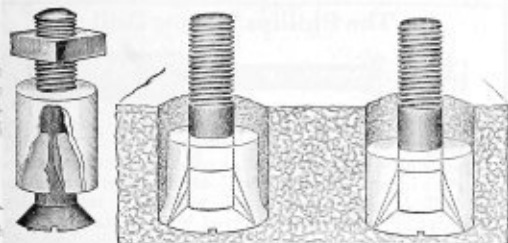
Size of Screw	Length of Unit, Inches	Size Drill to Use, Inches	For Use With	Standard Package	Price per 100
No. 8	$\frac{5}{8}$	$\frac{5}{16}$	No. 8 wood screws	100	\$ 2.50
No. 10	$\frac{7}{8}$	$\frac{3}{8}$	No. 10 wood screws	50	2.50
No. 14	1	$\frac{7}{16}$	No. 14 wood screws	50	3.50
$\frac{5}{8}$ -inch lag	$1\frac{1}{4}$	$\frac{9}{16}$	$\frac{5}{8}$ -inch lag screws	25	5.00
$\frac{3}{4}$ -inch lag	$1\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$ -inch lag screws	25	6.50
$\frac{1}{2}$ -inch lag	2	$\frac{3}{4}$	$\frac{1}{2}$ -inch lag screws	12	9.00
$\frac{5}{8}$ -inch lag	$2\frac{1}{2}$	$\frac{7}{8}$	$\frac{5}{8}$ -inch lag screws	12	14.00
$\frac{3}{4}$ -inch lag	3	1	$\frac{3}{4}$ -inch lag screws	12	19.00

To find the proper length of wood screws required for your work, add length of unit to the thickness of work and the sum plus $\frac{1}{8}$ -inch is the length to use. For lag screws add $\frac{1}{4}$ inch.

Van Lead Drive Anchors

For Any Kind of Flat Head Bolt

As its name implies the Van Lead Drive Anchor is fastened to brick, stone or concrete surfaces by driving the lead sleeve into the hole around a flat head bolt by means of a hollow punch or piece of pipe. The anchor consists of a die moulded cast lead sleeve into one end of which has been firmly pressed a hollow cone made of a hard composition metal the end being formed to receive a flat head bolt. When used the lead sleeve slides down the hard cone and is forced against the wall of the hole, thus making a permanent fastening, quickly and easily.



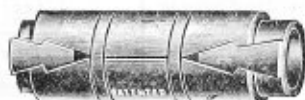
Showing Lead Drive Anchor on Bolt. Position After First Blow. Note Expansion Begins at Bottom. Position After Second Blow. Note Bolt Fully Anchored.

Prices Van Lead Drive Anchors

(Without Bolts)

Size of Bolt, Inch	Size Drill to Use, Inch	Price per 100
1/4	1/2	\$2.50
3/8	5/8	5.00
1/2	3/4	7.50

Channon Double Machine Expansion Bolts



All that is required to use these expansion bolts is a hole; not larger at the bottom than at the top, of sufficient size and depth to insert the expansion nut and cases. For use with machine bolts.

With Square Head Bolts—Price per 100

Length, Inches	Diameter, Inches											
	3/4	1	1 1/4	1 1/2	1 3/4	2	2 1/4	2 1/2	3	4	5	6
1 1/4	\$ 9.55											
2	9.60	\$10.95	\$13.35	\$18.50								
2 1/4	9.65	11.05	13.50	18.75	\$22.80							
3	9.80	11.15	13.65	19.00	23.10	\$31.40						
3 1/4	9.85	11.25	13.80	19.20	23.40	31.90						
4	9.90	11.40	13.95	19.45	23.70	32.30	\$46.30					
4 1/4	10.55	12.20	14.95	19.65	24.00	32.80	46.90					
5	10.65	12.35	15.10	19.90	24.30	33.20	47.50	\$62.00				
5 1/4	10.75	12.45	15.30	20.15	24.60	33.70	48.10	62.60	\$89.00			
6	10.85	12.60	15.50	20.40	24.90	34.10	48.70	63.60	90.10			
6 1/4			15.70	20.60	25.20	34.50	49.30	64.40	91.10			
7			15.85	20.85	25.50	35.00	49.80	65.20	92.20	\$181.60	\$234.20	\$313.80
7 1/4			16.05	21.10	25.80	35.40	50.50	66.10	93.30	183.10	236.00	317.30
8			16.25	21.30	26.10	35.80	51.00	66.90	94.30	184.50	237.70	321.50
9					26.80	36.80	52.20	68.50	96.40	187.30	241.20	328.50
10					27.40	37.60	53.30	70.20	98.50	190.00	244.70	335.50
11					28.00	38.50	54.50	71.80	100.60	192.90	248.20	342.50
12					28.60	39.40	55.70	73.40	102.70	195.70	251.80	349.50
13										198.50	255.30	356.90
14										201.30	258.80	363.50
15										204.00	262.20	370.50
16										206.80	265.80	377.50
17										209.70	269.20	384.50
18										212.50	272.80	395.50
Shields only	8.00	9.00	11.00	15.00	18.00	24.00	35.00	44.00	63.00	140.00	150.00	220.00
Length of shield, ins.	1 1/4	1 1/4	2 1/4	2 1/4	2 1/4	3 1/4	4	4 1/4	5	6 1/4	6 1/4	7 1/4
Size hole to require expansion, inches	3/4	3/4	3/4	1	1	1 1/4	1 1/4	1 1/4	1 1/4	2 1/4	2 1/4	2 1/4
Diam. of drill req., inches	3/4	3/4	3/4	1	1	1 1/4	1 1/4	1 1/4	1 1/4	2 1/4	2 1/4	2 1/4
Weight per 100, lbs.	6	8	12	20	22	32	64	102	138	300	300	450

H. Channon Company Chicago

The Phillips Spring Hammer



For drilling holes in concrete, brickwork or stone, its action is identical to the air hammer, but the cost is much less. It can be carried to a job and put to work immediately.

Made in sizes to accommodate varying ranges of work. Each size has an adjustment to regulate the force of blow required for the different size holes. The double crank handle balances the load and makes the work easy.

It is simple in construction, compactly built, and all working parts are housed in and protected from the dirt and knocks incident to the service.

No.	Price Each	No. of Blows per Revolution	Size of Plunger, Inches	For Holes, Inches	Weight, Pounds
2	\$30.00	8	$\frac{1}{8} \times 6$	$\frac{1}{8}$ to 1	9
3	\$36.00	8	$1 \times 6\frac{1}{4}$	$\frac{1}{8}$ to $1\frac{1}{4}$	12

The Phillips Overhead Drill

A high speed tool especially designed for drilling over-head holes in concrete, for expansion bolts, for hanging sprinkler systems, steam, gas, water and air piping, electric conduits cables, wires, fans, motors, shaft hangers, etc., and for drilling holes, in mine and tunnel roofs for hanging pipe and wire systems, etc.

The drill is rapid, strong, durable and dirt proof. It does practically the same amount of work as a power tool, at a far less initial cost, with no expense at all for carting, piping, wiring or hose and with upkeep reduced to minimum.

To get the variation in force of blow, which is necessary for greatest efficiency, in drilling the large and small holes, it is provided with two interchangeable ratchet wheels and shafts. One of these (mounted in hammer at factory) gives a long stroke heavy blow for the large size drills, the extra one shown gives an increased number of lighter blows which are most effective for small drills.

Changing the ratchet requires only a few minutes' time and is accomplished with the small wrench furnished with all tools.

Price.....\$60.00

The Phillips Star Drill



Length, Ins.	$\frac{1}{8}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	$1\frac{1}{2}$	$2\frac{1}{2}$	$3\frac{1}{2}$	$4\frac{1}{2}$	$6\frac{1}{2}$	$8\frac{1}{2}$
8	\$0.80	\$0.90	\$1.00	\$1.10	\$1.20	\$1.30	\$1.40	\$1.60	\$1.70	\$1.80
18			1.50	1.55	1.75	1.80	2.00	2.25	2.40	2.40
24					1.80	2.00	2.10	2.40	2.60	2.70

The Phillips Hollow Drill



We recommend our Hollow drill for all holes $\frac{1}{8}$ -inch and larger, in concrete, brick and soft stone. This drill requires least rotation to alter position of cutting edges for each blow. Cores out 50% of the material removed in drilling which means less work and more holes; whereas, all materials removed with a star or fluted drill is pulverized or hammer to a dust. Hollow drills make round smooth holes, true to size, just where spotted. Will not "run" to mortar joint and hang and will not hang or break up when striking reinforcing steel. Can be resharpened many times.

Extra Hollow Drills—Price Each

Length, Inches	$\frac{1}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	$1\frac{1}{2}$	$2\frac{1}{2}$	$3\frac{1}{2}$	$4\frac{1}{2}$	$6\frac{1}{2}$	$8\frac{1}{2}$
8	\$2.20	\$2.30	\$2.40	\$2.50	\$2.60	\$2.80	\$3.00	\$3.60	\$4.00
18	3.10	3.20	3.40	3.50	3.75	4.00	4.20	4.90	5.60
24	3.30	3.50	3.60	3.80	3.90	4.20	4.50	5.25	6.00

Spring Hammer Extension



This equipment is indispensable for over-head drilling, requiring but one man to operate it, and it is easily moved from hole to hole. The extension is of telescopic construction and allows for 2-foot adjustment. They are made to attach to a piece of 1-inch gas pipe.

Price each.....\$7.00

Channon Drill Heads



Heads can be screwed on to regular standard pipe, any length.

Turned from solid bar and steel and tempered.

Price Heads Only

Number	2	3	4	5	6A
Pipe size	$\frac{1}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	$1\frac{1}{2}$	$2\frac{1}{2}$
Cutting edge	$\frac{1}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	$1\frac{1}{2}$	$2\frac{1}{2}$
Price each	\$0.60	\$0.60	\$0.60	\$0.60	\$0.60
Number	6	6A	7	7A	8
Pipe size	$\frac{1}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	$1\frac{1}{2}$	$2\frac{1}{2}$
Cutting edge	$\frac{1}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	$1\frac{1}{2}$	$2\frac{1}{2}$
Price each	\$0.90	\$1.60	\$1.60	\$2.00	\$2.00

Channon Star Drills



Made from solid forged steel. Oil tempered. Point of drill is shaped like a countersink which makes cutting easy. Can be easily sharpened.

Diameter of face	$\frac{1}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	$1\frac{1}{2}$	$2\frac{1}{2}$	$3\frac{1}{2}$	$4\frac{1}{2}$	$6\frac{1}{2}$	$8\frac{1}{2}$
Length, inches	12	12	12	12	18	18	18	18	18
Price per dozen	\$4.80	\$5.00	\$5.85	\$5.85	\$8.70	\$10.50	\$10.50	\$10.50	\$10.50
Price each	.45	.50	.55	.55	.85	1.00	1.00	1.00	1.00
Diameter of face	$\frac{1}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	$1\frac{1}{2}$	$2\frac{1}{2}$	$3\frac{1}{2}$	$4\frac{1}{2}$	$6\frac{1}{2}$	$8\frac{1}{2}$
Length, inches	12	12	12	12	18	18	18	18	18
Price per dozen	\$12.50	\$15.00	\$15.00	\$15.00	\$20.75	\$20.75	\$20.75	\$20.75	\$20.75
Price each	1.25	1.50	1.50	1.50	1.75	1.75	1.75	1.75	1.75



Hot Pressed Square and Hexagon Nuts

United States Standard List

March 1, 1911—200-Pound Kegs



Order by Size of Bolt, inches	Hole, inches	Width, inches	Thick- ness, inches	SQUARE NUTS				HEXAGON NUTS			
				Price per cwt. in 200 lb. Kegs		Average Number in Keg of 200 lbs.		Price per cwt. in 200 lb. Kegs		Average Number in Keg of 200 lbs.	
				Blank	Tapped	Blank	Tapped	Blank	Tapped	Blank	Tapped
1/4	3/16	1/2	1/4	\$13.00	\$15.00	13,800	14,760	\$20.00	\$22.50	17,400	18,600
5/16	1/4	5/8	5/16	12.00	13.50	7,400	7,915	18.00	20.00	9,200	9,760
3/8	5/16	3/4	3/8	10.50	11.60	5,000	5,320	14.00	15.60	6,000	6,400
1/2	3/8	1 1/8	1/2	10.00	10.90	3,200	3,400	13.00	14.30	4,000	4,250
5/8	1/2	1 3/8	5/8	9.00	9.70	2,400	2,540	11.20	12.20	3,000	3,200
3/4	3/4	1 5/8	3/4	9.00	9.60	1,600	1,690	11.20	12.10	2,128	2,275
7/8	7/8	2	7/8	8.70	9.20	1,300	1,440	10.50	11.20	1,540	1,620
1	1	2 1/8	1	8.50	8.90	832	880	10.00	10.60	998	1,050
1 1/8	1 1/8	2 3/8	1 1/8	8.40	8.80	544	578	9.90	10.50	628	665
1 1/4	1 1/4	2 5/8	1 1/4	8.40	8.80	376	397	9.90	10.50	436	460
1 3/8	1 3/8	3	1 3/8	8.40	8.80	268	284	9.90	10.50	288	305
1 1/2	1 1/2	3 1/8	1 1/2	8.40	8.80	206	220	9.90	10.50	250	260
1 3/4	1 3/4	3 3/8	1 3/4	8.50	9.00	146	157	10.00	10.70	182	190
2	2	3 1/2	2	8.50	9.40	120	127	10.30	11.10	144	150
2 1/8	2 1/8	3 3/4	2 1/8	9.00	9.70	95	100	10.50	11.40	116	120
2 1/4	2 1/4	3 7/8	2 1/4	9.30	10.00	74	77	10.80	11.70	95	100
2 3/8	2 3/8	4	2 3/8	9.50	10.30	64	67	11.00	12.00	80	84
2 1/2	2 1/2	4 1/8	2 1/2	9.70	10.60	53	56	11.20	12.30	62	65
2 3/4	2 3/4	4 3/8	2 3/4	10.00	11.00	43	45	11.70	12.90	52	54
3	3	4 1/2	3	10.00	11.10	36	37	11.70	13.00	44	46
3 1/8	3 1/8	4 3/4	3 1/8	10.30	11.50	28	29	12.20	13.60	35	36
3 1/4	3 1/4	4 7/8	3 1/4	10.50	11.80	24	25	12.40	13.90	32	33
3 3/8	3 3/8	5	3 3/8	11.00	12.40	21	22	13.00	14.60	27	27
3 1/2	3 1/2	5 1/8	3 1/2	11.50	13.00	16	17	13.50	15.20	18	18

Be sure to state when ordering whether square or hexagon, blank or tapped.

Quantity Extras—Less than 200 lb. keg but over 100 lbs. add 20c cwt., less than 100 lbs. add 50c, less than 50 lbs. add \$1.00.

Cold-Punched Chamfered and Trimmed Square and Hexagon Nuts, with Reamed Holes



U. S. Standard Sizes

List May 1, 1911



Order by Size of Bolt, inches	Hole, inches	Width, inches	Thick- ness, inches	SQUARE NUTS				HEXAGON NUTS			
				Price per cwt. in 200 lb. Kegs		Average Number 200 lb. Kegs		Price per cwt. in 200 lb. Kegs		Average Number 200 lb. Kegs	
				Blank	Tapped	Blank	Tapped	Blank	Tapped	Blank	Tapped
1/4	3/16	1/2	1/4	\$20.00	\$22.00	13,000	13,700	\$27.00	\$29.50	16,000	17,390
5/16	1/4	5/8	5/16	18.00	19.50	7,400	7,800	24.00	26.00	8,000	8,695
3/8	5/16	3/4	3/8	14.50	15.60	4,800	5,000	18.50	20.10	5,300	5,800
1/2	3/8	1 1/8	1/2	14.00	14.90	3,200	3,400	18.00	19.30	3,853	4,184
5/8	1/2	1 3/8	5/8	11.30	12.00	2,400	2,500	15.00	16.00	2,666	2,898
3/4	3/4	1 5/8	3/4	11.30	11.90	1,700	1,800	14.00	14.90	2,094	2,274
7/8	7/8	2	7/8	10.00	10.50	1,240	1,300	12.50	13.20	1,580	1,694
1	1	2 1/8	1	9.70	10.10	800	840	11.40	12.00	877	952
1 1/8	1 1/8	2 3/8	1 1/8	9.60	10.00	490	520	11.10	11.70	578	626
1 1/4	1 1/4	2 5/8	1 1/4	9.60	10.00	343	355	11.10	11.70	400	434
1 3/8	1 3/8	3	1 3/8	9.60	10.00	250	263	11.10	11.70	290	315
1 1/2	1 1/2	3 1/8	1 1/2	10.10	10.50	175	184	11.50	12.10	228	245
1 3/4	1 3/4	3 3/8	1 3/4	10.30	10.80	139	146	12.00	12.70	169	185
2	2	3 1/2	2	10.70	11.30	110	115	12.60	13.40	131	142
2 1/8	2 1/8	3 3/4	2 1/8	11.10	11.80	89	93	13.20	14.10	103	113
2 1/4	2 1/4	3 7/8	2 1/4	11.50	12.20	74	78	14.00	14.90	85	92
2 3/8	2 3/8	4	2 3/8	12.00	12.80	59	62	14.50	15.50	71	78
2 1/2	2 1/2	4 1/8	2 1/2	12.00	12.90	49	53	14.50	15.60	57	62
2 3/4	2 3/4	4 3/8	2 3/4	12.50	13.60	35	37	15.00	16.30	42	46
3	3	4 1/2	3	13.50	14.80	26	28	16.00	17.50	31	34
3 1/8	3 1/8	4 3/4	3 1/8	14.00	15.40			16.50	18.10	25	27
3 1/4	3 1/4	4 7/8	3 1/4	14.50	16.00			17.00	18.70	18	20
3 3/8	3 3/8	5	3 3/8	14.50	16.10			17.00	18.80	15	16
3 1/2	3 1/2	5 1/8	3 1/2	14.50	16.20			17.00	18.90	11	12
3 3/4	3 3/4	5 3/8	3 3/4	15.00	17.20			18.00	19.90	9	10
4	4	6 1/8	4	15.50	17.50			18.00	20.00	8	9

Be sure to state when ordering whether square or hexagon, blank or tapped.

Quantity extras—Less than 200 lb. keg but over 100 lbs. add 20c cwt., less than 100 lbs. add 50c cwt., less than 50 lbs. \$1.00.

Finished Case Hardened and Semi-Finished Hexagon Nuts and Jam Nuts

Semi-Finished



Our finished case hardened nuts are finished to the standard adopted by the United States Government, being milled to exact outside dimensions, tapped, threaded and faced off at the bottom at right angles to the thread. Our semi-finished nuts correspond in dimensions with the finished nuts, tapped and faced true on the bottom. Both finished and semi-finished nuts are furnished regularly with U. S. Standard form thread. V threads can be supplied.

Finished



Price Per Hundred

Size of bolt, inches.....	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1	1 1/8	1 1/4	1 1/2	1 3/4	2
Finished case hardened.....	\$6.00	\$6.00	\$7.00	\$8.00	\$9.00	\$10.00	\$12.00	\$16.00	\$22.00	\$27.00	\$32.00	\$38.00	\$48.00
Semi-finished.....	2.00	2.00	2.50	3.25	3.75	4.50	5.50	6.50	8.50	12.00	17.00	22.00	27.00
Brass semi-finished.....	1.40	2.40	3.20	6.20	7.20	9.60	17.00	17.00	27.00	45.00	65.00	85.00	115.00
Width of nuts, inches.....	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{3}{4}$
Thickness regular nut, inches.....	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{3}{4}$
Thickness of jam nut, inches.....	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{3}{4}$
Number of threads per inch.....	24	20	18	16	14	12-13	12	11	11	10	9	8	8

Size of bolt, inches.....	1 1/8	1 1/4	1 1/2	1 3/4	2	2 1/4	2 1/2	2 3/4	3
Finished case hardened.....	\$ 50.00	\$ 66.00	\$ 90.00	\$ 120.00	\$ 145.00	\$ 175.00	\$ 250.00	\$ 325.00	\$ 550.00
Semi-finished.....	24.00	33.00	49.00	69.00	93.00	130.00	170.00	215.00	310.00
Width of nuts, inches.....	1 1/8	2	2 1/8	2 3/8	2 1/2	2 3/4	2 1/2	2 3/4	3 1/4
Thickness regular nut, inches.....	1 1/8	1 1/4	1 1/2	1 3/4	1 1/2	1 3/4	1 1/2	1 3/4	2 1/4
Thickness of jam nut, inches.....	1 1/8	1 1/4	1 1/2	1 3/4	1 1/2	1 3/4	1 1/2	1 3/4	2 1/4
Number of threads per inch.....	7	7	6	6	5 1/2	5	5	4 1/2	4 1/2

Jam Nuts or nuts thinner or smaller than standard, take price of regular size nut. Finished nuts not case hardened take price of case hardened nuts. Packed, $\frac{1}{2}$ and smaller, 100 in a box. $\frac{5}{8}$ to 1 inch, 50 in a box.

S. A. E. Semi-Finished Nuts



Size of Bolt, Inches	No. of Threads per Inch	Thickness of Nut, In.	Width of Nut, Inches	Price per 100
1/4	28	3/16	3/8	\$2.00
5/16	24	1/4	1/2	2.50
3/8	24	5/16	5/8	3.25
7/16	20	3/8	3/4	3.75
1/2	20	7/16	7/8	4.50
9/16	18	1/2	1	5.50
5/8	18	5/8	1 1/8	6.50
3/4	16	3/4	1 1/4	8.50
7/8	16	7/8	1 1/2	8.50
1	14	1	1 3/4	12.00
1 1/8	14	1 1/8	2	17.50

Hexagon Nut Assortments



Assorted as Follows

Size, Inches			$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	Price per Box
As't No.	Type	Thread	Number in a Box					
1	S. F.	V	6	8	20	6	10	\$1.65
2	S. F.	U. S.	6	8	20	6	10	1.65
3	S. F.	S. A. E.	6	9	15	10	10	1.70
4	Cas't'd	V	6	8	20	6	10	3.30
5	Cas't'd	U. S.	6	8	20	6	10	3.30
6	Cas't'd	S. A. E.	6	9	15	10	10	3.40

Standard Castellated Nuts



S. A. E. Thread



Size Bolt	Thread	Outside Diam.	Height, Inches	Height Plain Nut	Depth of Slot	Price per 100
1/4	28	3/8	3/16	3/16	1/8	\$4.00
5/16	24	1/2	1/4	1/4	3/16	6.00
3/8	24	5/8	5/16	5/16	1/4	6.50
7/16	20	3/4	3/8	3/8	1/2	7.50
1/2	20	7/8	7/16	7/16	1/2	9.00
9/16	18	1	1/2	1/2	1 1/8	11.00
5/8	18	1 1/8	1 1/8	1 1/8	1 1/4	13.00
3/4	16	1 1/4	1 1/4	1 1/4	1 1/2	17.00
7/8	14	1 1/2	1 1/2	1 1/2	1 3/4	24.00

Semi-Finished Castellated Nuts

V. or U. S. S. Thread

Size, Inches	Threads per Inch	Width, Inches	Height, Inches	Depth of Slot	Price per 100
1/4	20	1/2	1/4	1/8	\$ 4.00
5/16	18	5/8	5/16	3/16	5.00
3/8	16	3/4	3/8	1/4	6.50
7/16	14	7/8	7/16	1/2	7.50
1/2	12-13	1	1	1 1/8	9.00
9/16	12	1 1/8	1 1/8	1 1/4	11.00
5/8	11	1 1/4	1 1/4	1 1/2	13.00
3/4	10	1 1/2	1 1/2	1 3/4	17.00
7/8	9	1 3/4	1 3/4	2	24.00
1	8	2	2	2 1/4	35.00

Packed $\frac{1}{2}$ -inch and smaller, 100 in a box, $\frac{5}{8}$ to 1-inch, 50 in a box.

Winged Thumb Nuts and Blanks

Price per Hundred—Threaded and Blank

		Malleable Iron									
Bolt size, inches.....		$\frac{1}{8}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	$1\frac{1}{8}$	$1\frac{1}{2}$	$1\frac{3}{4}$	2
Price per 100, threaded.....		\$2.40	\$1.10	\$1.30	\$1.60	\$2.15	\$2.75	\$3.70	\$6.00		
Threads per inch.....		40	24	20	18	16	14	12-13	11		

Prices on blanks are governed by quantity required. Quotations made upon application.

Pressed Steel

Made from sheet steel. Exceptionally strong and nicely finished.

Size and thread.....		6-32	8-32	10-32	$\frac{3}{8}$ -24	$\frac{1}{2}$ -20	$\frac{5}{8}$ -18	$\frac{3}{4}$ -16
Width across wings, inches.....		$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{3}{4}$
Price per 100.....		\$0.90	\$0.90	\$0.90	\$0.90	\$1.00	\$1.25	\$1.60

Drop Forged

For bolt, size ins.....	$\frac{1}{8}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	$1\frac{1}{8}$	$1\frac{1}{2}$	$1\frac{3}{4}$	2
Diam. top, ins.....	$\frac{1}{4}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
U. S. Std. threads.....	32	24	20	18	16	14	12-13	12	11	10
Price per 100, thrd.....	\$4.50	\$5.00	\$5.50	\$6.50	\$8.00	\$10.00	\$12.50	\$15.00	\$17.00	\$23.00
Price per 100, blk.....	1.75	2.00	2.25	2.60	3.25	4.00	5.00	6.00	7.25	10.50

Pressed Brass

Size and thread.....		6-32	8-32	10-32	10-24	$\frac{1}{4}$ -20	$\frac{5}{8}$ -18	$\frac{3}{4}$ -16
Width across wings, inches.....		$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$	$1\frac{1}{8}$	$1\frac{1}{2}$	$1\frac{3}{4}$
Price per 100.....		\$1.50	\$1.50	\$1.80	\$1.80	\$2.25	\$3.75	\$5.50
Price per dozen.....		.20	.20	.25	.25	.30	.50	.75

Machine Screw Nuts Square and Hexagon

Tapped



Size No. of Screw Gauge	No. of Threds. per Inch	Iron Square Price per Gross	Iron Hexagon Price per Gross	Brass Square Price per Gross	Brass Hexagon Price per Gross
2	56	\$0.23	\$0.36	\$0.72	\$1.08
3	48	.23	.36	.72	1.08
4	36	.23	.36	.72	1.08
6	32	.23	.36	.72	1.08
8	32	.26	.40	.80	1.22
10	24-32	.29	.43	.87	1.30
12	24	.32	.48	.94	1.44
14	20-24	.36	.55	1.08	1.66
16	18	.48	.72	1.44	2.16
18	18	.62	.94	1.88	2.81
20	16-18	.82	1.22	2.45	3.67
24	16	1.06	1.58	3.17	4.75

Hexagon Brass Cap Nuts



Size	Threads per Inch	Height, Inches	Diam. of Hex. Base	Price per Hundred
6	32	$\frac{5}{16}$	$\frac{5}{8}$	\$1.60
8	32	$\frac{3}{8}$	$\frac{5}{8}$	1.60
10	24	$\frac{3}{8}$	$\frac{5}{8}$	2.00
10	32	$\frac{3}{8}$	$\frac{5}{8}$	2.00
12	24	$\frac{3}{8}$	$\frac{5}{8}$	2.00
12	20	$\frac{3}{8}$	$\frac{5}{8}$	2.90
$\frac{3}{8}$	18	$\frac{3}{8}$	$\frac{5}{8}$	4.00
$\frac{7}{8}$	16	$\frac{3}{8}$	$\frac{5}{8}$	5.60
$\frac{1}{2}$	14	$\frac{3}{8}$	$\frac{5}{8}$	9.00
$\frac{1}{2}$	12-13	$\frac{3}{8}$	$\frac{5}{8}$	9.00

Brass Washers

For Machine Screws

Small Diameter

Size of Machine Screw	Outside Diam.	In-side Diam.	Thick-ness	Price per Pound	Approximate Number to the Pound
No. 4	$\frac{5}{16}$	.125	.025	\$4.00	2500
No. 6	$\frac{3}{8}$	.150	.032	2.00	1100
No. 8	$\frac{7}{16}$	.170	.032	2.00	1170
No. 10	$\frac{1}{2}$	.195	.036	1.80	760
No. 12	$\frac{5}{8}$	.228	.040	1.60	525
No. 14	$\frac{9}{16}$	.260	.040	1.60	420
No. 16	$\frac{5}{8}$	.285	.040	1.50	340
No. 18	$\frac{11}{16}$	.315	.051	1.50	230
No. 20	$\frac{3}{4}$	.345	.064	1.50	150
No. 24	$\frac{7}{8}$	.385	.064	1.50	110

For Machine Screws, Large Diameter

Size of Machine Screw	Outside Diam.	In-side Diam.	Thick-ness	Price per Pound	Approximate Number to the Pound
No. 8	$\frac{1}{2}$	.170	.036	\$1.80	725
No. 10	$\frac{1}{2}$	.195	.040	1.60	480
No. 12	$\frac{5}{8}$	.228	.040	1.60	380
No. 14	$\frac{9}{16}$	.260	.051	1.50	210
No. 16	$\frac{3}{4}$	.285	.064	1.50	135
No. 18	$\frac{7}{8}$	.315	.064	1.50	100
No. 20	$\frac{1}{2}$	.345	.064	1.50	103
No. 24	1	.385	.081	1.40	64

For Bolts

Size Bolt, Ins.	Outside Diam., Inches	In-side Diam., Inches	Thick-ness, Inches	Number in Pound	Price per Pound
$\frac{3}{8}$	$\frac{1}{2}$	.195	.040	480	\$1.60
$\frac{1}{4}$	$\frac{1}{2}$	.260	.051	210	1.50
$\frac{5}{16}$	$\frac{1}{2}$	.315	.064	103	1.50
$\frac{3}{8}$	1	.385	.081	64	1.40
$\frac{1}{2}$	$\frac{1}{2}$	.440	.081	45	1.40
$\frac{5}{8}$	$\frac{1}{2}$	.495	.091	29	1.40
$\frac{3}{4}$	$\frac{1}{2}$	.550	.091	21	1.40
$\frac{7}{8}$	2	.605	.125	10	1.40
1	$\frac{3}{4}$	.660	.144	6	1.40
1	$\frac{1}{2}$	.715	.144	$5\frac{1}{4}$	1.40

H. Channon Company Chicago

Spring Lock Washers

Also Known as Nut Locks, Spring Washers, Split Washers



Type B—Standard or Plain Pattern



Type D—Positive Pattern



Type C—Ribbed Pattern

Coiled from bars of special analysis Alloy steel and properly heat treated to secure greatest amount of toughness and reaction. Guaranteed commercially perfect in quality, finish and proportion. Conform to S. A. E. tests which are extremely severe.

Type B—Plain or Std. Pattern.—The most popular style—is reversible. When compressed, take initial bearing against backing and nut and have great holding power because of frictional bearing obtained. The spring resistance locks and holds the nut. Nuts may be quickly removed.

Type D—Positive Pattern.—Same as Type B except that a sharp projection is stamped on each end. These projections when fully compressed dig into the nut also the backing making it almost impossible to turn the nut off again. This style is recommended where only a very thin section can be used due to lack of space.

Type C—Ribbed Pattern.—The rib when screwed down tight crushes into the first nut thread so tightly that nut and bolt are practically locked together. In addition there is the spring pressure exerted by the coil.



Standard Package

Thin Pattern		Screw Sizes		Price per 1000	
Screw Sizes	Width Steel	Thick. Steel	Wt. per 1000	Type B	Type D
No. 2 .0841	3/16	3/16	.3	\$ 3.35	\$ 6.70
No. 4 .1104	1/4	1/4	.3	3.00	5.55
No. 6 .1368	5/16	5/16	.4	2.70	5.00
No. 8 .1631	3/8	3/8	.5	2.35	4.35
No. 10 .1894	7/16	7/16	.7	1.70	3.35
No. 12 .2157	1/2	1/2	.9	1.70	3.35
No. 14 .2420	9/16	9/16	1.0	2.35	4.00

Thin Pattern		Bolt Sizes		Price per 1000	
Bolt Size	Width Steel	Thick. Steel	Wt. per 1000, Lbs.	Type B	Type D
3/8	3/8	3/8	.7	\$ 1.70	\$ 3.35
1/2	1/2	1/2	1.2	2.35	4.00
5/8	5/8	5/8	2.9	4.35	6.00
3/4	3/4	3/4	4.5	5.70	7.35
7/8	7/8	7/8	5.5	6.35	8.00
1	1	1	7	7.70	9.35
1 1/8	1 1/8	1 1/8	12.5	10.00	11.70
1 1/4	1 1/4	1 1/4	14	11.00	12.70
1 1/2	1 1/2	1 1/2	15 1/4	13.00	15.00
1 3/4	1 3/4	1 3/4	27	18.00	20.00
2	2	2	35	22.00	24.00

The thin pattern is recommended only for light work with but little vibration or pressure.

Regular Standard Pattern		Bolt Sizes		Price per 1000	
Bolt Size	Width Steel	Thick. Steel	Wt. per 1000, Lbs.	Type B	Type D
3/8	3/8	3/8	1	\$ 1.70	\$ 3.35
1/2	1/2	1/2	2 1/4	3.70	5.35
5/8	5/8	5/8	3	4.35	6.00
3/4	3/4	3/4	3 1/4	5.00	6.70
7/8	7/8	7/8	6 1/4	6.35	8.00
1	1	1	7 1/2	7.00	8.70
1 1/8	1 1/8	1 1/8	17	11.35	13.00
1 1/4	1 1/4	1 1/4	40	17.70	19.35
1 1/2	1 1/2	1 1/2	61	22.35	24.35
1 3/4	1 3/4	1 3/4	68	24.70	26.70
2	2	2	77	27.35	29.35
1 1/8	1 1/8	1 1/8	86	30.35	33.90
1 1/4	1 1/4	1 1/4	109	39.70	42.35
1 1/2	1 1/2	1 1/2	129	43.70	46.35
1 3/4	1 3/4	1 3/4	164	54.35	58.35
2	2	2	265	61.35	68.70
			290	72.35	83.00

S. A. E. Medium Pattern		Bolt Sizes		Price per 1000	
Bolt Size	Width Steel	Thick. Steel	Wt. per 1000, Lbs.	Type B	Type D
3/8	3/8	3/8	.8	\$ 1.35	\$ 3.00
1/2	1/2	1/2	1.5	2.70	4.35
5/8	5/8	5/8	4.75	5.00	6.70
3/4	3/4	3/4	5.5	5.70	7.35
7/8	7/8	7/8	12.5	9.00	10.70
1	1	1	14	9.70	11.35
1 1/8	1 1/8	1 1/8	23	13.35	15.00
1 1/4	1 1/4	1 1/4	25	14.35	16.00
1 1/2	1 1/2	1 1/2	45	19.70	21.70
1 3/4	1 3/4	1 3/4	58	22.70	24.70
2	2	2	95	33.00	35.00

S. A. E. Heavy Pattern		Bolt Sizes		Price per 1000	
Bolt Size	Width Steel	Thick. Steel	Wt. per 1000, Lbs.	Type B	Type D
1/2	1/2	1/2	1	\$ 1.70	\$ 3.35
5/8	5/8	5/8	2	3.00	4.70
3/4	3/4	3/4	6.5	6.70	7.35
7/8	7/8	7/8	7.25	6.35	8.00
1	1	1	17	11.00	12.70
1 1/8	1 1/8	1 1/8	19	11.70	13.35
1 1/4	1 1/4	1 1/4	30	15.35	17.00
1 1/2	1 1/2	1 1/2	31	16.35	18.00
1 3/4	1 3/4	1 3/4	61	22.35	24.35
2	2	2	73	26.70	28.70
			107	37.35	40.00

Ribbed Pattern—Light Standard		Bolt Sizes		Price per 1000	
Bolt Size	Width Steel	Thick. Steel	Wt. per 1000, Lbs.	Type C	
3/8	3/8	3/8	1.2	\$ 2.70	
1/2	1/2	1/2	2.7	4.00	
5/8	5/8	5/8	4.6	5.70	
3/4	3/4	3/4	5	6.35	
7/8	7/8	7/8	8.7	8.35	
1	1	1	10	9.00	
1 1/8	1 1/8	1 1/8	24	14.70	
1 1/4	1 1/4	1 1/4	25	15.70	
1 1/2	1 1/2	1 1/2	32	17.70	
1 3/4	1 3/4	1 3/4	39	20.00	
2	2	2	56	30.70	
			61	34.35	
			135	42.00	
			150	50.70	
			183	68.00	
			208	80.00	

Ribbed Pattern—Heavy Standard		Bolt Sizes		Price per 1000	
Bolt Size	Width Steel	Thick. Steel	Wt. per 1000, Lbs.	Type C	
3/8	3/8	3/8	2.1	\$ 3.35	
1/2	1/2	1/2	3.6	4.70	
5/8	5/8	5/8	6.5	7.00	
3/4	3/4	3/4	7.5	7.70	
7/8	7/8	7/8	20	13.00	
1	1	1	21	13.70	
1 1/8	1 1/8	1 1/8	38	21.70	
1 1/4	1 1/4	1 1/4	40	22.70	
1 1/2	1 1/2	1 1/2	66	28.35	
1 3/4	1 3/4	1 3/4	74	31.70	
2	2	2	119	41.70	
			132	45.00	
			142	49.00	
			163	67.70	
			214	79.70	
			253	91.35	

List shows standard sizes and types, but we can supply promptly most any size or section of steel.

Less than full packages of 1000 of a size:

Add 20 percent for 500 to 999.

Add 30 percent for 250 to 499.

Add 40 percent for under 250.

Minimum charge 50 cents.

Standard Wrought Washers

U. S. Standard Sizes—In 200-Pound Kegs

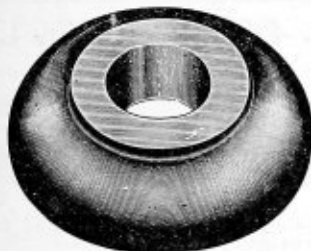
List of Jan. 20, 1910

Order by Size of Bolt, In.	List Price per 100 Pounds	Diam., Inches	Size of Hole, Inches	Thickness, Wire Gauge No.	Number in 100 Pounds	Order by Size of Bolt, In.	List Price per 100 Pounds	Diam., Inches	Size of Hole, Inches	Thickness, Wire Gauge No.	Number in 100 Pounds
$\frac{1}{8}$	\$14.00	$\frac{1}{4}$	$\frac{1}{8}$	18	39,400	$\frac{1}{8}$	\$ 9.00	$\frac{1}{4}$	$\frac{1}{8}$	9	625
$\frac{1}{4}$	12.20	$\frac{3}{8}$	$\frac{1}{8}$	16	15,600	$\frac{1}{4}$	9.00	$\frac{3}{8}$	$\frac{1}{8}$	9	520
$\frac{3}{8}$	11.40	$\frac{1}{2}$	$\frac{1}{8}$	16	11,250	$\frac{3}{8}$	9.20	$\frac{1}{2}$	$\frac{1}{8}$	9	400
$\frac{1}{2}$	10.50	$\frac{3}{4}$	$\frac{1}{8}$	14	6,800	$\frac{1}{2}$	9.20	$\frac{3}{4}$	$\frac{1}{8}$	8	300
$\frac{5}{8}$	9.80	1	$\frac{1}{8}$	14	4,300	$\frac{5}{8}$	9.20	1	$\frac{1}{8}$	8	280
$\frac{3}{4}$	9.40	$1\frac{1}{4}$	$\frac{1}{8}$	12	2,600	$\frac{3}{4}$	9.50	$1\frac{1}{4}$	$\frac{1}{8}$	8	240
$\frac{7}{8}$	9.30	$1\frac{1}{2}$	$\frac{1}{8}$	12	2,250	$\frac{7}{8}$	9.50	$1\frac{1}{2}$	$\frac{1}{8}$	8	215
1	9.20	$1\frac{3}{4}$	$\frac{1}{8}$	10	1,300	1	9.50	$1\frac{3}{4}$	$\frac{1}{8}$	8	190
$1\frac{1}{8}$	9.10	2	$\frac{1}{8}$	10	1,010	$1\frac{1}{8}$	9.50	2	$\frac{1}{8}$	8	175
$1\frac{1}{4}$	9.00	$2\frac{1}{4}$	$\frac{1}{8}$	9	860	$1\frac{1}{4}$	10.50	$2\frac{1}{4}$	$\frac{1}{8}$	5	122
						$1\frac{1}{2}$	10.50	$2\frac{3}{4}$	$\frac{1}{8}$	4	106

Quantity extras.....	100 to 200 lbs.	50 to 100 lbs.	25 to 50 lbs.	5 to 25 lbs.	1 to 5 lbs.
add per 100 lbs.....	\$0.10	\$0.20	\$0.30	\$0.50	\$1.00

Cast Iron Washers

Gov't O. G. Standard



Malleable Iron Washers

Standard Plain Pattern



200-Pound Kegs

Same diameter as cast iron washer but only half as thick. Holes are clean and surfaces smooth. Practically indestructible as they are made of refined malleable iron.

Size of Bolt, Inches	Price per Hundred Washers	Hole, Inches	Diam., Inches	Thickness, Inches	Approx. Weight, Lbs. Oz.
$\frac{1}{8}$	\$ 2.50	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	7
$\frac{1}{4}$	3.00	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{8}$	12
$\frac{3}{8}$	4.00	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{3}{8}$	1
$\frac{1}{2}$	5.50	$\frac{3}{4}$	1	$\frac{3}{8}$	6
$\frac{5}{8}$	8.00	1	$1\frac{1}{4}$	$\frac{1}{2}$	...
$\frac{3}{4}$	10.00	$1\frac{1}{8}$	$1\frac{1}{2}$	$\frac{1}{2}$	...
$\frac{7}{8}$	18.00	$1\frac{3}{8}$	$1\frac{3}{4}$	$\frac{1}{2}$	...
1	24.00	$1\frac{5}{8}$	2	$\frac{1}{2}$	...

No.	Size of Bolt, Inches	Price per 100 Washers	Diam., Inches	Thickness, Inches	Approx. Weight, per 100
37	$\frac{1}{8}$	\$ 1.50	$\frac{1}{4}$	$\frac{1}{4}$	15
38	$\frac{1}{4}$	2.20	$\frac{3}{8}$	$\frac{1}{4}$	22
40	$\frac{3}{8}$	3.30	$\frac{1}{2}$	$\frac{1}{4}$	33
42	$\frac{1}{2}$	5.00	$\frac{3}{4}$	$\frac{1}{4}$	50
43	$\frac{5}{8}$	6.80	1	$\frac{1}{4}$	68
44	$\frac{3}{4}$	8.70	$1\frac{1}{4}$	$\frac{1}{4}$	87
45	$\frac{7}{8}$	15.00	$1\frac{1}{2}$	$\frac{1}{4}$	150
46	1	19.00	$1\frac{3}{4}$	$\frac{1}{4}$	190
49	$1\frac{1}{8}$	20.60	2	$\frac{1}{4}$	206
140	$1\frac{1}{4}$	42.00	$2\frac{1}{4}$	$\frac{1}{4}$	420

Special cast or malleable washers furnished promptly upon receipt of sketches, such as angle or star washers, spool, floor or socket washers.

Malleable Iron Washers

With Nut Locking Feature



SEE THAT POINT IT LOCKS WASHER SEE THAT I US IT LOCKS NUT

Same diameter as cast iron washers but only half as thick. Being strong also two-thirds lighter than cast iron washers, considerable saving is effected in freight, hauling and weight to structure. Also save $\frac{1}{2}$ inch in length of bolt used and in addition have nut locking feature without additional cost to purchaser. Nut locking feature does not interfere with its use as a plain washer. Locks by placing cold chisel in any one of the beveled slots—one blow of hammer will turn up a burr and lock the nut.



Price in 200 Lb. Kegs

Size of Bolt, inches	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	$1\frac{3}{4}$	2
Diameter, inches	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	$1\frac{3}{4}$	2
Thickness, inches	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{3}{8}$	$\frac{1}{4}$	$\frac{1}{8}$
Weight per 100 washers, pounds	15	22	33	50	68	87	150	190	206
Price per 100 washers	\$1.50	\$2.20	\$3.30	\$5.00	\$6.80	\$8.70	\$15.00	\$19.00	\$20.60

For Small Washers, see Brass Washers also Burrs

H.Channon Company Chicago

No. 5 Tank Lugs

Malleable Iron—For Round Rods—Side Pull,
Closed Top Type—For Tanks, Silos, Etc.



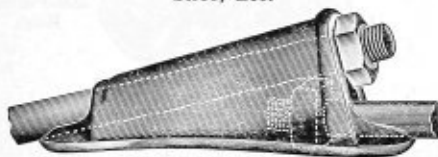
A strong well finished lug made of high grade malleable iron, carefully inspected and tested.

Diameter of Rod, Inches	Weight per 100 Pieces, Pounds	Number of Pieces in Barrel	List per 100
$\frac{3}{8}$	65	800	\$ 7.00
$\frac{1}{2}$	80	550	8.00
$\frac{5}{8}$	110	500	10.00
$\frac{3}{4}$	150	325	14.00
$\frac{7}{8}$	240	200	24.00
1	270	160	30.00
$1\frac{1}{8}$	370	100	35.00
$1\frac{1}{4}$	460	90	48.00
$1\frac{1}{2}$	700	75	72.00

Galvanized to order. Prices upon request.

No. 2 Tank Lugs

Malleable Iron—For Round Rods—Straight
Pull Type—For Pipe Lines, also Tanks,
Silos, Etc.



The drawing up of only one nut makes this a very convenient and quickly applied lug. Top is closed the entire length.

Diameter of Rod, Inches	Weight per 100 Pieces, Pounds	Number of Pieces in Barrel	List per 100
$\frac{3}{8}$	25	1100	\$ 6.00
$\frac{1}{2}$	35	1000	7.00
$\frac{5}{8}$	80	900	8.00
$\frac{3}{4}$	130	550	10.00
$\frac{7}{8}$	150	475	14.00
$\frac{1}{2}$	220	225	24.00
1	275	190	30.00

No. 3 Flat Band Lugs

Malleable Iron—For Flat Bands—
Single Bolt Type



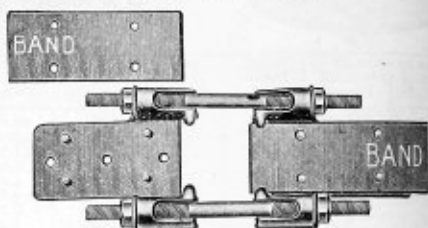
To apply, insert hoop end under the fingers of the lug. The studs on the lug take the place of rivets or bolts in the perforations of the band, which cannot slip off. Easily applied.

Size of Band, Inches	Size of Bolt, Inches	Price per Pair
$1\frac{1}{2}$	$\frac{1}{2}$ x 11	\$0.40
$1\frac{3}{4}$	$\frac{5}{8}$ x 11	.50
2	$\frac{3}{4}$ x 11	.60
$2\frac{1}{2}$	$\frac{7}{8}$ x 11	.80

Galvanized to order. Prices upon request.

No. 3 D. B. Flat Band Lugs

Double Bolt Type



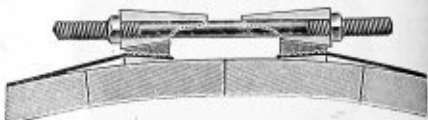
Lug has lugs as well as holes and can be bolted or riveted as desired.

To apply insert the hoop end under the fingers of the lug. The studs on the lug take the place of rivets or bolts in the perforations of the band which cannot slip off as the fingers hold it in place.

Size of Band, Inches	Size of Bolt, Inches	Price per Pair
3	$\frac{5}{8}$ x 11	\$1.00
4	$\frac{3}{4}$ x 11	2.00

No. 4 Tank or Kiln Lug

Single Bolt Type



Shows section of single bolt lug and corrugated key wedges as applied to tank.

Size of Band, Inches	Size of Bolt, Inches	Price per Pair
$1\frac{1}{2}$	$\frac{5}{8}$ x 11	\$0.40
$1\frac{3}{4}$	$\frac{3}{4}$ x 11	.50

No. 4 D. B. Lug



To apply, bend ends of band slightly as shown. Place lug in position on band—drive in the wedge with corrugated side next to the band—drawing bolts to a good tension—then drive wedges hard—tightening them uniformly.

Size of Band, Inches	Size of Bolt, Inches	Price per Pair
2	$\frac{1}{2}$ x 11	\$0.60
$2\frac{1}{2}$	$\frac{1}{2}$ x 11	.80
3	$\frac{5}{8}$ x 11	1.00
$3\frac{1}{2}$	$\frac{3}{4}$ x 11	1.50
4	$\frac{3}{4}$ x 12	2.00
$4\frac{1}{2}$	$\frac{7}{8}$ x 12	2.50
5	$\frac{7}{8}$ x 16	3.00
6	1 x 16	3.50

Structural and Boiler Rivets

Extra Soft Open Hearth Steel



Button Head
Structural



Cone Head
Boiler



Steeple Head



Countersunk Head
Measured Over All

Base Sizes

Boiler Rivets, standard heads.....	$\frac{3}{4}$ to $1\frac{1}{4}$ diameter, incl.—2 to 5 inches long, incl.
Structural Rivets, standard heads.....	$\frac{3}{4}$ to $1\frac{1}{4}$ diameter, incl.—2 to 5 inches long, incl.
Boiler Rivets, straight necks.....	$\frac{3}{4}$ to $1\frac{1}{4}$ diameter, incl.—2 to 5 inches long, incl.

Above in kegs or bags, weighing approximately 200 to 300 lbs.

Standard Extras per 100 Pounds

(Oct. 15, 1912)

$\frac{1}{2}$ and $\frac{3}{4}$ Diameter	$\frac{1}{2}$ and $\frac{3}{4}$ Diameter	Larger than $1\frac{1}{4}$	Lengths 1 Inch and Shorter	Lengths Between 1 and 2 Inches	Lengths Over 5 Inches	Flat Head	Std. C. S. Heads	100-Pound Packages
\$0.50	\$0.15	\$0.25	\$0.50	\$0.25	\$0.25	\$0.25	\$0.25	\$0.10

Rivets with swell necks, per 100 lbs.....	\$0.25
Special heads, not reg. std., per 100 lbs.....	.25
Rivets, 5 inches and longer, less than 1000 lbs.....	.25
Small orders for miscellaneous sizes for less than two tons.....	.10

Cold, or hot made solid die rivets when specially specified.....	\$0.25
Annealing cold made rivets $\frac{1}{2}$ and larger.....	.35
Shipping less than 100 pounds of a size.....	.50
All Cone and C. S. Head Rivets at Boiler Rivet price.	

Approximate Weight per 100 Pieces of Cone and Button Head Rivets

Length	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	1	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$
$\frac{1}{2}$	8.75	13.70	16.20												
$\frac{3}{4}$	9.35	14.40	17.22												
1	10.00	15.20	18.25	21.70	26.55										
$1\frac{1}{4}$	10.70	16.00	19.28	23.10	28.00										
$1\frac{1}{2}$	11.40	16.80	20.31	24.50	29.45	37.0	46	55	60						
$1\frac{3}{4}$	12.10	17.60	21.34	25.90	30.90	38.0	48	58	63	81	95				
2	12.80	18.40	22.37	27.30	32.35	40.2	50	60	65	84	98	133			
$2\frac{1}{4}$	13.50	19.20	23.40	28.70	33.80	41.9	52	62	67	87	101	137	171		
$2\frac{1}{2}$	14.20	20.00	24.43	30.10	35.25	43.5	54	65	69	90	104	141	177	222	
$2\frac{3}{4}$	14.90	20.80	25.46	31.50	36.70	45.2	56	67	71	93	107	145	182	228	
3	15.60	21.60	26.49	32.90	38.15	47.0	58	69	74	96	110	149	187	234	
$3\frac{1}{4}$	16.30	22.40	27.52	34.30	39.60	48.7	60	72	77	99	114	153	192	240	
$3\frac{1}{2}$	17.00	23.20	28.55	35.70	41.05	50.3	62	74	80	102	118	157	198	246	
$3\frac{3}{4}$	17.70	24.00	29.58	37.10	42.50	51.9	64	76	83	105	121	161	203	253	
4	18.40	24.80	30.61	38.50	43.95	53.5	66	78	86	109	124	165	208	259	
$4\frac{1}{4}$	19.10	25.60	31.64	39.90	45.40	55.1	68	81	89	112	127	169	213	265	
$4\frac{1}{2}$	19.80	26.40	32.67	41.30	46.85	56.8	70	83	92	115	130	173	218	271	
$4\frac{3}{4}$	20.50	27.20	33.70	42.70	48.30	58.4	72	85	95	118	133	177	223	278	
5	21.20	28.00	34.73	44.10	49.75	60.0	74	88	98	121	137	181	228	284	
$5\frac{1}{4}$	21.90	28.80	35.76	45.50	51.20	61.6	76	90	101	124	141	185	234	290	
$5\frac{1}{2}$	22.60	29.60	36.79	46.90	52.65	63.3	78	92	103	127	144	189	239	296	
$5\frac{3}{4}$	23.30	30.40	37.82	48.30	54.10	64.9	80	94	106	130	148	193	244	302	
6	24.00	31.50	38.85	49.70	55.55	66.6	82	97	108	134	151	197	250	309	
$6\frac{1}{4}$	24.70	32.40	39.88	51.10	57.00	68.1	84	99	111	137	155	201	255	315	
$6\frac{1}{2}$	25.40	33.30	40.91	52.50	58.45	69.8	86	101	113	140	158	205	260	321	
$6\frac{3}{4}$	26.10	34.20	41.94	53.90	59.90	71.4	88	104	116	143	162	209	265	327	
7	26.80	35.20	42.97	55.30	61.35	73.0	90	106	118	146	165	213	271	334	
$7\frac{1}{4}$	27.50	36.00	44.00	56.70	62.80	74.6	92	108	120	149	168	217	276	340	
$7\frac{1}{2}$	28.20	36.90	45.03	58.10	64.25	76.3	94	111	124	152	172	221	282	346	
$7\frac{3}{4}$	28.90	37.80	46.06	59.50	65.70	77.9	96	113	126	155	175	225	287	352	
8	29.60	38.60	47.09	60.90	67.15	79.5	98	115	128	158	179	229	292	359	
$8\frac{1}{4}$	30.30	39.50	48.12	62.30	68.60	81.1	100	117	130	161	182	233	297	365	
$8\frac{1}{2}$	31.00	40.40	49.15	63.70	70.05	82.8	102	120	133	165	186	237	303	372	
$8\frac{3}{4}$	31.70	41.30	50.18	65.10	71.50	84.4	104	122	135	168	189	241	308	378	
9	32.40	42.20	51.21	66.50	72.95	86.0	106	124	137	171	193	245	313	384	
$9\frac{1}{4}$	33.10	43.10	52.24	67.90	74.40	87.6	108	126	139	174	196	249	318	390	
$9\frac{1}{2}$	33.80	44.00	53.27	69.30	75.85	89.3	110	128	141	177	200	254	324	396	
$9\frac{3}{4}$	34.50	44.90	54.30	70.70	77.30	90.9	112	130	143	179	202	257	329	402	
10	35.20	45.80	55.33	72.10	78.75	92.5	114	134	154	183	206	263	334	409	
$10\frac{1}{4}$	35.90	46.70	56.36	73.50	80.20	94.1	116	136	156	186	208	266	339	415	
$10\frac{1}{2}$	36.60	47.10	57.39	74.90	81.65	95.7	118	138	160	190	212	272	345	422	
$10\frac{3}{4}$	37.30	48.00	58.42	76.30	83.10	97.3	120	140	162	192	214	275	350	428	

Weight of Heads Alone per 100 Pieces	5.50	8.40	11.50	13.20	18.00	23.0	29.0	33	38	46	56	77.5	103	134
--------------------------------------------	------	------	-------	-------	-------	------	------	----	----	----	----	------	-----	-----

Button Head Rivets weigh a little less, but approximately the same as Cone Head.

H.Channon Company Chicago

Small Bulk Rivets

Popular Sizes are $\frac{3}{8}$, $\frac{5}{8}$, $\frac{3}{4}$, $\frac{7}{8}$
and No. 11



Old Standard Wire Gauge

List Prices Below are Per Pound in
5 and 10 lb. Boxes

Length Inches	DIAMETER OF RIVET OR SIZE WIRE																			
	$\frac{1}{16}$ Inch	$\frac{3}{16}$ Inch	$\frac{1}{2}$ Inch	$\frac{5}{8}$ Inch	No. 1 .300	No. 2 .284	No. 3 .259	$\frac{3}{4}$ Inch	No. 4 .238	No. 5 .220	No. 6 .203	$\frac{7}{8}$ Inch	No. 7 .180	No. 8 .165	No. 9 .148	No. 10 .134	No. 11 .120	No. 12 .109	No. 13 .095	No. 14 .083
1 in. & longer	\$0.19	\$0.19	\$0.19	\$0.19	\$0.20	\$0.20	\$0.20	\$0.20	\$0.21	\$0.21	\$0.21	\$0.21	\$0.21	\$0.22	\$0.23	\$0.24	\$0.25	\$0.26	\$0.26	\$0.27
$\frac{1}{2}$ in.	.19	.19	.20	.20	.20	.20	.20	.20	.21	.21	.21	.21	.21	.22	.23	.24	.25	.26	.26	.27
$\frac{3}{4}$ in.	.19	.19	.20	.20	.20	.20	.20	.20	.21	.21	.21	.21	.21	.22	.23	.24	.25	.26	.26	.27
$\frac{1}{2}$ in. & longer	.20	.20	.20	.20	.21	.21	.21	.21	.22	.22	.22	.22	.23	.23	.24	.25	.26	.27	.27	.28
$\frac{1}{4}$ in.		.21	.21	.21	.22	.22	.22	.22	.23	.23	.23	.23	.24	.24	.25	.26	.27	.28	.28	.29
$\frac{1}{8}$ in.			.21	.22	.23	.23	.23	.23	.24	.24	.24	.24	.25	.25	.26	.27	.28	.28	.29	.30
$\frac{1}{16}$ in.				.22	.23	.23	.23	.23	.24	.24	.24	.24	.25	.25	.26	.27	.28	.28	.29	.30
$\frac{1}{32}$ in.				.22	.23	.23	.23	.23	.24	.24	.24	.24	.25	.25	.26	.27	.28	.28	.29	.30
$\frac{1}{64}$ in.					.23	.23	.23	.23	.24	.24	.24	.24	.25	.25	.26	.27	.28	.28	.29	.30
$\frac{1}{128}$ in.					.23	.23	.23	.23	.24	.24	.24	.24	.25	.25	.26	.27	.28	.28	.29	.30
$\frac{1}{256}$ in.						.24	.24	.24	.24	.24	.24	.24	.25	.25	.26	.27	.28	.28	.29	.30
$\frac{1}{512}$ in.							.24	.24	.24	.24	.24	.24	.25	.25	.26	.27	.28	.28	.29	.30
$\frac{1}{1024}$ in.								.24	.24	.24	.24	.24	.25	.25	.26	.27	.28	.28	.29	.30
$\frac{1}{2048}$ in.									.24	.24	.24	.24	.25	.25	.26	.27	.28	.28	.29	.30
$\frac{1}{4096}$ in.										.25	.25	.25	.26	.26	.27	.28	.28	.29	.30	.31
$\frac{1}{8192}$ in.											.26	.26	.27	.27	.28	.29	.29	.30	.31	.32
$\frac{1}{16384}$ in.												.28	.29	.30	.31	.32	.33	.34	.35	.36
$\frac{1}{32768}$ in.													.29	.30	.32	.33	.36	.44	.51	.61



The above Special Heads are made up to order.

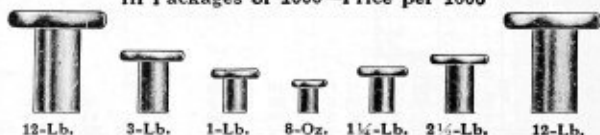
Dimensions under number of gauge are old standard wire gauge expressed in thousandths of an inch.

For 25 and 50-pound boxes deduct 2c pound, for 100 pounds deduct 3c lb., for 100 and 200-pound kegs deduct 4c pound. Rins made from smaller wire than No. 14, all lengths, list 80c pound; 3-32 diameter use list of No. 13; 7-32 diameter use list of No. 5; 5-32 use list of No. 8; 3/8 diameter list of No. 11; 9-32 use list of No. 2.

For shoulder and pointed rivets add 2c pound, excepting pointed bame, ester and sucker rod. Net extras for tinned or copper plated add 1c per pound to net price. For metallic tinning or brass plating add 2½c per pound to net price. For bright rivets add ½c per pound.

Tinners' Rivets—Flat Heads

In Packages of 1000—Price per 1000



Exact Sizes

Size	Ounce Sizes				Pound Sizes											
	8	10	12	14	1	1½	1¾	1½	2	2½	3	3½	4	5	6	7
Diameter Barrel, inches.....	.086	.081	.095	.095	.103	.115	.123	.131	.139	.143	.153	.161	.170	.174	.197	.206
Length, Barrel, in 64ths.....	10	11	12	12	13	14	15	16	17	18	20	21	22	24	25	26
Diameter, Head, in 64ths.....	12	13	14	15	16	17	18	19	19	20	23	24	25	27	29	29
Thickness, Head, Inches.....	.023	.020	.020	.020	.020	.025	.025	.040	.045	.050	.055	.060	.065	.070	.075	.086
Black..... per 1,000.....	22	24	26	28	29	32	37	41	44	56	66	79	89	100	112	131
Metaline Tinned..... per 1,000.....	31	35	39	43	47	54	64	72	79	100	115	134	149	179	188	177
Tin Plated..... per 1,000.....	26	29	32	35	37	42	49	55	59	75	85	99	109	138	147	184

[illegible]

Black, per lb.....	.42	.38	.35	.33	.30	.27	.26	.25	.24	.24	.23	.23	.22	.22	.21	.21	.21	.21	.20	.19
--------------------	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Length of barrel and diameter head given in 64ths of an inch. See 2-pound size 17 equals 17-64 in length.

Tinners' Rivet Sets



Solid Cast Steel

Highly Tempered

Number.....	00	0	1	2	3	4	5	6	7	8
For iron rivets, pounds and ounces.....	14	12-10	8	6	5-4	3-2½	2-3¾	1½	1¼-1	10-11
For copper rivets, Nos.		5	6	7	8	9	10 & 11	12	13	14
Length, inches.....	5½	5	5	5	4½	4½	4½	4½	4½	4
Approximate weight per dozen, pounds.....	10½	10½	7	7	5	5	3½	3½	3	3
Price each.....	\$0.90	\$0.90	\$0.75	\$0.75	\$0.60	\$0.60	\$0.45	\$0.45	\$0.40	\$0.40

Common Wire Nails (Actual Sizes)

60d.—6 in. x No. 2.

This nail, as actually made, is $\frac{1}{4}$ in. longer than shown.

50d.—5½ in. x No. 3.

40d.—5 in. x No. 4.

30d.—4½ in. x No. 5.

20d.—4 in. x No. 6.

16d.—3½ in. x No. 8.

12d.—3¼ in. x No. 9.

10d.—3 in. x No. 9.

9d.—2¾ in. x No. 10¼.

8d.—2½ in. x No. 10¼.

7d.—2¼ in. x No. 11¼.

6d.—2 in. x No. 11¼.

5d.—1¾ in. x No. 12¼.

4d.—1½ in. x No. 12¼.

3d.—1¼ in. x No. 14.

2d.—1 in. x No. 15.



Sizes and Extras (100-Pound Kegs)

Size	Length, Inches	Gauge No.	Approx. No. to Pound	Extra Over Base Price	Size	Length, Inches	Gauge No.	Approx. No. to Pound	Extra Over Base Price
2d	1	15	876	\$0.70	10d	3	9	69	\$0.05
3d	1¼	14	568	.45	12d	3¼	9	63	.05
4d	1½	12½	316	.30	16d	3½	8	49	.05
5d	1¾	12½	271	.30	20d	4	6	31	Base
6d	2	11½	181	.20	30d	4½	5	24	Base
7d	2¼	11½	161	.20	40d	5	4	18	Base
8d	2½	10½	106	.10	50d	5½	3	14	Base
9d	2¾	10½	96	.10	60d	6	2	11	Base

Barbed nails furnished in all sizes and styles at 15c per 100 lbs. over smooth.

We carry an enormous stock at all times.

Common Wire Nails

For Actual Sizes and Extras See Opposite Page

Uniform in length and size. Heads of proper size. Points are right. Rigid inspection. All of our nails are thoroughly cleaned and polished. Kegs are all strong, plainly marked and are guaranteed to contain full weight (100 pounds) of good nails.

Wire nails are used everywhere—the world over—and are as staple as sugar in a grocer's stock.

They are cheap in price—the cost of nails—on any piece of work—large or small—being usually the lowest cost item on the job. Yet there is real economy in getting good nails and the right kind and size. Nails of poor quality often spoil a good job and the damage done makes them high at any price.

Don't buy nails too large in size—they may split the wood or, for the sake of economy order them too thin and have trouble in not being able to drive them.

For Standard Extras and actual sizes, see opposite page.



Standard Cement Coated Nails



"Cooler" Type Head Flat and Thin. Made in Sizes Up to 12 Penny Only.



"Sinker" Type Head is Reinforced by Slight Counter Sinking which Reduces the Diameter.

Size, Penny	2	3	4	5	6	7	8	9	10	11	12	16	20	30	40	50	60
Gauge	16	15½	14	13½	13	12½	11½	11½	11	10	9	7	6	5	4	3	2
Length, inches	1	1½	1¾	1¾	1¾	2¼	2¼	2½	2½	3¼	3¼	3¼	4¼	4¼	5¼	5¼	6¼
Number in keg	85,700	54,300	29,800	25,500	17,900	15,300	10,100	8,900	6,200	4,900	3,100	2,400	1,800	1,300	1,100	1,100	1,100
Net weight, pounds	79	64	61	70	65	72	71	68	63	80	80	83	84	82	79	82	82

Advance over base... \$0.70 \$0.45 \$0.30 \$0.30 \$0.20 \$0.20 \$0.10 \$0.10 \$0.05 \$0.20 \$0.20 \$0.20 \$0.20 \$0.20 \$0.20 \$0.20 \$0.20
Sold by count system—kegs weigh less than uncoated nails but contain same count.

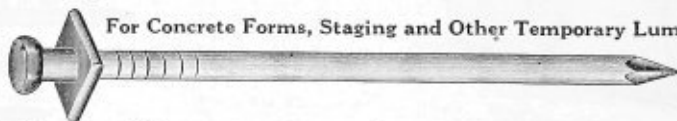
Cement Coated Box Nails (Cooler Head)

Lighter in gauge than standard and greater count. For automatic nailing machines.

Size, Penny	2	3	4	5	6	7	8	9	10	12	16	20
Gauge	16½	16	15½	15	13½	13½	12½	12½	11½	11½	11	10
Length, inches	1	1¼	1¾	1¾	1¾	2¼	2¼	2½	2½	3¼	3¼	3¼
Number in keg	96,200	64,600	45,500	39,700	23,600	19,300	14,000	13,100	8,900	5,700	7,100	5,200
Net weight, pounds	74	68	64	74	77	72	75	78	75	80	78	83

Advance over base... \$1.00 \$0.70 \$0.50 \$0.50 \$0.35 \$0.35 \$0.25 \$0.25 \$0.15 \$0.35 \$0.35 \$0.35

"Economy" Double Headed Concrete Form Nails



For Concrete Forms, Staging and Other Temporary Lumber Structures

These patented nails can be withdrawn and used over again. The second head has an area of four or five times as great as ordinary nails and these double headed nails may be driven home harder and the boards may be drawn together more tightly. Standard 100 lb. kegs.

Size, Penny	6d	8d	10d	16d	20d
List Prices, per lb.	\$0.14	\$0.13½	\$0.12½	\$0.12	\$0.11½

"Pull-Easy" Nail Collars



Size, Penny	4	5	6	8	10	12	16	20	30	40	50	60
Number of collar	1	1	1	1	1 and 2	2	2	2	3	3	3	3
Price per 1000	No. 1 \$1.80					No. 2 \$1.90			No. 3 \$5.00			

Round Wire Spikes



Flat Head—Diamond Point



Oval Head—Chisel Point

Size.....	40 d	50 d	60 d	7-Inch	8-Inch	9-Inch	10-Inch	12-Inch
Length, inches.....	5	5½	6	7	8	9	10	12
Gauge.....	No. 2	No. 1	No. 1	¾-inch	¾-inch	¾-inch	¾-inch	¾-inch
Approximate number to pound.....	13	10	9	7	4	3	3	2½
Extra over base.....	\$0.10	\$0.10	\$0.10	\$0.10	\$0.10	\$0.10	\$0.25	\$0.25

Square Boat Spikes (200 lb. kegs)



These are driven mostly in hard timbers and it stands to reason that a spike with a clean cut, sharp, chisel point will facilitate the work. The process of manufacturing our spikes insures a product that will drive easily and hold well. Uniform as to length and gauge, drive straight and true. Heads will not fly off.

Sizes	Lengths	Extras per 100 Pounds	Sizes	Lengths	Extras per 100 Pounds
¼ inch square	3 to 3½ inches	\$1.00	¾ inch square	4 to 12 inches	\$0.30
½ " "	4 to 8 " "	.75	1 " "	6 to 12 " "	.20
¾ " "	3½ " "	.70	1½ " "	6 to 12 " "	.15
1 " "	4 to 8 " "	.45	2 " "	8 to 14 " "	.15
1½ " "	3 to 3½ " "	.55			

Approximate Number of Boat Spikes in 200-Pound Keg

Length, inches	3	4	5	6	7	8	9	10	11	12	14	16
¼ inch square	3000	2375	2050	1825								
½ " "	1600	1360	1230	1175	990	880						
¾ " "	1320	1140	940	800	650	600	525	475				
1 " "				600	590	510	400	360	320	230		
1½ " "				450	375	335	300	275	260	240		
2 " "						260	240	220	205	190	175	160

Approximate Number of Wire Nails per Pound

Wire Gauge	1	2	3	4	5	6	7	8	9	10	11	12
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												
22												

These approximate numbers are an average only, and the figures given may be varied either way, by changes in the dimensions of the heads or points. Brads and no-head nails will run more to the pound than table shows, and larger or thick headed nails will run less.

Common Brads



Size	Length and Gauge		Approx. No. to Lb.	Extra Over Base Price
2d	1	inch No. 15	876	\$0.70
3d	1 1/4	" " 14	568	.45
4d	1 1/2	" " 12 1/2	316	.30
5d	1 3/4	" " 12 1/2	271	.30
6d	2	" " 11 1/2	181	.20
7d	2 1/4	" " 11 1/2	161	.20
8d	2 1/2	" " 10 3/4	106	.10
9d	2 3/4	" " 10 3/4	96	.10
10d	3	" " 9	69	.05
12d	3 1/4	" " 9	64	.05
16d	3 1/2	" " 8	49	.05
20d	4	" " 6	31	Base
30d	4 1/2	" " 5	24	Base
40d	5	" " 4	18	Base
50d	5 1/2	" " 3	16	Base
60d	6	" " 2	11	Base

Flooring Brads



Size	Length and Gauge		Approx. No. to Lb.	Extra Over Base Price
6d	2	inch No. 11	157	\$0.20
7d	2 1/4	" " 11	139	.20
8d	2 1/2	" " 10	99	.10
9d	2 3/4	" " 10	90	.10
10d	3	" " 9	69	.05
12d	3 1/4	" " 8	54	.05
16d	3 1/2	" " 7	43	.05
20d	4	" " 6	31	Base

Barbed nails furnished in all sizes and styles at 15c per 100 lbs. over smooth.

Casing Nails



Size	Length and Gauge		Approx. No. to Lb.	Extra Over Base Price
2d	1	inch No. 15 1/2	1010	\$1.00
3d	1 1/4	" " 14 1/2	635	.70
4d	1 1/2	" " 14	473	.50
5d	1 3/4	" " 14	406	.50
6d	2	" " 12 1/2	236	.35
7d	2 1/4	" " 12 1/2	210	.35
8d	2 1/2	" " 11 1/2	145	.25
9d	2 3/4	" " 11 1/2	132	.25
10d	3	" " 10 1/2	94	.15
12d	3 1/4	" " 10 1/2	87	.15
16d	3 1/2	" " 10	71	.15
20d	4	" " 9	52	.15
30d	4 1/2	" " 9	46	.15
40d	5	" " 8	35	.15

Finishing Nails



Size	Length and Gauge		Approx. No. to Lb.	Extra Over Base Price
2d	1	inch No. 16 1/2	1351	\$1.15
3d	1 1/4	" " 15 1/2	807	.85
4d	1 1/2	" " 15	584	.65
5d	1 3/4	" " 15	500	.65
6d	2	" " 13	309	.45
7d	2 1/4	" " 13	238	.45
8d	2 1/2	" " 12 1/2	189	.35
9d	2 3/4	" " 12 1/2	172	.35
10d	3	" " 11 1/2	121	.25
12d	3 1/4	" " 11 1/2	113	.25
16d	3 1/2	" " 11	90	.25
20d	4	" " 10	62	.25

Smooth Box Nails



Size	Length and Gauge		Approx. No. to Lb.	Extra Over Base Price
2d	1	inch No. 15 1/2	1010	\$1.00
3d	1 1/4	" " 14 1/2	635	.70
4d	1 1/2	" " 14	473	.50
5d	1 3/4	" " 14	406	.50
6d	2	" " 12 1/2	236	.35
7d	2 1/4	" " 12 1/2	210	.35
8d	2 1/2	" " 11 1/2	145	.25
9d	2 3/4	" " 11 1/2	132	.25
10d	3	" " 10 1/2	94	.15
12d	3 1/4	" " 10 1/2	87	.15
16d	3 1/2	" " 10	71	.15
20d	4	" " 9	52	.15
30d	4 1/2	" " 9	46	.15
40d	5	" " 8	35	.15

Barbed Box Nails

Size	Length and Gauge		Approx. No. to Lb.	Extra Over Base Price
2d	1	inch No. 15 1/2	1010	\$1.15
3d	1 1/4	" " 14 1/2	635	.85
4d	1 1/2	" " 14	473	.65
5d	1 3/4	" " 14	406	.65
6d	2	" " 12 1/2	236	.50
7d	2 1/4	" " 12 1/2	210	.50
8d	2 1/2	" " 11 1/2	145	.40
9d	2 3/4	" " 11 1/2	132	.40
10d	3	" " 10 1/2	94	.30
12d	3 1/4	" " 10 1/2	87	.30
16d	3 1/2	" " 10	71	.30
20d	4	" " 9	52	.30
30d	4 1/2	" " 9	46	.30
40d	5	" " 8	35	.30

Barbed Nails furnished in all Sizes and Styles at 15c per 100 lbs. over Smooth

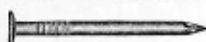
Wire Shingle Nails



Size	Length, Inches	Gage No.	Approx. No. to Lb.	Extra over Base Price
3d	1 1/4	13	429	\$0.45
3 1/2d	1 3/8	12 1/2	345	.40
4d	1 1/2	12	274	.30

Barbed nails furnished in all sizes at 15c per 100 lbs. over smooth.

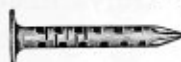
Sterilized Blued Lath Nails



Lathers carry the nails in the mouth while at work and it is, therefore, from the standpoint of health sanitation, necessary to have the nails free from all injurious substances. Polished or bright nails cannot be made or kept entirely clean owing to process of manufacture as well as the effect of atmospheric conditions.

Size	Length Inches	Gage No.	Approx. Number to Pound	Extra over Base Price
2d	1	16 1/2	1351	\$1.25
2d light	1	17	1560	1.35
3d	1 1/8	15	778	.75
3d light	1 1/8	16	1015	.90

Barbed Roofing Nails



Size Inches	Length Inches	Gage No.	Approx. Number to Pound	Extra over Base Price
1 1/2	3 1/2	13	714	\$0.75
1 3/8	3 1/8	12	469	.65
1 1/4	1	12	411	.60
1 1/4	1 1/4	12	365	.60
1 1/4	1 1/4	11	251	.55
1 1/4	1 1/4	11	230	.55
1 1/2	1 1/2	10	176	.45
1 1/4	1 1/4	10	151	.45
2	2	9	103	.35

Large Head (1/2 in.) Barbed Roofing Nails



Length Inches	No. 8		No. 9		No. 10	
	Extra	No. per Lb.	Extra	No. per Lb.	Extra	No. per Lb.
3/4	\$0.65	205	\$0.75	252	\$0.95	290
1	.55	179	.65	219	.85	253
1 1/4	.45	158	.55	193	.75	224
1 1/2	.40	142	.50	173	.70	201
1 3/4	.35	128	.45	156	.65	183
1 3/8	.30	108	.40	131	.60	154
1 1/4	.25	93	.35	113	.55	133

Extra prices for small lots, depending upon quantity.



American Felt Roofing Nails

A large head nail especially designed for use in laying prepared roofing material. This nail, having an extra large head and thin shank, meets admirably the requirements for placing all prepared roofing. The head is reinforced on the shank so that it will not easily pull or break off.

Count per Pound	Length Inches	Gage No.	Diameter of Heads Inches
180	1	12	5/8
195	1 1/8	12	5/8
162	1	11	5/8
175	1 1/8	11	5/8

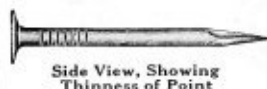


Plaster Board Nails

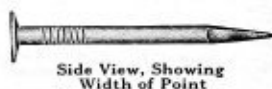
A smooth nail with diamond point and 1/2-inch flat head.

1 inch	No. 9 \$0.50 Extra	No. 10 \$0.60 Extra
1 1/4 inch	No. 9 .40 Extra	No. 10 .50 Extra
1 1/2 inch	No. 9 .35 Extra	No. 10 .45 Extra

Clout Nails



Side View, Showing Thinness of Point



Side View, Showing Width of Point

Length Inches	Gage No.	Approx. Number to Pound	Extra over Standard Base Prices
3/4	15	1160	\$1.30
7/8	14	808	1.15
1	14	705	1.00
1 1/8	14	628	.90
1 1/4	13	423	.80
1 3/8	13	390	.75
1 1/2	13	350	.60

No. 8 Barbed Dowel Pins



Length	Number to Pound	Extra
5/8	290	\$1.25
3/4	250	1.00
7/8	210	.85
1	190	.70
1 1/8	165	.60
1 1/4	150	.60
1 3/8	130	.60
1 1/2	120	.60

Special Fine Nails

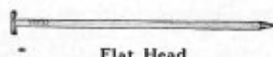


Size	Length Inches	Gage No.	Approx. Number to Pound	Advance over Base Price
2d	1	16 1/2	1351	\$1.00
3d	1 1/4	15	718	.50
4d	1 1/2	14	473	.50
2d extra fine	1	17	1500	1.10
3d extra fine	1 1/4	16	1015	.65

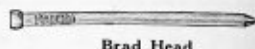
3d fine and 3d extra fine for lathing purposes usually furnished blued.

H. Channon Company Chicago

Wire Brads in 1 lb. Packages



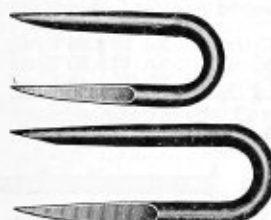
Flat Head



Brad Head

Be Sure to State Whether Flat or Brad Heads Are Desired

$\frac{3}{8}$ Inch		$\frac{1}{2}$ Inch		$\frac{3}{4}$ Inch		1 Inch		$1\frac{1}{2}$ Inch		2 Inch	
No. 19	\$1.00	No. 18	\$0.65	No. 16	\$0.43	No. 15	\$0.33	No. 12	\$0.29	No. 12	\$0.25
20	1.25	20	.85	18	.52	16	.36	14	.30	13	.29
22	1.90					17	.40	15	.31	14	.30
						18	.43	17	.38	15	.35
$\frac{3}{8}$ Inch		$\frac{5}{8}$ Inch		$\frac{7}{8}$ Inch		$1\frac{1}{4}$ Inch		$1\frac{3}{4}$ Inch		$2\frac{1}{2}$ Inch	
No. 19	\$0.90	No. 14	\$0.43	No. 12	\$0.33	No. 12	\$0.29	No. 12	\$0.28	No. 10	\$0.26
20	1.00	16	.63	14	.36	14	.31	14	.29	11	.27
22	1.55	18	.68	16	.39	15	.32	15	.30	12	.27
		20	.75	18	.45	16	.34	16	.32	13	.25
$\frac{1}{2}$ Inch		$\frac{3}{4}$ Inch		1 Inch							
No. 15	\$0.55	No. 12	\$0.36	No. 12	\$0.30						
16	.55	14	.38	14	.32						



Fence Staples

(In 100 lb. kegs.)
Cuts shown are full size $1\frac{1}{4}$ and $1\frac{1}{2}$.
Furnished Annealed, Polished, Galvanized.

Size Wire	Extra per 100 Pounds	Size Wire	Extra per 100 Pounds
No. 9 Wire	Base	No. 12 Wire	\$0.35
8	\$0.25	13	.50
10	.10	Oiling	.15
11	.20		

Approximate Number to Pound No. 9 Gauge

Length.....	$\frac{3}{8}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	$1\frac{3}{4}$	2
Number.....	120	108	96	87	72	65

Plain Fence Wire



100 lb. Coiled Bundles

Steel Wire Gauge	Annealed Extra per 100 Pounds	Steel Wire Gauge	Annealed Extra per 100 Pounds
No. 9 & coarser	Base	No. 14	\$0.35
No. 10	\$0.05	15	.45
11	.10	16	.55
12	.15		
$12\frac{1}{2}$	.15		
13	.25		

Less than 1000 pounds add:
500 to 999.....\$0.10
100 to 499......15

Galvanized—Market Extras.

Poultry Netting Staples

(Full sized cuts shown)

Packed in 100 lb. kegs. 50-25-10 lb. wood boxes and 1-lb. papers.

No. 14 No. to one pound.

Length..... $\frac{3}{4}$ 7/8 1

No. 480 416 352

Price according to quantity purchased.



Full Size

Galvanized Wire Hoop Staples

$\frac{5}{8}$ No. 14—568 to one pound.
 $\frac{1}{2}$ No. 14—610 to one pound.

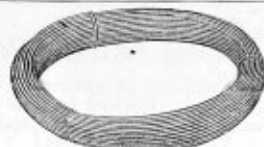
Stone Wire

Put up only in coils or "stones" weighing 12 lbs. each—8 inch inside diameter.



Steel Wire Gauge	Size Extras 100 lbs.	Finish Extras per 100 Pounds			
		Galvanized	Coppered	Tinned	Tinned Annealed
No. 16	Base	\$1.05	\$1.20	\$1.00	\$1.50
17	\$0.15	1.45	1.20	1.50	2.00
18	.30	1.45	1.20	1.50	2.00
19	.70	2.00	1.20	2.00	2.50
20	.85	2.00	1.20	2.00	2.50
21	1.00	2.00	1.20	2.00	2.50
22	1.15	2.00	1.20	2.00	2.50
23	1.30	2.00	1.20	2.00	2.50
24	1.45	2.25	1.20	2.00	2.50
25	1.60	2.25	1.20	2.00	2.50
26	1.75	2.25	1.20	2.00	2.50
27	2.50	3.25	1.95	2.50	3.00
28	2.70	3.25	1.95	2.50	3.00
29	2.90	3.25	1.95	2.50	3.00
30	3.10	3.25	1.95	2.50	3.00
31	3.30	3.25	1.95	2.50	3.00
32	3.50	4.00	1.95	3.50	4.00
33	4.00	4.00	3.20	3.50	4.00
34	4.60	4.00	3.20	3.50	4.00
35	5.60	5.00	3.20	5.00	10.00
36	7.60	6.00	3.20	5.00	10.00

Market Wire



Low Carbon Bessemer and Basic Wires

100-Pound Bundles

Steel Wire Gauge	Size Extras 100 Lbs.	Extras for Finish, per 100 Pounds				Steel Wire Gauge	Size Extras 100 Lbs.	Finish Extras per 100 Pounds				
		Galv.	Copp'd or Lacquered	Tinned	Tinned Annealed			Galv.	Copp'd or Lacquered	Tinned	Tinned Annealed	Ann'd & Cleaned
No. 9 & Coarser	Base		\$0.50	\$1.00	\$1.50	No. 9 to 14 incl	Base	\$0.70	\$0.50	\$1.00	\$1.50	\$0.07
10	\$0.05		.50	1.00	1.50	10	\$0.05	.70	.50	1.00	1.50	.07
11	.10		.50	1.00	1.50	11	.10	.70	.50	1.00	1.50	.07
12	.15		.50	1.00	1.50	12	.15	.70	.50	1.00	1.50	.07
13	.25	Market	.60	1.00	1.50	13	.25	.70	.60	1.00	1.50	.07
14	.35	Card	.60	1.00	1.50	14	.35	.70	.60	1.00	1.50	.07
15	.45	Extras	.60	1.00	1.50	15	.45	1.05	.60	1.00	1.50	.07
16	.55		.60	1.00	1.50	16	.55	1.05	.60	1.00	1.50	.07
17	.70		.60	1.50	2.00	17	.70	1.45	.60	1.50	2.00	.07
18	.85		.60	1.50	2.00	18	.85	1.45	.60	1.50	2.00	.07

Quantity Extras Less than 1000 Pounds						Quantity Extras Less than 1000 Pounds					
600 to 999, per 100 pounds					\$0.10	500 to 999, per 100 pounds					\$0.10
100 to 499, per 100 pounds					.15	100 to 499, per 100 pounds					.15

Steel Wire Gauges

Decimal Equivalents		Full Sizes of Plain Wire		Steel Wire Gauge* Number	Size of Wire		Weight One Mile, Pounds	Pounds per Foot	Feet to Pound
					Common Fractions	Decimally			
$\frac{1}{16}$ = .0156	$\frac{1}{16}$ = .5156			1	$\frac{9}{32}$	.2830	1128.0	.2136	4.681
$\frac{1}{8}$ = .0312	$\frac{1}{8}$ = .5312			2	$\frac{7}{16}$	.28125	1114.0	.211	5.441
$\frac{3}{16}$ = .0468	$\frac{3}{16}$ = .5468			3	$\frac{1}{4}$	.2625	970.4	.1838	6.313
$\frac{1}{4}$ = .0625	$\frac{1}{4}$ = .5625			4	$\frac{3}{8}$	.250	880.2	.1667	7.386
$\frac{5}{16}$ = .0781	$\frac{5}{16}$ = .5781			5	$\frac{1}{2}$	.2437	836.4	.1584	8.750
$\frac{3}{8}$ = .0937	$\frac{3}{8}$ = .5937			6	$\frac{5}{8}$	.2253	714.8	.1354	10.17
$\frac{7}{16}$ = .1093	$\frac{7}{16}$ = .6093			7	$\frac{3}{4}$	.21875	673.9	.1276	11.97
$\frac{1}{2}$ = .125	$\frac{1}{2}$ = .625			8	$\frac{7}{8}$	.2070	603.4	.1143	14.29
$\frac{9}{16}$ = .1406	$\frac{9}{16}$ = .6406			9	$\frac{1}{1}$	.1920	519.2	.0983	17.05
$\frac{5}{8}$ = .1562	$\frac{5}{8}$ = .6562			10	$\frac{1}{1}$	.1875	495.1	.0937	20.57
$\frac{11}{16}$ = .1718	$\frac{11}{16}$ = .6718			11	$\frac{1}{1}$	.1770	441.2	.0835	25.82
$\frac{3}{4}$ = .1875	$\frac{3}{4}$ = .6875			12	$\frac{1}{1}$	.1620	369.6	.070	33.69
$\frac{7}{8}$ = .2031	$\frac{7}{8}$ = .7031			13	$\frac{1}{1}$	.15625	343.8	.0651	44.78
$\frac{15}{16}$ = .2187	$\frac{15}{16}$ = .7187			14	$\frac{1}{1}$	.1483	309.7	.0586	58.58
$\frac{1}{1}$ = .2343	$\frac{1}{1}$ = .7343			15	$\frac{1}{1}$	.1350	256.7	.0486	72.32
$\frac{1}{1}$ = .25	$\frac{1}{1}$ = .75			16	$\frac{1}{1}$	.1250	220.0	.0416	95.98
$\frac{1}{1}$ = .2656	$\frac{1}{1}$ = .7656			17	$\frac{1}{1}$	.1205	204.5	.0387	128.6
$\frac{1}{1}$ = .2812	$\frac{1}{1}$ = .7812			18	$\frac{1}{1}$	.1055	156.7	.0296	166.2
$\frac{1}{1}$ = .2968	$\frac{1}{1}$ = .7968			19	$\frac{1}{1}$	.09375	123.8	.0234	223.0
$\frac{1}{1}$ = .3125	$\frac{1}{1}$ = .8125			20	$\frac{1}{1}$	.0915	117.9	.0223	309.6
$\frac{1}{1}$ = .3281	$\frac{1}{1}$ = .8281								
$\frac{1}{1}$ = .3437	$\frac{1}{1}$ = .8437								
$\frac{1}{1}$ = .3593	$\frac{1}{1}$ = .8593								
$\frac{1}{1}$ = .375	$\frac{1}{1}$ = .875								
$\frac{1}{1}$ = .3906	$\frac{1}{1}$ = .8906								
$\frac{1}{1}$ = .4062	$\frac{1}{1}$ = .9062								
$\frac{1}{1}$ = .4218	$\frac{1}{1}$ = .9218								
$\frac{1}{1}$ = .4375	$\frac{1}{1}$ = .9375								
$\frac{1}{1}$ = .4531	$\frac{1}{1}$ = .9531								
$\frac{1}{1}$ = .4687	$\frac{1}{1}$ = .9687								
$\frac{1}{1}$ = .4843	$\frac{1}{1}$ = .9843								
$\frac{1}{1}$ = .5	$\frac{1}{1}$ = 1.0								

*Formerly American Steel & Wire Company's Gauge.

H.Channon Company Chicago

Gold Medal Music Wire

Highest grade, specially tempered for the making of springs. Used extensively for cutting brick, clay, soap and other kindred material. Packed in one and five-pound coils. One-pound coils sent unless otherwise specified.



Gauge Number	Diameter in Dec. of an Inch	Price per Pound	Gauge Number	Diameter in Dec. of an Inch	Price per Pound
2-0	.008	\$8.50	17	.039	\$1.50
1-0	.009	7.00	18	.041	1.50
1	.010	5.50	19	.043	1.50
2	.011	4.50	20	.045	1.50
3	.012	3.75	21	.047	1.25
4	.013	3.00	22	.049	1.25
5	.014	2.50	23	.051	1.25
6	.016	2.30	24	.055	1.25
7	.018	2.20	25	.059	1.25
8	.020	2.10	26	.063	1.25
9	.022	2.00	27	.067	1.25
10	.024	1.85	28	.071	1.25
11	.026	1.75	29	.075	1.25
12	.029	1.75	30	.080	1.25
13	.031	1.75	31	.085	1.25
14	.033	1.75	32	.090	1.25
15	.035	1.75	33	.095	1.25
16	.037	1.50	34	.100	1.25

Gold Medal Square Drill Rod



In Bars Three Feet Long

Size	Equiv. Dec. of Inch	Price Per Bar	Price Per Lb.	Size	Equiv. Dec. of Inch	Price Per Bar	Price Per Lb.
1/4	0.500	\$5.25	\$1.60	1/4	0.250	\$1.35	\$1.60
3/8	0.4687	4.50	1.60	3/8	0.219	1.00	1.60
1/2	0.4375	3.90	1.60	1/2	0.1875	.78	1.60
5/8	0.4062	3.35	1.60	5/8	0.156	.60	1.60
3/4	0.375	2.85	1.60	3/4	0.125	.34	1.60
7/8	0.344	2.40	1.60	7/8	0.094	.22	1.60
1	0.3125	2.00	1.60	1	0.0625	.10	1.60
1 1/8	0.281	1.65	1.60				

Wire

The most satisfactory form of handling small wire is on spools. It is closely wound and has a thin coating of shellac to prevent tarnishing. All sizes are listed by English gauge numbers.

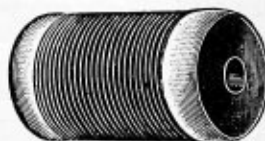
We also carry annealed and bright market wire in 100 lb. coils, and stone wire in 12 1/2-lb. coils known as stones.

These are shown on another page. We solicit your orders for any special wire you may be in the market for, and offer our unlimited service.

Wire on Spools

Annealed Steel, Soft Brass, Spring Brass and Soft Copper Wire

One Pound Spools



Annealed Steel Wire

Gauge of Wire.....	18	20	22	24	26
Per Dozen Spools...	\$3.84	\$4.08	\$4.40	\$4.56	\$4.80
Price per Spool.....	.38	.41	.44	.46	.48

Soft Brass Wire

Gauge of Wire.....	18	20	22	24	26
Per Dozen Spools...	\$8.80	\$8.80	\$9.60	\$10.40	\$10.80
Price per Spool.....	.88	.88	.96	1.04	1.08

Spring Brass Wire

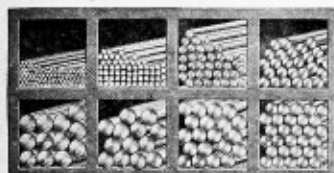
Gauge of Wire.....	18	20	22	24	26
Per Dozen Spools...	\$8.80	\$8.80	\$9.60	\$10.40	\$10.80
Price per Spool.....	.88	.88	.96	1.04	1.08

Soft Copper Wire

Ga. of Wire	18	20	22	24	26	28	30
Per Dz. Sps.	\$8.80	\$8.80	\$9.60	\$10.40	\$10.80	\$13.84	\$15.80
Price per Sp.	.83	.88	.96	1.04	1.08	1.38	1.58

Gold Medal Drill Rod

Best quality crucible tool steel, accurate to size for drills, taps, reamers and punches, and all small tools requiring a high grade steel.



In Bars 3 Feet Long

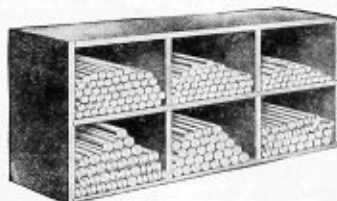
Size	Equiv. Dec. of an Inch	Apprx. Wt. per Ft.	Price per Bar	Price per Lb.	Size	Equiv. Dec. of an Inch	Apprx. Wt. per Ft.	Price per Bar	Price per Lb.
37	.103	.029	\$0.10	\$0.90	H	.266	.188	\$0.40	\$0.75
36	.106	.030	.10	.90	I	.2658	.193	.40	.75
35	.108	.031	.10	.90	J	.272	.198	.42	.75
34	.109	.0315	.10	.90	K	.277	.205	.42	.75
33	.110	.032	.10	.90	L	.281	.212	.46	.75
32	.112	.034	.10	.90	M	.2805	.210	.46	.75
31	.115	.036	.10	.90	N	.290	.225	.48	.75
30	.120	.039	.10	.90	O	.295	.233	.50	.75
29	.125	.041	.10	.83	P	.2965	.240	.52	.75
28	.127	.043	.10	.83	Q	.302	.242	.52	.75
27	.134	.048	.12	.83	R	.312	.254	.54	.75
26	.139	.052	.12	.83	S	.316	.266	.58	.75
25	.141	.053	.12	.83	T	.323	.277	.60	.75
24	.143	.055	.12	.83	U	.328	.285	.62	.75
23	.146	.057	.14	.83	V	.332	.294	.62	.75
22	.148	.059	.14	.83	W	.339	.308	.66	.75
21	.151	.061	.14	.83	X	.344	.315	.66	.75
20	.153	.063	.14	.83	Y	.348	.325	.70	.75
19	.155	.065	.14	.83	Z	.358	.342	.74	.75
18	.156	.0655	.14	.83		.359	.345	.74	.75
17	.157	.066	.16	.83		.368	.362	.78	.75
16	.161	.069	.16	.83		.375	.375	.82	.75
15	.164	.072	.16	.83		.377	.383	.82	.75
14	.168	.076	.20	.83		.386	.400	.86	.75
13	.172	.079	.20	.83		.391	.413	.88	.75
12	.172	.079	.20	.83		.397	.421	.90	.75
11	.175	.082	.20	.83		.404	.437	.92	.75
10	.178	.085	.20	.75		.406	.441	.96	.75
9	.180	.087	.20	.75		.413	.458	.98	.75
8	.182	.089	.20	.75		.421	.462	1.00	.75
7	.185	.092	.20	.75		.437	.500	.86	.60
6	.188	.094	.20	.75		.453	.531	.90	.60
5	.1875	.095	.22	.75		.469	.562	.96	.60
4	.191	.096	.22	.75		.484	.629	1.08	.60
3	.194	.099	.22	.75		.500	.666	1.14	.60
2	.197	.104	.22	.75		.515	.708	1.22	.60
1	.199	.106	.24	.75		.531	.750	1.30	.60
	.201	.107	.24	.75		.546	.823	1.42	.60
	.203	.108	.24	.75		.562	.850	1.46	.60
	.204	.109	.24	.75		.578	.915	1.58	.60
	.207	.115	.24	.75		.594	.958	1.66	.60
	.212	.121	.26	.75		.609	.979	1.68	.60
	.2185	.125	.26	.75		.625	1.04	1.80	.60
	.219	.129	.28	.75		.640	1.09	1.86	.60
	.227	.138	.28	.75		.656	1.12	1.94	.60
	.234	.147	.30	.75		.671	1.18	2.04	.60
	.2343	.148	.30	.75		.687	1.27	2.18	.60
	.238	.150	.34	.75		.703	1.33	2.30	.60
	.242	.154	.34	.75		.719	1.37	2.38	.60
	.246	.161	.34	.75		.734	1.44	2.48	.60
	.250	.167	.36	.75		.75	1.50	2.58	.60
	.250	.167	.36	.75		.875	2.04	3.52	.60
	.257	.174	.38	.75			2.67	4.60	.60
	.261	.181	.38	.75					

Larger sizes up to 1 1/2-inch by 64th. Price per pound. \$0.60

Bessemer Steel Rod (Copper Plated)

In bars four feet long. They are drawn round and true to size from refined steel and are free from flaws, seams, hard spots and sand. They are soft and easy to work and much stiffer than iron rods.

Gauge or Size, Inches	Price per Bar	Price per Pound	Gauge or Size, Inches	Price per Bar	Price per Pound
16	\$0.10	\$0.15	3/8	\$0.22	\$0.08
14	.10	.15	3/8	.24	.08
12	.10	.12	3/8	.26	.08
10	.10	.12	3/8	.28	.08
8	.10	.10	3/8	.30	.08
6	.10	.09	3/8	.34	.08
4	.10	.09	3/8	.40	.08
3	.12	.09	3/8	.50	.08
2	.14	.08	3/8	.60	.08
1	.16	.08	3/8	.70	.08
	.18	.08	3/8	.80	.08
	.20	.08	3/8	.96	.08
			1	1.00	.08



H.Channon Company Chicago

Standard Steel Classification Aug. 1st, 1916

Steel Bars and Small Shapes

Net Extras Per Hundred Pounds Over Base Market Price

Mild Steel Classification

Rounds to 7 $\frac{1}{8}$ in.—Squares to 4 $\frac{1}{2}$ in.

3 $\frac{1}{8}$ to 3 $\frac{1}{2}$ inches.	Base
3 $\frac{1}{2}$ to 4 inches.	\$.05 extra
4 to 4 $\frac{1}{2}$ inches.	.10 extra
4 $\frac{1}{2}$ to 5 inches.	.20 extra
5 to 5 $\frac{1}{2}$ inches.	.25 extra
5 $\frac{1}{2}$ to 6 inches.	.30 extra
6 to 6 $\frac{1}{2}$ inches.	.35 extra
6 $\frac{1}{2}$ to 7 inches.	.40 extra
7 to 7 $\frac{1}{8}$ inches.	.50 extra
7 $\frac{1}{8}$ to 8 inches.	.75 extra
8 to 9 inches.	1.00 extra
9 to 10 inches.	1.25 extra
10 to 12 inches.	.75 extra
12 to 14 inches.	1.25 extra
14 to 16 inches.	.15 extra
16 to 18 inches.	.20 extra
18 to 20 inches.	.25 extra
20 to 22 inches.	.40 extra
22 to 24 inches.	.50 extra
24 to 26 inches.	.63 extra

Flat Bars and Heavy Bands

1 to 6 inches x 3 $\frac{1}{8}$ to 1 inches.	Base
1 to 6 inches x 1 $\frac{1}{4}$ to 5 $\frac{1}{8}$ inches.	\$.10 extra
1 to 6 inches x 3 $\frac{1}{4}$ to 3 $\frac{1}{2}$ inches.	.20 extra
1 to 6 inches x 3 $\frac{1}{2}$ to 3 $\frac{3}{4}$ inches.	.25 extra
1 to 6 inches x 3 $\frac{3}{4}$ to 4 inches.	.25 extra
1 to 6 inches x 4 to 4 $\frac{1}{2}$ inches.	.35 extra
1 to 6 inches x 4 $\frac{1}{2}$ to 5 inches.	.50 extra
1 to 6 inches x 5 to 5 $\frac{1}{2}$ inches.	.60 extra
1 to 6 inches x 5 $\frac{1}{2}$ to 6 inches.	1.00 extra
1 to 6 inches x 6 to 6 $\frac{1}{2}$ inches.	.05 extra
1 to 6 inches x 6 $\frac{1}{2}$ to 7 inches.	.10 extra
1 to 6 inches x 7 to 8 inches.	.15 extra
1 to 6 inches x 8 to 10 inches.	.20 extra

Above extras not applicable on steel tires.

Light Bars and Bands

1 $\frac{1}{2}$ to 6 in. x Nos. 7, 8, 9 and 3 $\frac{1}{8}$ in.	\$.20 extra
1 $\frac{1}{2}$ to 6 in. x Nos. 10, 11, 12 and 3 $\frac{1}{2}$ in.	.30 extra
1 to 1 $\frac{1}{2}$ in. x Nos. 7, 8, 9 and 3 $\frac{1}{8}$ in.	.30 extra
1 to 1 $\frac{1}{2}$ in. x Nos. 10, 11, 12 and 3 $\frac{1}{2}$ in.	.35 extra
1 to 1 $\frac{1}{2}$ in. x Nos. 7, 8, 9 and 3 $\frac{1}{8}$ in.	.35 extra
1 to 1 $\frac{1}{2}$ in. x Nos. 10, 11, 12 and 3 $\frac{1}{2}$ in.	.40 extra
1 to 1 $\frac{1}{2}$ in. x Nos. 7, 8, 9 and 3 $\frac{1}{8}$ in.	.50 extra
1 to 1 $\frac{1}{2}$ in. x Nos. 10, 11, 12 and 3 $\frac{1}{2}$ in.	.60 extra
1 to 1 $\frac{1}{2}$ in. x Nos. 7, 8, 9 and 3 $\frac{1}{8}$ in.	.60 extra
1 to 1 $\frac{1}{2}$ in. x Nos. 10, 11, 12 and 3 $\frac{1}{2}$ in.	.65 extra
1 to 1 $\frac{1}{2}$ in. x Nos. 7, 8, 9 and 3 $\frac{1}{8}$ in.	.65 extra
1 to 1 $\frac{1}{2}$ in. x Nos. 10, 11, 12 and 3 $\frac{1}{2}$ in.	.75 extra
1 to 1 $\frac{1}{2}$ in. x Nos. 7, 8, 9 and 3 $\frac{1}{8}$ in.	.90 extra
1 to 1 $\frac{1}{2}$ in. x Nos. 10, 11, 12 and 3 $\frac{1}{2}$ in.	1.05 extra
1 to 1 $\frac{1}{2}$ in. x Nos. 7, 8, 9 and 3 $\frac{1}{8}$ in.	.95 extra
1 to 1 $\frac{1}{2}$ in. x Nos. 10, 11, 12 and 3 $\frac{1}{2}$ in.	1.20 extra

Hexagons

3 $\frac{1}{8}$ to 2 $\frac{1}{2}$ inches.	\$.15 extra
2 $\frac{1}{2}$ to 3 inches.	.25 extra
3 to 3 $\frac{1}{2}$ inches.	.35 extra
3 $\frac{1}{2}$ to 4 inches.	.55 extra
4 to 4 $\frac{1}{2}$ inches.	.65 extra
4 $\frac{1}{2}$ to 5 inches.	.75 extra

Half Ovals and Half Rounds

Half Rounds

1 to 3 inches.	\$.20
3 to 3 $\frac{1}{2}$ inches.	.35
3 $\frac{1}{2}$ to 4 inches.	.50
4 to 4 $\frac{1}{2}$ inches.	.70
4 $\frac{1}{2}$ to 5 inches.	1.10

Half Ovals

Gauges shown are Birmingham wire gauge.

1 to 4 inch x 3 $\frac{1}{4}$ inch and thicker.	\$.25
1 to 4 inches x Nos. 7, 8, 9 and 3 $\frac{1}{8}$ inch.	.35
1 to 4 inches x Nos. 10, 11, 12 and 3 $\frac{1}{2}$ inch.	.50
3 $\frac{1}{2}$ to 5 in. x 3 $\frac{1}{8}$ and thicker.	.50

Half Ovals (Cont'd)

3 $\frac{1}{2}$ to 5 in. x Nos. 10, 11, 12 and 3 $\frac{1}{2}$ in.	\$.45
3 $\frac{1}{2}$ to 5 in. x Nos. 13, 14 and 15.	.50
5 to 5 $\frac{1}{2}$ in. x 3 $\frac{1}{8}$ in. and thicker.	.50
5 to 5 $\frac{1}{2}$ in. x Nos. 10, 11, 12 and 3 $\frac{1}{2}$ in.	.75
5 to 5 $\frac{1}{2}$ in. x Nos. 13, 14 and 15.	.90
5 to 5 $\frac{1}{2}$ in. x 3 $\frac{1}{8}$ in. and thicker.	.90
5 to 5 $\frac{1}{2}$ in. x Nos. 13, 14 and 15.	1.05
5 to 5 $\frac{1}{2}$ in. x 3 $\frac{1}{8}$ in. and thicker.	1.35
5 to 5 $\frac{1}{2}$ in. x Nos. 14 and 15.	1.60

Angles

1 $\frac{1}{2}$ x1 $\frac{1}{2}$ in. and wider, but under 3 in. x 3 $\frac{1}{8}$ in. and heavier.	\$.10
1 $\frac{1}{2}$ x1 $\frac{1}{2}$ in. and wider, but under 3 in. x 3 $\frac{1}{8}$ in.	.15
1x1 to 1 $\frac{1}{2}$ x1 $\frac{1}{2}$ in. x 3 $\frac{1}{8}$ in. and heavier.	.15
1x1 to 1 $\frac{1}{2}$ x1 $\frac{1}{2}$ in. x 3 $\frac{1}{8}$ in.	.20
1 $\frac{1}{2}$ x3 $\frac{1}{8}$ in. x 3 $\frac{1}{8}$ in.	.20
1 $\frac{1}{2}$ x3 $\frac{1}{8}$ in. x 3 $\frac{1}{2}$ in.	.25
1 $\frac{1}{2}$ x3 $\frac{1}{8}$ in. x 3 $\frac{1}{2}$ in.	.25

Channels

1 $\frac{1}{2}$ in. and wider, but under 3 in. x 3 $\frac{1}{8}$ in. and heavier.	\$.15
1 $\frac{1}{2}$ in. and wider, but under 3 in. x 3 $\frac{1}{8}$ in.	.25
1 to 1 $\frac{1}{2}$ in. x 3 $\frac{1}{8}$ in. and heavier.	.25
Spec. section 1 $\frac{1}{2}$ x1 $\frac{1}{2}$ x3 $\frac{1}{8}$	.40

Tees

Sizes—	Net extra per 100 lbs.
1 $\frac{1}{2}$ x 1 $\frac{1}{2}$ inches and wider, but under 3 inches wide; by 3 $\frac{1}{8}$ inch and heavier.	\$.20
1 x 1 to 1 $\frac{1}{2}$ x 1 $\frac{1}{4}$ x 3 $\frac{1}{8}$ inch and heavier.	.40
1 x 1 to 1 $\frac{1}{2}$ x 1 $\frac{1}{4}$ x 3 $\frac{1}{8}$ inch.	.50
3 $\frac{1}{8}$ x 3 $\frac{1}{8}$ x 3 $\frac{1}{8}$ inch.	.50
3 $\frac{1}{8}$ x 3 $\frac{1}{8}$ x 3 $\frac{1}{2}$ inch.	.60
3 $\frac{1}{8}$ x 3 $\frac{1}{8}$ x 3 $\frac{1}{2}$ inch.	.60
3 $\frac{1}{8}$ x 3 $\frac{1}{8}$ x 3 $\frac{1}{2}$ inch.	.70
3 $\frac{1}{8}$ x 3 $\frac{1}{8}$ x 3 $\frac{1}{2}$ inch.	1.30
3 $\frac{1}{8}$ x 3 $\frac{1}{8}$ x 3 $\frac{1}{2}$ inch.	1.80

Unequal leg tees are subject to special prices, which will be furnished on application.

Warehouse Extras for Cutting

In Cents per Hundred Pounds Effective Aug. 15, 1916

	3 ft. and over	2 ft. to 3 ft.	1 ft. to 2 ft.	6 in. to 1 ft.	4 in. to 6 in.	2 in. to 4 in.
Beams and Channels, 3 in. and over.	\$.00	\$.15	\$.30	\$.85	1.40	2.30
Tees, 3 in. and over.	.00	.15	.30	.85	1.40	2.30
Angles 2x2x3 $\frac{1}{8}$ in. and larger.	.00	.10	.20	.30	.50	.75
Mild Steel Rounds and Squares, 2 in. and under.	.20	.20	.30	.50	.65	.80
Mild Steel Rounds and Squares, over 2 in.	.30	.30	.40	.85	1.40	2.30
Flats 1 in. thick and over.	.30	.30	.40	.85	1.40	2.30
Angles under 2x2x3 $\frac{1}{8}$ in., also 2 in. to 3 in. wide by 1 $\frac{1}{2}$ in. thick.	.30	.30	.40	.85	1.40	2.30
Channels under 3 in.	.30	.30	.40	.85	1.40	2.30
Tees under 3 in.	.30	.30	.40	.85	1.40	2.30
Rails	.25	.25	.40	.85	1.40	2.30

Standard Iron Classification

Net Extras Per 100 Pounds Over Base Market Price

Rounds and Squares

		Per 100 lbs.
1	to 1 1/8 inches	Base
2	to 2 1/8 "	extra \$0.20
3	to 3 1/2 "	". .50
3 3/8	to 4 "	". .80
4 1/8	to 4 1/2 "	". 1.00
4 3/8	to 5 "	". 1.30
5 1/8	to 6 "	". 1.80
6 1/8	to 6 1/2 "	". 2.20
6 3/8	to 7 1/4 "	". 2.50
7 1/8	to 7 1/2 inch	". .10
8 1/8	to 8 "	". .20
9 1/8	to 9 "	". .30
10 1/8	to 10 "	". .40
11 1/8	to 11 "	". .50
12 1/8	to 12 "	". .70
14 1/8	to 14 "	". .90
16 1/8	to 16 inch	". 1.40
18 1/8	to 18 "	". 2.50

Flats

		Per 100 lbs.
1 1/2	to 4 by 3/8 to 1 inch	Base
4 1/4	to 6 by 3/8 to 1 1/2 "	extra \$0.10
4 1/4	to 6 by 1 1/8 to 1 1/2 "	". .40
6 1/4	to 8 by 3/8 to 1 "	". .60
6 1/4	to 8 by 1 1/8 to 1 1/2 "	". .60
8 1/4	to 10 by 3/8 to 1 "	". .80
1 1/8	to 4 by 1 1/8 to 1 1/2 "	". .30
2	to 4 by 1 1/2 to 2 "	". .50
4 1/4	to 6 by 1 1/2 to 2 "	". .60
6 1/4	to 8 by 1 1/2 to 2 "	". .80
8 1/4	to 10 by 1 1/2 to 2 "	". .90
8 1/4	to 10 by 1 1/2 to 2 1/2 "	". 1.00
2	to 4 by 2 1/2 to 3 "	". .60
4 1/4	to 6 by 2 1/2 to 3 "	". .80
6 1/4	to 8 by 2 1/2 to 3 "	". 1.00
1 1/8	to 1 1/8 by 3/8 to 1 "	". .10
1	to 1 1/8 by 3/8 to 3/8 "	". .20
3/4	to 1 1/8 by 3/8 to 3/4 "	". .40
5/8	to 1 1/8 by 3/8 to 5/8 "	". .50
1/2	to 1 1/8 by 3/8 to 1/2 "	". .90

Oval Iron

		Per 100 lbs.
3/8	to 1 1/2 inches	extra \$0.40
3/8	to 1 1/8 "	". .50
3/8	to 1 1/4 "	". .60
3/8	to 1 3/8 "	". .80
3/8	to 1 1/2 "	". 1.10
3/8	to 1 3/4 inch	". 1.00
3/8	to 1 1/2 x 3/8 "	". 1.20

Half Oval and Half Round

		Per 100 lbs.
2 1/4	to 3 inches	extra \$0.60
3/8	to 2 "	". .50
3/4	to 1 1/8 "	". .70
5/8	to 1 1/4 "	". .90
1/2	to 1 1/2 "	". 1.20
3/8	to 1 3/8 "	". 2.50
1/2	to 1 1/2 inch	". 3.50
3/4	to 1 3/4 "	". 4.50

Half oval, less than 1/4 their width in thickness, extra price.

Heavy Bands

8 1/4	to 10 x 1/4 to 1/8	\$0.70 extra
7	to 8 x 1/4 to 1/8	.70 extra
6 1/4	to 6 3/4 x 1/4 to 1/8	.50 extra
4 1/4	to 6 x 1/4 to 1/8	.30 extra
1 1/2	to 4 x 1/4 to 1/8	.20 extra
1	to 1 3/8 x 1/4 to 1/8	\$.30 extra
3/4	to 1 1/8 x 1/4 to 1/8	.50 extra
5/8	to 1 1/4 x 1/4 to 1/8	.80 extra
3/8	to 1 1/2 x 1/4 to 1/8	1.00 extra
3/8	to 1 3/4 x 1/4 to 1/8	1.50 extra

Heavy bands, 1/2 inch thick, 10 cents per 100 pounds higher than 1/4 to 1/8 thick. Bevel edge shaft iron 10 cents higher than same size of heavy bands.

Light Bands

7	to 8 xNos. 9 to 11	\$.90 extra
7	to 8 xNos. 10, 11, 12	1.00 extra
6 1/4	to 6 3/4 xNos. 9 to 11	.70 extra
6 1/4	to 6 3/4 xNos. 10, 11, 12	.80 extra
4 1/4	to 6 xNos. 9 to 11	.50 extra
4 1/4	to 6 xNos. 10, 11, 12	.60 extra
1 1/4	to 4 xNos. 9 to 11	.40 extra
1 1/4	to 4 xNos. 10, 11, 12	.50 extra
1	to 1 1/2 xNos. 9 to 11	.50 extra
1	to 1 1/2 xNos. 10, 11, 12	.60 extra
1 1/2	to 3 xNos. 9 to 11	\$.60 extra
1 1/2	to 3 xNos. 10, 11, 12	.70 extra
1 1/2	to 3 1/2 xNos. 9 to 11	.80 extra
1 1/2	to 3 1/2 xNos. 10, 11, 12	1.00 extra
1 1/2	to 3 1/2 xNos. 9 to 11	1.10 extra
1 1/2	to 3 1/2 xNos. 10, 11, 12	1.30 extra
1 1/2	to 3 1/2 xNos. 10, 11, 12	1.40 extra
1 1/2	to 3 1/2 xNos. 10, 11, 12	1.50 extra
1 1/2	to 3 1/2 xNos. 10, 11, 12	1.60 extra

Rivet Extras

Net extras per 100 pounds over base market price.

Base Sizes

Boiler Rivets, Standard Heads	
3/4 dia. to 1 1/4 dia. incl. 2 and up to 5 in. length incl.	
Structural Rivets, Standard Heads	
3/4 dia. to 1 1/4 dia. incl. 2 and up to 5 in. length incl.	
Ship Rivets, Straight Necks	
3/4 dia. to 1 1/4 dia. incl. 2 and up to 5 in. length incl.	
Above in kegs or bags, weighing approximately 200 to 300 lbs.	

Standard Extras

	Per 100 lbs.
1. 1/2 and 3/4 inch diameters	\$1.00
2. 5/8 and 1 1/8 inch diameters	.30
3. Rivets larger than 1 1/4 inch in diameter	.50
4. Lengths 1 inch and shorter	1.00
5. Lengths between 1 inch and 2 inches	.50
6. Lengths over 5 inches	.50
7. Flat Head Rivets	.50
8. All Standard Countersunk Head Rivets	.50
9. Rivets, Swell Necks	.50
10. Special Heads, other than our regular standards, minimum charge	.50
11. Cold, or Hot Made Solid Die Rivets, when specially specified	.50
12. Annealing Cold Made Rivets, 1/2 inch diameter and larger	.70
13. Small orders for miscellaneous sizes for less than two tons to parties not under contract	.20
14. Rivets packed in 100 lb. packages	.20

H. Channon Company Chicago

Norway and Swedish Iron. Extras

Rounds and Squares

	Per 100 Lbs.
1 to 1 1/4 inches.....	Base
2 to 2 1/4 inches.....	extra \$0.10
2 1/4 to 3 1/4 inches.....	extra .20
3 1/4 to 4 inches.....	extra .50
4 to 4 1/4 inches.....	extra .10
4 1/4 to 5 inches.....	extra .20
5 to 5 1/4 inches.....	extra .30
5 1/4 to 6 inches.....	extra .40
6 to 6 1/4 inches.....	extra .60
6 1/4 to 7 inches.....	extra 1.00
7 to 7 1/4 inches.....	extra 3.00

Flats

	Per 100 Lbs.
1 1/2 to 4 by 3/4 to 1 inch thick.....	Base
4 1/2 to 6 by 3/4 to 1 inch thick.....	extra \$0.10
1 1/2 to 6 by 1 1/4 to 1 1/2 inches thick.....	extra .10
2 1/2 to 6 by 2 inches thick.....	extra .10
1 1/4 and 1 1/2 by 3/4 to 1 inch thick.....	extra .10
1 and 1 1/4 by 3/4 to 1 inch thick.....	extra .10
3/4, 5/8, 3/4 and 3/4 by 3/4 to 1 inch thick.....	extra .40
1 1/2 to 6 by 1 1/4 and 3/4 inch thick.....	extra .10
1 to 1 1/4 by 3/4 and 3/4 inch thick.....	extra .10
3/4 and 3/4 by 3/4 and 3/4 inch thick.....	extra 1.60
1 to 2 by 3/4 inch thick.....	extra .10
3/4 and 3/4 by 3/4 inch thick.....	extra .10
3/4 and 3/4 by 3/4 inch thick.....	extra 1.10

Twisted Reinforcing Bars

Manufacturer's Standard Extras for Twisted Reinforcement Bars

Size	Weight per Foot	Advance over Base Per 100 Pounds
1/4	0.213	\$0.65
3/8	0.332	.45
1/2	0.478	.30
5/8	0.651	.25
3/4	0.850	.12 1/2
7/8	1.08	.12 1/2
1	1.33	.75
1 1/8	1.61	.75
1 1/4	1.91	Base
1 1/2	2.25	Base
1 3/4	2.60	Base
2	2.99	Base
2 1/4	3.40	Base
2 1/2	4.30	Base
2 3/4	5.31	Base
3	6.43	Base
3 1/2	7.65	Base

Weights of Standard Reinforcing Bars

Size	Round, Wt. per Ft., Lbs.	Square, Wt. per Ft., Lbs.
3/4	.375	.478
1/2	.511	.651
3/8	.668	.851
1/4	.845	1.076
1/2	1.044	1.329
3/4	1.503	1.914
1	2.046	2.605
1 1/4	2.672	3.402
1 1/2	3.382	4.306
1 3/4	4.175	5.316

Extra for Cutting Reinforcing Bars

Per 100 Lbs.

3/4 and 1/2 inch, 1 inch long and over.....	net \$0.25
1/2 and 3/8 inch, 1 inch long and over.....	net .20
3/8 inch and larger, 1 inch long and over.....	net .15

Cold Twisted Medium Open Hearth Steel Concrete Reinforcing Bars (Structural Grade of Steel)



Are favored and specified generally by the leading architects and engineers and are accepted as standard by all. If these bars are used, no criticism can be made as they represent the engineer's conviction of proper reinforcing values—great strength (elastic limit) without any tendency towards brittleness. Among other claims may be mentioned: Elastic limit of 35,000 to 60,000 lbs. per square inch.

Twisting the bars cold is a testing process and cleans the bars from mill scale. Defective steel cannot be put through this work without the defects showing up.

Rail Carbon Bars for Reinforcing Concrete

High Elastic Limit

As compared with plain or deformed (not twisted) mild or medium steel having an elastic limit of thirty thousand to thirty-five thousand pounds per square inch, rail carbon steel will give greater reinforcing strength, or a smaller quantity can be used and an equivalent result obtained.

Hot-twisted rail-carbon steel bars reach a slightly higher elastic limit than plain rail carbon bars, as the result of twisting, and are therefore of more value than plain bars to the extent of the difference in elastic limit, to say nothing of the mechanical bond in twisted steel which by many is considered a great advantage and by others indispensable. Twisted bars weigh the same as square bars of like size.

Properties Considered	Structural Steel Grade (Medium Open Hearth)	Hard Grade (High Carbon Open Hearth)	Cold Twisted
	Plain Bars	Plain Bars	Cold-twisted bars shall be twisted cold with one complete twist in a length equal to not more than 12 times the thickness of the bar.
Phosphorus, maximum, open-hearth.....	.06	.06	.06
Ultimate tensile strength, pounds per sq. in.....	55-70,000	80,000 min.	Recorded only
Yield point, minimum, pounds per sq. in.....	33,000	50,000	55,000
Elongation, per cent in 8-in., minimum.....	1,400,000	1,200,000	5%
Cold bend without fracture.....	T. S.	T. S.	
Bars under 3/4-in. in diameter or thickness.....	180°d.-1t.	180°d.-3t.	180°d.-2t.
Bars 3/4-in. in diameter or thickness and over.....	180°d.-1t.	90°d.-3t.	180°d.-3t.

Write for our special Manila and Wire Data tables

Boughton Tool Steel



Octagon

Round

Square

Flat

Owing to the great variance in the terms and names of tool steels, considerable confusion has arisen. To avoid delays and unnecessary correspondence resulting from mistakes, we suggest that our names be used when ordering. If tool steels are ordered by our grade names, i. e., AAA1, A, B, C, etc., we can then fill orders quickly and there will be no cause for misunderstandings and complaints.

Grades

The following grades of tool steel are carried in stock, both annealed and unannealed. The standard stock lengths are 10 feet for annealed and 14 feet for unannealed steel. When shorter lengths than standard are ordered there will be an extra charge for cutting. (See list of extras.)

Grade AAA1 Special High Speed Steel. This is the highest grade of alloy steel it is possible to produce and is the equal of any on the market. It is capable of the utmost that can be required of tool steel in the way of heavy cuts, high speeds and on hard materials. It will hold its hardness even when the point of the tool becomes a dull red.

Base price, per pound

Grade A High Speed Steel for Woodworking Knives. A high grade alloy steel especially adapted for thin machine knives of all kinds. It is exceedingly tough and hard in the bar, ready for use, and is not so subject to heat influence as carbon steel. It is only necessary to cut to the required length and grind bevel. Base price, per pound.

Grade B Special Carbon Tool Steel. The highest grade of carbon tool steel made. It is intended for expensive cutters, drills, forming tools, taps, dies, reamers, punches, etc., and turning, planing and slotting hard material. Highly recommended for all purposes where great strength, long endurance or excessive duty is required. Base price.

Grade C Extra Carbon Tool Steel. This grade is intended for all purposes requiring carbon steel of extra quality, such as lathe and machine tools, cutters, taps, edge tools, chisels, dies, shear blades and punches. This is the best grade of steel for general use. Base price, per pound.

Grade D Carbon Tool Steel. For all ordinary purposes such as rock drills, cutting tools, hammers, swages, ball bearings, etc., and tools whose use does not warrant using a higher priced steel. Will give good service for the use intended, although it is advisable to use Grade B or C for the best results in Carbon Steel. Base price, per pound.

Annealing

When ordering always state whether annealed or unannealed steel is wanted. An extra charge of 1 cent per pound (all grades) is made for annealing.

Standard Carbons

All grades of our tool steel can be furnished in about 8 different carbon percentages. This has no relation to the price or quality; the lower the percentage of carbon the milder the steel. The size and shape of the bar is generally a safe guide as to the purpose for which the steel is to be used but we prefer customers to specify the purpose for which the steel is to be used.

When Ordering Tool Steel

Specify the grade of steel wanted. Specify the purpose for which the steel is to be used. Specify whether annealed or unannealed steel is desired. Order sizes large enough to allow for removal of the decarbonized surface of annealed steel, which should be taken off before hardening. To avoid cutting charges, where exact length is not necessary, specify "about" so many feet. This enables us to send nearest length in stock.

Net Extras

The extras given below in cents per pound are to be added to the price for regular bar sizes. This is known as Base or Base Price. All dimensions are inclusive.

Round, Square and Octagon				Base	
				Extra per lb.	Extra per lb.
3/8 to 2 inch					
2 1/8 to 3	\$.01	3 1/8 to 7	\$.03	7/16 to 3/4	\$.01
3 1/8 to 4	.01 1/2	7 1/8 to 8	.03 1/2	3/4 to 1 1/2	.02
4 1/8 to 5	.02	7 1/8 to 1 1/2	.00 1/2	1 1/2 and 9/16	.03
5 1/8 to 6	.02 1/2				
Flat					
3/8 to 2 inch thick x 3/16 to 2 inch wide					
				Extra per lb.	Extra per lb.
1/2 x 3/16	\$.025	3/16 x 7/16 to 8	\$.02	5/8 to 2 x 2 1/8 to 7	\$.01
1/2 x 1/4	.18	3/4 x 5/16 to 3/8	.02	5/8 to 1 1/4 x 7/16 to 8	.01
1/2 x 5/16	.10	3/4 x 1/2 to 5/8	.01 1/2	1 1/4 to 2 x 7/16 to 8	.01 1/2
1/2 x 3/8	.05	3/4 x 13/16 to 2	.01 1/2	2 1/4 to 3 x 2 1/8 to 5	.01
1/2 x 7/16 to 1/2	.04	1 1/4 x 2 1/8 to 7	.01	2 1/4 to 3 x 5/16 to 8	.01 1/2
1/2 x 9/16 to 1	.02	2 1/4 x 7/16 to 8	.02	3 1/4 to 4 x 3/16 to 6	.01 1/2
1/2 x 7/8 to 8	.03	5/16 x 3/8 to 5/8	.01 1/2	3 1/4 to 4 x 6/16 to 8	.02
3/4 x 1/4	.07	5/16 x 1/2 to 8	.01	4 1/4 to 5 x 7/16 to 8	.02
3/4 x 5/16	.05	7/8 x 1/2 to 8	.01	4 1/4 to 5 x 7/16 to 8	.02 1/2
3/4 x 3/8	.02	3/4 x 3/8 to 8	.01	5 1/4 to 6 x 5/16 to 8	.02 1/2
3/4 x 7/16 to 5/8	.01 1/2	5/16 x 2 1/8 to 8	.01	6 1/4 to 7 x 6/16 to 7	.04
3/4 x 1 1/8 to 2	.01	9/16 to 2 x 5/8 to 2	.00	6 1/4 to 8 x 7/16 to 8	.04 1/2
1 1/4 x 2 1/8 to 7	.01				

Intermediate sizes take next higher prices

Extras for Cutting to Specified Single and Multiple Lengths

24 inches or over, extra per pound	\$.00 1/2	12 to 18 inches, extra per pound	\$.01 1/2
18 to 24 inches, extra per pound	.01	6 to 12 inches, extra per pound	.02

Crescent, Sanderson, Novo, Jessop and other Grades also furnished from Chicago Stock.

Prices quoted on application.

When Grade is not specified we always furnish Grade C Extra Carbon Tool Steel.



Anti-Friction Bearing Bronze

The special mixture, superior quality of the metals used, and the skill and experience employed in the processes of mixing and casting, combine to produce a bearing metal which has no equal on the market.

It is used by manufacturers of the best high speed and hard service machines in use and many tests have proven it to be the best bearing metal obtainable.

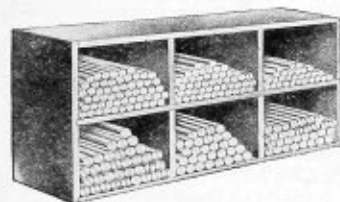
It will not granulate nor flake. Each bar is cleaned by sand blasting and carefully inspected before shipment.

In ordering cored bars always allow $\frac{1}{8}$ inch for finish. Outside diameters should be $\frac{1}{8}$ inch larger and inside $\frac{1}{8}$ inch smaller than when finished. All bars are furnished in the rough.

The following sizes are carried in stock for immediate delivery.

Hollow Bars 12 Inches Long									Solid Bars 12 Inches Long		
No.	Outside Diam., Inches	Inside Diam., Inches	Approx. Wt., Lbs.	No.	Outside Diam., Inches	Inside Diam., Inches	Approx. Wt., Lbs.	No.	Outside Diam., Inches	Inside Diam., Inches	Approx. Wt., Lbs.
1	1	$\frac{1}{2}$	2 $\frac{1}{2}$	15	1 $\frac{1}{2}$	$\frac{3}{4}$	5 $\frac{1}{4}$	29	2	1	9 $\frac{1}{4}$
2	1	$\frac{5}{8}$	2 $\frac{1}{2}$	16	1 $\frac{1}{2}$	$\frac{7}{8}$	4 $\frac{3}{4}$	30	2	1 $\frac{1}{4}$	8 $\frac{1}{2}$
3	1 $\frac{1}{8}$	$\frac{3}{4}$	3 $\frac{1}{4}$	17	1 $\frac{1}{2}$	1	4 $\frac{3}{4}$	31	2	1 $\frac{1}{2}$	5 $\frac{1}{2}$
4	1 $\frac{1}{8}$	$\frac{7}{8}$	3 $\frac{1}{2}$	18	1 $\frac{3}{8}$	$\frac{1}{2}$	6	32	2 $\frac{1}{4}$	$\frac{3}{8}$	13 $\frac{1}{4}$
5	1 $\frac{1}{8}$	$\frac{1}{2}$	2 $\frac{1}{4}$	19	1 $\frac{3}{8}$	$\frac{5}{8}$	5 $\frac{1}{2}$	33	2 $\frac{1}{4}$	1	12 $\frac{1}{2}$
6	1 $\frac{1}{4}$	$\frac{1}{2}$	4 $\frac{1}{4}$	20	1 $\frac{3}{8}$	$\frac{7}{8}$	5	34	2 $\frac{1}{4}$	1 $\frac{1}{4}$	10 $\frac{1}{2}$
7	1 $\frac{1}{4}$	$\frac{5}{8}$	3 $\frac{3}{4}$	21	1 $\frac{3}{8}$	1	4 $\frac{1}{2}$	35	2 $\frac{1}{4}$	1 $\frac{1}{2}$	8 $\frac{3}{4}$
8	1 $\frac{1}{4}$	$\frac{3}{4}$	3 $\frac{1}{4}$	22	1 $\frac{3}{8}$	$\frac{5}{8}$	8 $\frac{1}{4}$	36	2 $\frac{1}{4}$	1 $\frac{3}{4}$	6 $\frac{1}{4}$
9	1 $\frac{1}{4}$	$\frac{7}{8}$	2 $\frac{3}{4}$	23	1 $\frac{3}{8}$	$\frac{3}{4}$	7 $\frac{3}{4}$	37	2 $\frac{1}{2}$	1	16
10	1 $\frac{1}{2}$	$\frac{1}{2}$	4 $\frac{1}{2}$	24	1 $\frac{3}{8}$	$\frac{7}{8}$	7	38	2 $\frac{1}{2}$	1 $\frac{1}{4}$	14 $\frac{1}{2}$
11	1 $\frac{1}{2}$	$\frac{5}{8}$	4	25	1 $\frac{3}{8}$	1	6 $\frac{1}{2}$	39	2 $\frac{1}{2}$	1 $\frac{1}{2}$	12 $\frac{1}{2}$
12	1 $\frac{1}{2}$	$\frac{3}{4}$	3 $\frac{1}{2}$	26	1 $\frac{3}{8}$	1 $\frac{1}{4}$	4 $\frac{3}{4}$	40	2 $\frac{1}{2}$	1 $\frac{3}{4}$	9 $\frac{3}{4}$
13	1 $\frac{1}{2}$	$\frac{7}{8}$	3	27	2	$\frac{1}{2}$	10 $\frac{1}{4}$				
14	1 $\frac{1}{2}$	$\frac{1}{2}$	5 $\frac{3}{4}$	28	2	$\frac{3}{8}$	10 $\frac{1}{4}$				

Always order by number.



Brass and Bronze Rods

Brown & Sharpe's Gauge the Standard—Extras Over Base Prices

Prices are for 100 pounds or more of one item of brass rods in one order. For items of less than 100 pounds see foot note.

Stock lengths 10 to 12 feet.

Sizes and Prices

Size	No. 11 (0907) to $\frac{1}{4}$ Inch	Inc. $\frac{1}{8}$ Inch to $\frac{1}{2}$ Inch	Inc. $\frac{3}{8}$ Inch to $\frac{1}{2}$ Inch	Inc. $\frac{3}{4}$ Inch to 1 Inch
Round	6 $\frac{1}{2}$	2	$\frac{1}{2}$	Base
Hexagon, octagon and square	9	4 $\frac{1}{2}$	3	2
Rectangular and half round	11	6 $\frac{1}{2}$	5	4

Sizes larger than 2 inches special prices quoted upon application.

Prices of rectangular and half round are governed by the thinner dimension.

Special shaped rods other than listed above, prices quoted upon application, not less than price of rectangular and half round.

Rods cut to uniform specific lengths, add the following list advances:

Inc. 1 Inch to 2 Inches	Inc. 2 Inches to 4 Inches	Inc. 4 Inches to 6 Inches	Inc. 6 Inches to 9 Inches	Inc. 9 Inches to 12 Inches	Inc. 12 Inches to 24 Inches	2 Feet and Over
12c	8c	5c	4c	3c	2c	1c

Shorter than 1 inch special prices quoted upon application, not less than 12 cents list advance.

For sizes smaller than No. 11, consult Wire List.

This page revised to January 1, 1916.

Foot Note.—When less than 100 pounds is ordered in one item on one order the following net extra charge is made. From 75 to 100 pounds, 1 cent pound; from 50 to 75 pounds, 2 $\frac{1}{2}$ cents pound; from 25 to 50 pounds, 5 cents pound; from 15 to 25 pounds 10 cents pound; from 10 to 15 pounds, 15 cents pound; from 5 to 10 pounds, 20 cents pound; and for less than 5 pounds, 25 cents pound.

Brass and Bronze Angles and Channels

Brown & Sharpe's Gauge The Standard

Angles, plain and of one angle; Channels, plain and of three sides only; half round and half oval only.

Prices are for 100 lbs. or more of one item of angles and channels in one order; for items of less than 100 lbs., see foot-note on page —

Width of Widest Dimension	No. 8 to No. 10	No. 10 to No. 12	No. 12 to No. 14	No. 14 to No. 19, inc.	No. 20	No. 21	No. 22	No. 23	No. 24
$\frac{3}{4}$ in. (9.5) to $\frac{1}{2}$ in. (12.7)	10	8	6	4	6	8	10	12	16
$\frac{1}{2}$ in. (12.7) to $\frac{3}{4}$ in. (19.0)	8	6	4	2	4	5	7	9	13
$\frac{3}{4}$ in. (19.0) to 1 in. (25.4) inc.	6	4	2	Base	1	3	5	7	10
Over 1 in. (25.4) to $1\frac{1}{2}$ in. (38.1) inc.	8	6	4	2	3	5	7	9	12

Thicker than No. 8, narrower than $\frac{3}{8}$ in. or wider than $1\frac{1}{2}$ in. special prices quoted upon application.

Shapes other than listed, special prices quoted upon application.

Angles and Channels Cut to Uniform Specific Lengths

1 in. to 2 in.	2 in. to 4 in.	4 in. to 6 in.	6 in. to 12 in.	12 in. to 96 in.	96 in. and over.	
6c.	4c.	3c.	2c.	No charge	1c.	list advance

Shorter than 1 in. special prices quoted upon application, not less than 6c. list advance.

Roll and Sheet Brass and Commercial Bronze

Prices are for 100 lbs. or more of one item of sheet metal in one order; for items of less than 100 lbs., see foot-note on page 308.

Brown & Sharpe's Gauge The Standard

Table Revised January 1, 1916

Extras Over Base Prices

[illegible]

All metal heavier than No. 6 gauge, listed and charged as sawed metal, whether sheared, slit, or sawed.

Metal between gauges takes price of nearest gauge.

Circles cut from above metal, over 6 in. and not exceeding 12 in., No. 10 gauge and thinner, 6c list advance.

Circles cut from above metal, over 6 in. and not exceeding 12 in., thicker than No. 10, 10c list advance.

Circles cut from above metal, 6 in. and smaller, and larger than 12 in., special prices quoted upon application

Segments, pattern sheets and irregular shape blanks, special prices quoted upon application.

Polishing one side. No. 16 and heavier (per pound), 4c list advance.

Polishing one side, lighter than No. 16 (per square foot), 10c list advance.

Polishing both sides, double the above prices.

Sheet metal extra leveled, special prices quoted upon application

Sheet metal 14 in. wide and narrower, cut to uniform specific lengths, add the following list advances:

1 ft. to 4 ft.	4 ft. to 6 ft.	6 ft. to 8 ft.	8 ft. to 10 ft.	10 ft. and over, special prices quoted upon application, not less than 6c list advance.
<u>1c.</u>	<u>2c.</u>	<u>4c.</u>	<u>6c.</u>	

Sheet metal, 14 in. wide and narrower when ordered cut to multiple lengths of any specific length less than 24 in., no charge for cutting.

Sheet metal, 14 in. wide and narrower, cut to specific lengths, shorter than 12 in., special prices quoted upon application, not less than 1c. list advance.

Sheet metal wider than 14 in. cut to uniform specific lengths, special prices quoted upon application not less than prices for cutting 14 in. wide.

H. Channon Company Chicago

Brazed Brass, Bronze and Copper Tubing

Brown & Sharpe's Gauge The Standard

Prices are for 100 pounds or more of one item in one order. For items of less than 100 pounds, see foot note on preceding page.

Extras Over Base Price

B. & S. Gauge	In. 3/8	In. 1/2	In. 5/8	In. 3/4	In. 7/8	In. 1	In. 1 1/8	In. 1 1/4	In. 1 1/2	In. 1 3/4	In. 2	In. 2 1/4	In. 2 1/2	In. 2 3/4	In. 3
No. 12	.0808						1							2	4
13	.0719						1							4	5
14	.0640						1							4	5
15	.0570				10	4	2							4	5
16	.0508			25	10	4	2							4	5
17	.0452			25	10	4	2							4	5
18	.0403			25	10	4	2							4	5
19	.0358		55	25	10	4	2							4	5
20	.0319	107	57	27	12	6	4	2						4	5
21	.0284	109	59	29	14	8	5	3							
22	.0253	109	61	31	16	10	7	5							
23	.0225	113	63	33	18	12	9	7							
24	.0201	117	67	37	22	16	13	11							

All tubing between gauges takes prices of nearest gauge.

Square and Hexagon tubing, over corresponding size and gauge of round tubing, 6 cents list advance

Rectangular tubing, over corresponding size and gauge of round tubing, of narrower dimension, 6 cents list advance

Fancy pattern tubing, over corresponding size and gauge of round tubing, 8 cents list advance

Extra fancy pattern tubing, over corresponding size and gauge of round tubing, 16 cents list advance

Combination tubing, 25 cents list advance

For diameters of the fractional parts of an inch, where no price is given, take the column to the left of where such size would appear if designated.

Brazed Tubing Cut to Uniform Specific Lengths

1 In. to 2 In.	2 In. to 4 In.	4 In. to 6 In.	6 In. to 12 In.	12 In. to 96 In.	96 In. and over
6c	4c	3c	2c	No Charge	1c list advance

Shorter than 1 inch special prices quoted upon application, not less than 6c list advance.

Seamless High Brass, Low Brass, Bronze and Copper Tubes

Prices are for 100 pounds of one item in one order, for items of less than 100 pounds, see foot note on preceding page.

Stubs' Wire Gauge Standard—Outside Diameter

Extras over base price brass tubes.—Adopted November 13, 1908. Base price.

B. & S. Gauge	3/8	1/2	5/8	3/4	7/8	1	1 1/8	1 1/4	1 1/2	1 3/4	2	2 1/4	2 1/2	2 3/4	3	3 1/2	4	4 1/2	5	5 1/2	6	6 1/2	7	7 1/2	8	8 1/2	9	9 1/2	10
3-8	4to11	23to13																											
9	12	.109			6	5	5																						
10-11	13to3 1/2	.095			7	5	5																						
12	14	.083			7	7	5	5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
13	15	.072			8	7	7	5	5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
14	16to3 1/4	.065	8	8	7	7	5	5	5	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
15	17	.058	8	8	7	7	5	5	5	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
16	18	.049	9	9	8	8	6	6	6	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
17-18	19	.042	9	9	8	8	6	6	6	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
19	20	.035	9	9	8	8	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
20	21to3 1/2	.032	11	10	10	8	8	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
21	22	.028	13	13	11	11	9	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
22	23	.025	15	15	13	13	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
23	24	.022	31	26	24	23	22	21	19	18	18	18	19	19	20	21	21	21	21	21	21	21	21	21	21	21	21	21	21
24	25	.020	34	29	27	25	24	23	22	22	23	24																	

Sizes between gauges and diameters take the price of the gauge or diameter nearest.

Brass Iron Pipe Sizes

Prices are for 100 pounds of one item in one order; for items of less than 100 pounds, see foot note on preceding page.

Extras over Base Price Brass Tubes

3/8	1/2	3/4	1	1 1/4	2	2 1/2	3	3 1/2	4	4 1/2	5	6	7	8	11c
8	7	2	1	BASE											

Additional Charge for Cutting Tube to Exact Lengths, if Required, 24 Inches or Less

Tubes cut over 12 inches and up to 24 inches, inclusive.	1c	per lb. advance on above list
" 9	12	
" 6	9	
" 4	6	
" 2	4	
" 1	2	
" 3/4	1	

For all seamless tubes of any shape other than round special prices quoted upon application.

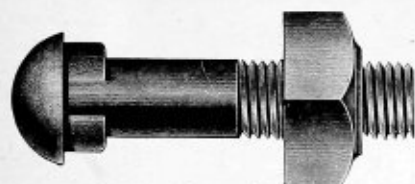
For tinning tubes inside and outside of sizes above specified, add 4c per lb.

For tinning any size or kind of tube on one side only, add 5c per lb.

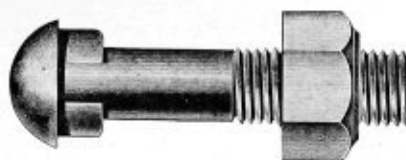
For tinning tubes in lengths not over three inches on ends only, an extra charge of not less than 1c per end.

Standard Track Bolts

Button Heads—Oval Necks



Standard Square Nut



Hexagon Nut

200-Pound Kegs

Standard Sizes, Weights, Dimensions, Extras

Diam. Thread	Length Under Head	Size of Rail Wt. per Yd.	Extras Over Base, 100 Lbs.		No. in 200-Lb. Keg		Diam. Thread	Length Under Head	Size of Rail Wt. per Yd.	Extras Over Base, 100 Lbs.		No. in 200-Lb. Keg	
			Square	Hexagon	Square Nut	Hexagon Nut				Square	Hexagon	Square Nut	Hexagon Nut
$\frac{3}{4}$ x $1\frac{1}{2}$		8-10	\$3.15	\$3.70	1800	1830	$\frac{3}{4}$ x $3\frac{1}{2}$		55-60	Base	\$0.15	259	273
$\frac{1}{2}$ x $1\frac{1}{2}$		12-14-16	1.55	1.90	1012	1064	$\frac{3}{4}$ x $3\frac{3}{8}$		60-65	"	.15	255	268
$\frac{1}{2}$ x 2		20	1.35	1.70	964	1006	$\frac{3}{4}$ x $3\frac{1}{4}$		70-75	"	.15	250	263
$\frac{1}{2}$ x $2\frac{1}{4}$		25	1.20	1.55	915	953	$\frac{3}{4}$ x 4		70-75	"	.15	242	254
$\frac{1}{2}$ x $2\frac{3}{4}$		30-35	.60	.85	505	533	$\frac{3}{4}$ x $4\frac{1}{4}$		75	"	.15	170	178
$\frac{3}{4}$ x 3		30-40	.40	.55	462	484	$\frac{3}{4}$ x $4\frac{3}{4}$		80-85	"	.15	164	171
$\frac{3}{4}$ x 3		40-45	.15	.35	278	294	1 x $4\frac{1}{2}$		90	"	.15	120	126
$\frac{3}{4}$ x $3\frac{1}{2}$		50	.05	.25	269	283	1 x $4\frac{3}{4}$		90-100-110	"	.15	116	121

Base sizes are $\frac{3}{4}$ diameter and larger by $\frac{3}{4}$ inches and longer with square nuts. Unless otherwise specified, we supply O. H. steel bolts with square nuts and U. S. Std. rolled threads. Other sizes than listed supplied promptly. Bolts with Harvey ratchet grip threads with Ideal recessed nuts quoted upon request. Send samples of special bolts.

Standard Steel Railroad Spikes



200-Pound Kegs

These spikes have clean cut, sharp, chisel points to facilitate driving into hard timbers. Spikes drive easily and hold well after driving. Heads will not fly off.

Diam. (Sq.) Inches	Length Inches	Extras Over Base, per 100 Pounds	Standard Size of Rail	No. of Spikes in 200 Pound Keg	Number of Splice Bars, Bolts and Spikes for One Mile of Single Track		
					Splice Bars, Pairs	Bolts	Spikes
$\frac{3}{4}$ x $2\frac{1}{2}$		\$0.60	8-10	2200	364	1456	10560
$\frac{3}{4}$ x $2\frac{1}{2}$		.40	12-14	1520	for 8 to 45-Lb. Rail	for 8 to 45-Lb. Rail	for 8 to 45-Lb. Rail
$\frac{3}{4}$ x 3		.30	12-14	1340			
$\frac{3}{4}$ x $3\frac{1}{2}$		.20	16	1170			
$\frac{3}{4}$ x $3\frac{1}{2}$		.10	20-30	684	326	1304	11520
$\frac{3}{4}$ x 4		.10	20	620	for 50 to 60-Lb. Rail	for 50 to 60-Lb. Rail	for 50 to 60-Lb. Rail
$\frac{3}{4}$ x $4\frac{1}{2}$		.10	25-30	600			
$\frac{3}{4}$ x $4\frac{1}{2}$		.10	35	536	326	1956	11520
$\frac{3}{4}$ x 5		.10	40	490	for 70 to 100-Lb. Rail	for 70 to 100-Lb. Rail	for 70 to 100-Lb. Rail
$\frac{3}{4}$ x 5		Base	45-75	360			
$\frac{3}{4}$ x $5\frac{1}{2}$		Base	45-100	340			

Reversed point spikes can be furnished from mill at 25c per 100 pounds extra. Other sizes can be furnished at slight extra charge. $\frac{1}{2}$ x $1\frac{1}{4}$ to 3 inches— $\frac{1}{2}$ x 2 to 4 inches— $\frac{1}{2}$ x 2 to 4 inches— $\frac{1}{2}$ x 3 to 4 inches— $\frac{1}{2}$ x 2 to 4 inches— $\frac{1}{2}$ x 5 to 6 inches and $\frac{3}{4}$ x $5\frac{1}{2}$ to 6 inches. Shimming Spikes— $\frac{1}{2}$ x 7 and 8 inches take base price. Screw spikes upon request.



The Grip Nut

The Boss Lock Nut

Goes on either side and locks by one-half turn. Fits rolled or cut threads also under size threads. Can be used again and again—does not injure threads. Registers deeply and firmly into valley of threads of bolt. Its impinging edges seize the primary nut locking all three members. List same as grip nuts.

The Grip Nut

Locks by friction on deflecting threads. Does not require jamming or springing. Standard on many railroads.

Size, inches.....	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1	1 $\frac{1}{4}$	1 $\frac{1}{2}$	2
Square, per 1000.....	\$12.00	\$13.50	\$13.50	\$15.00	\$15.00	\$19.50	\$19.50	\$24.00		
Hexagon, per 1000.....	15.00	15.50	15.50	18.00	18.00	22.50	22.50	28.50		
Size, inches.....	$\frac{3}{4}$	1	1 $\frac{1}{4}$	1 $\frac{1}{2}$	1 $\frac{3}{4}$	2	2 $\frac{1}{2}$	3	3 $\frac{1}{2}$	4
Square, per 1000.....	\$30.00	\$45.00	\$60.00	\$75.00	\$90.00	\$105	\$150	\$240		
Hexagon, per 1000.....	34.50	52.50	69.00	87.00	105	125	180	270		

For lock washers listed elsewhere, see index.



Boss Nut Locked



Boss Lock Nut

Tie Plates and Rail Braces quoted upon receipt of quantities and specifications.

Standard Steel Rails



Light Section Rails

Weight per yard, pounds	8	10	12	14	16	20	25	30	35	40	45
Height of rail, inches	1 1/2	1 3/4	2	2 1/8	2 3/8	2 5/8	2 7/8	3 1/8	3 3/8	3 5/8	3 7/8
Width of base, inches	1 1/2	1 3/4	2	2 1/8	2 3/8	2 5/8	2 7/8	3 1/8	3 3/8	3 5/8	3 7/8
Size of bolt, inches	3/8 x 1 1/2	3/8 x 1 1/2	1/2 x 1 3/4	1/2 x 1 3/4	1/2 x 1 3/4	1/2 x 2	1/2 x 2 1/8	1/2 x 2 1/8	1/2 x 2 1/8	1/2 x 2 1/8	1/2 x 2 1/8
Size of spike, inches	3/8 x 2 1/2	3/8 x 2 1/2	3/8 x 3	3/8 x 3	3/8 x 3 1/2	3/8 x 3 1/2	3/8 x 4	3/8 x 4 1/2	3/8 x 4 1/2	3/8 x 5	3/8 x 5 1/2
Length of splice bar, inches	16 1/2	16 1/2	16 1/2	16 1/2	16 1/2	16 1/2	16 1/2	16 1/2	16 1/2	20	20
Weight of splice bar, per pair	2.00	2.60	3.44	3.44	4.36	4.86	5.70	10.45	12.10	16.10	18.75

Above furnished 30 feet long and 10 percent not less than 20 feet long. Ties 24-inch centers—2640 per mile.

Standard Section Rails

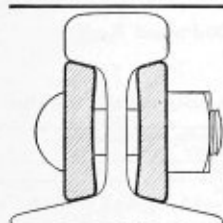
Weight per yard, pounds	50	55	60.20	60.30	60.40	65	70.20	70.30	70.40	75	80.20
Height of rail, inches	3 1/2	4 1/2	4 1/2	4 3/8	4 1/2	4 1/2	4 1/2	4 1/2	4 1/2	4 3/8	5 1/2
Width of base, inches	3 3/8	4 3/8	4 3/8	4 3/8	4 3/8	4 3/8	4 3/8	4 3/8	4 3/8	4 3/8	4 3/8
Size of bolt, inches	3/4 x 3 1/2	3/4 x 3 1/2	3/4 x 3 1/2	3/4 x 3 1/2	3/4 x 3 1/2	3/4 x 3 1/2	3/4 x 3 1/2	3/4 x 3 1/2	3/4 x 3 1/2	3/4 x 4	3/4 x 4 1/2
Size of spike, inches	3/8 x 5 1/2	3/8 x 5 1/2	3/8 x 5 1/2	3/8 x 5 1/2	3/8 x 5 1/2	3/8 x 5 1/2	3/8 x 5 1/2	3/8 x 5 1/2	3/8 x 5 1/2	3/8 x 5 1/2	3/8 x 5 1/2
Length of splice bar, inches	24	24	24	24	24	24	24	24	24	34	34
Weight splices per pair	25 1/2	29	41	36 1/4	32 1/2	36	64	65	55	58	74

Standard Section Rails

Weight per yard, pounds	80.30	80.40	85	90.20	90.30	90.40	100.20	100.30	100.40	110	120
Height of rail, inches	4 3/8	5	5 3/8	5 3/8	5 1/2	5 3/8	6	5 3/8	5 3/8	6 1/2	6 1/2
Width of base, inches	4 3/8	5	5 3/8	5 3/8	5 1/2	5 3/8	6	5 3/8	5 3/8	6 1/2	6 1/2
Size of bolt, inches	7/8 x 4 1/4	7/8 x 4 1/4	7/8 x 4 1/4	1 x 4 1/4	1 x 4 1/4	1 x 4 1/4	1 x 4 1/4	1 x 4 1/4	1 x 4 1/4	1 x 4 1/4	1 x 4 1/4
Size of spike, inches	3/8 x 5 1/2	3/8 x 5 1/2	3/8 x 5 1/2	3/8 x 5 1/2	3/8 x 5 1/2	3/8 x 5 1/2	3/8 x 5 1/2	3/8 x 5 1/2	3/8 x 5 1/2	3/8 x 5 1/2	3/8 x 5 1/2
Length splice bar, inches	34	34	34	34	34	34	34	34	34	34	34
Weight splices, per pair	69	63	68	91	78	73	104	92	86	99	107

Standard Section Rails furnished 90 percent 33 feet long and 10 percent not less than 24 feet long varying by full feet.

Ties 22-inch centers—2880 ties per mile. 4 bolts to joint, 8 to 65-pound rail, 6 bolts for larger.

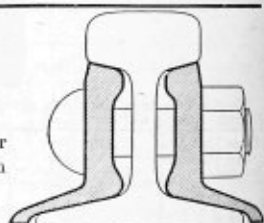


16-Pound Plain Bar
(Style of 8 to 25-Lb.)

Standard Splice Bars

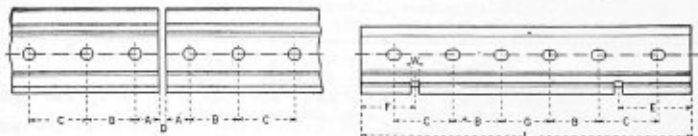
Rolled Sections

These standard rolled sections obtainable for prompt shipment. See above for weight and length and below for punching and notching.



40-Pound Angle Bar
For Larger Rail

Standard Drilling for Rails and Standard Punching and Notching for Splice Bars



Rail Drilling

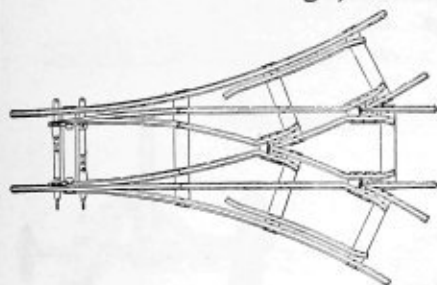
Rail Weight per Yard Pounds	Size of Hole, Inches	A	B	C	D
		Inches	Inches	Inches	Inches
8 to 10	1/2	2	4	.....	1/2
12 to 25	3/8	2	4	.....	3/8
30 to 35	1/2	2	4	.....	1/2
40 to 45	1/2	2	5	.....	1/2
50 to 67	1	2	5	.....	1
70 to 72	1 1/4	2	5	.....	1 1/4
75 to 85	1 1/4	2	5	6	1 1/4
90 and heavier	1 1/4	2	5	6	1 1/4

Splice Bar Punching and Notching

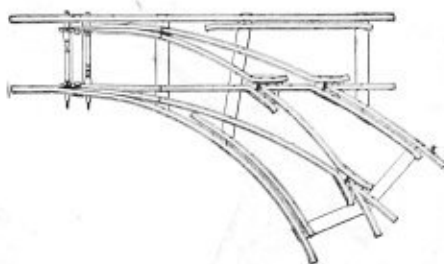
Rail Weight per Yard, Pounds	Length, Inches	G	B	C	E	F	W
		Inches	Inches	Inches	Inches	Inches	Inches
8 to 10	16 1/2	4 1/2	4	.....	.....	.....	.....
12 to 25	16 1/2	4 1/2	4	.....	.....	.....	.....
30 to 35	16 1/2	4 1/2	4	.....	.....	.....	.....
40 to 45	20	5 1/2	5	.....	3 1/2	1 1/2	3 1/2
50 to 67	24	5 1/2	5	.....	6 1/2	2 1/2	6 1/2
70 to 72	34	5 1/2	5	6	7 1/2	5 1/2	7 1/2
75 to 85	34	5 1/2	5	6	7 1/2	5 1/2	7 1/2
90 and heavier	34	5 1/2	5	6	7 1/2	5 1/2	7 1/2

Tie Plates and Rail Braces—upon request.

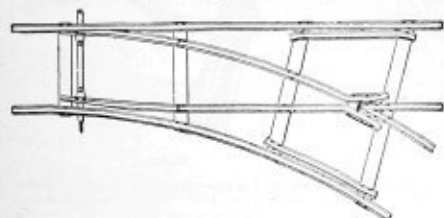
Frogs, Switches, Crossings, Etc.



Three-Way Turnout Fig. 81



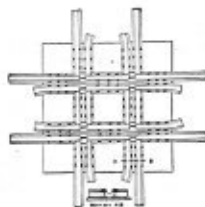
Three-Way Side Turnout Fig. 82



Side Turnout Fig. 83



Portable Bridge Fig. 86



Crossing Fig. 84



Diamond Turnout Fig. 85

The above illustrations show light portable track material for mines, quarries, plantations, rolling mills, docks, industrial plants, etc.

We can supply also split switches, crossings, switch stands, head chairs, etc., for light or standard rail upon receipt of proper information, see below.

Information Required

The following information must accompany inquiry, in order that goods may be manufactured correctly and shipped promptly:

Rigid Frogs.—Angle, length over all and length of main point; height and weight of rail, spacing of splice-bar holes, i. e., the distance from end of rail to center of first hole, distance between centers of first and second holes. If convenient, send sketch showing dimensions of rail, or refer to mill rolling the rail, giving their section number. If curved frog is wanted, specify whether right or left hand and radius of curve.

Turnouts.—Gauge of track, height and weight of rail, spacing of splice-bar holes, radius of center line and whether right or left hand. Turnout is designated as right or left according to direction of curve when standing at switch and facing frog.

Split Switches.—Length of switch, gauge of track, height and weight of rail, spacing of splice-bar holes, throw of stand to be used in connection with switch and diameter of hole in end of head rod.

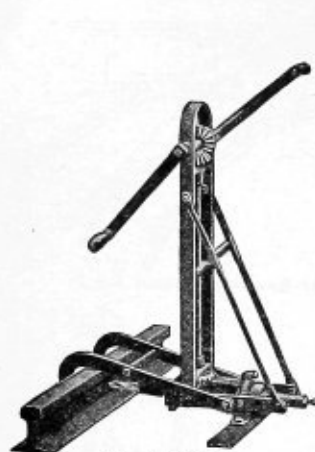
Switch Stands.—Throw of stands, whether single or double throw, style of target desired and dimensions of mast top for lamp.

Crossings.—Angle between intersection of tracks, gauge of tracks, height and weight of rail and spacing of splice-bar holes. If the tracks are of different gauges, or if either track is curved, send plan with gauge marked on each track, and direction and radius of curve. The angle of crossings on curves should be given between the tangents at the intersection of center lines.

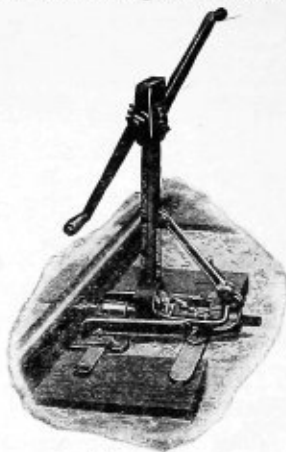
Head Chairs.—Drawing of rail with which they are to be used, or width of head and base, throw of switch-stand, and whether for two-way or three-way turn-out.

Stub Switch Tie Bars.—Drawing of rail used or width of head and base and gauge of track.

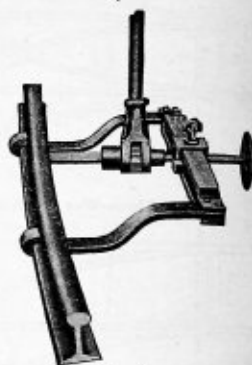
Track Drilling Machines



New Style Paulus



Moore



Beland

New-Style Paulus Track Drill—For light and heavy drilling. Has two distinct feeds and dust-proof ball bearing thrust reducing friction and promoting ease of operation. An arrangement feeds and returns bit quickly to and from work. Handles are adjustable and can be lengthened for heavy feeding and large bits. Frame is malleable iron "T" section combining strength with lightness. Has Rich spindle for using Rich flat bits of high speed steel. Can also be fitted with plain spindle for using twist bits. Weight 95 lbs.

Type A is the standard overclutch which is largely used and needs no introduction. Type B is the special hook designed to enable operator to drill holes close to the end of rail. Another advantage of this type is that hook may be lengthened so that fish plates may be drilled at the same time as rail.

Type C is the underclutch type. A few roads still order this form of clutch. Most, however, call for the overclutch as it is more quickly handled and convenient.

Type D is for drilling girder rails. Adjustable screw supports hook in desired position. Also useful for drilling I-beams, size of hook enabling operator to drill to the center of 15-inch beams.

Paulus Track Drill—A standard type; automatic feed; will collapse to allow passage of train without disturbing drill. Price with one drill bit.

With Rich spindle and flat bit	Types A, B, or C	\$50.00	Type D	\$35.00
With twist bit spindle and twist bit	Types A, B, or C	\$40.00	Type D	\$44.00

Moore Track Drills, Nos. 1 and 2 are designed for heavy and severe work. Have detachable uprights with adjustable rail hooks which go over top of rail and are easily erected and secured. This overclutch hook may be lengthened quickly for drilling through splice bars, angle bars, guard rail, frogs, crossings, etc., by removing one bolt. The rail hook can then be adjusted to suit the conditions and bolt put back in a few seconds' time. This cannot be done with any other drill on the market. Hook can be quickly removed to allow trains to pass by shifting eccentric lever in the back brace. When taken apart the drill can be easily carried by one man. Can also be fitted with underclutch if desired.

No. 3 is designed for use where fewer sizes of holes are to be drilled and hardness of rails is more uniform. Has three changes of feed and same detachable rail hook and upright as in Nos. 1 and 2. One man can operate drill when drilling holes from $\frac{3}{4}$ to $1\frac{1}{4}$ inch, or two men from 1 to $1\frac{1}{4}$ inches.

No. 1. For drilling holes up to 1 inch. Each. \$37.00

No. 2. For drilling holes up to $1\frac{1}{4}$ inch. Each. \$43.00

No. 3. Either under or overclutch pattern. Each. \$56.00

Beland Track Drill is of ratchet type and is both strong and convenient to handle.

Price complete	\$6.00	Drill bits, each	\$0.35	Ratchet, each	\$3.00
----------------	--------	------------------	--------	---------------	--------

Economy High Speed Track Bits (All 6 1-4 In. Long)



No. 504. Flat Beaded.



No. 505. Flat with Round Slabbed Shanks.



No. 509. Flat with Combination Flat Beaded and Round Shank.

Fitting Flat Drill Chucks on Paulus, New Style Paulus, Buda, Climax, Gorder and Harvey Track Drill Machines.

Thickness of bits $\frac{1}{2}$ inch to $\frac{3}{4}$ inch is $\frac{1}{8}$ inch. No. 1 Bead. Thickness of bits $\frac{3}{4}$ inch to $1\frac{1}{4}$ inch is $\frac{1}{4}$ inch. No. 2 Bead. Size given is for shank end of bit. Point end is $\frac{1}{8}$ inch larger.

Fitting chucks on Paulus, Buda, Harvey, Francis Reed & Co.'s Nos. 18 and 19, Duntley and Sheffield Car Co.'s Track Drilling machines.

Thickness of bits $\frac{1}{2}$ inch to $\frac{3}{4}$ inch is $\frac{1}{8}$ inch. Thickness of bits $\frac{3}{4}$ inch to $1\frac{1}{4}$ inch is $\frac{1}{4}$ inch. Shanks on these bits are $2\frac{1}{4}$ inches long, .648 diameter, commonly called $\frac{5}{8}$ inch. Size at point end is $\frac{1}{8}$ inch larger than diameter of drills given.

This bit will fit all Chucks for track drilling machines listed under Nos. 504 and 505 bits above. Also for Rich Chucks.

Thickness of bits $\frac{1}{2}$ inch to $\frac{3}{4}$ inch is $\frac{1}{8}$ inch. No. 1 Bead. Thickness of bits $\frac{3}{4}$ inch to $1\frac{1}{4}$ inch is $\frac{1}{4}$ inch. No. 2 Bead. Shanks on these bits are $2\frac{1}{4}$ inches long, .648 diameter, commonly called $\frac{5}{8}$ inch. Size at point end is $\frac{1}{8}$ inch larger than diameter of drills given.

Size, inches	$\frac{5}{8}$	$\frac{11}{16}$	$\frac{3}{4}$	$\frac{13}{16}$	$\frac{7}{8}$	$\frac{15}{16}$	1	$1\frac{1}{16}$	$1\frac{1}{8}$	$1\frac{3}{16}$	$1\frac{1}{2}$
Price each	\$1.05	1.10	1.20	1.30	1.40	1.50	1.55	1.65	1.75	1.85	1.95

Track Tools

Crow Bars



Wedge Point

Pinch Point



Length, feet...	4	4 1/2	5	5 1/2	6	7
Price each...	\$0.90	\$1.00	\$1.30	\$1.50	\$1.80	\$3.00
Pinch bars with heel, extra...						.50

Lining Bars



Diamond Point

Length, feet...	5	5 1/2	6	6 1/2
Price each...	\$1.50	\$1.70	\$2.00	\$3.00

Railroad Claw Bars Goose Neck Pattern



Price each...	\$3.70
---------------	--------



With Heel

Price each...	\$3.60
---------------	--------

Tamping Bars



Price each...	\$1.70
---------------	--------

Rail Forks



Price each...	\$2.80
---------------	--------

Rail Tongs



Price each...	\$3.20
---------------	--------

Tie Tongs



Price each...	\$3.70
---------------	--------

"Fitting Up" Wrenches



With offset and tapered to 1/4 at point. For 3/4 up to 1-inch bolts. Price each... \$1.10

Track Wrenches



Single End

For Bolt, Inches	Opening, Inches	Length, Inches	Weight	Price Each
1 1/2	3/8	24	4 lbs., 10 ozs.	\$0.70
1 1/2	3/8	30	5 lbs., 8 ozs.	.84
1 1/2	1 1/8	24	4 lbs., 10 ozs.	.70
1 1/2	1 1/8	30	5 lbs., 8 ozs.	.84
1 1/2	1 1/8	24	4 lbs., 10 ozs.	.70
1 1/2	1 1/8	30	5 lbs., 8 ozs.	.84
1 1/2	1 1/8	24	6 lbs., 9 ozs.	1.00
1 1/2	1 1/8	30	8 lbs., 0 ozs.	1.20
1 1/2	1 1/8	24	6 lbs., 9 ozs.	1.00
1 1/2	1 1/8	30	8 lbs., 0 ozs.	1.20
1 1/2	1 1/8	24	6 lbs., 9 ozs.	1.00
1 1/2	1 1/8	30	8 lbs., 0 ozs.	1.20
1 1/2	2	24	6 lbs., 9 ozs.	1.00
1 1/2	2	30	8 lbs., 0 ozs.	1.20

Double End



Length 28 inches.	Weight 9 lbs.	Price each...	\$2.00
-------------------	---------------	---------------	--------

Spike Puller



Price each	2-ball, \$0.90	3-ball...	\$1.10
------------	----------------	-----------	--------

Track Mauls



Track Chisels



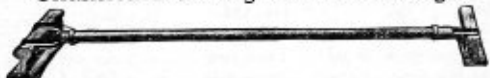
Track Punches



Made of best crucible tool steel, oil finished, hardened and tempered.

Weight, Pounds	Price		
	Mauls	Chisels	Punches
4			\$0.96
4 1/2			1.08
4 3/4			1.20
5	\$0.70	\$1.20	1.20
6	.80		
8	.96		
10	1.20		
12	1.50		

Channon-Huntington Track Gauges



No. 65. Standard gauge, 4 ft., 8 1/2 ins. Weight per doz., 140 lbs. Price each... \$1.90
No. 67. With guard rail attachment. Price each... \$3.00

No. 70 Wood Track Levels



White pine with three coats of paint, bound with steel. Price each...

Combined Track Gauge and Level

Has gauge glass in rubber packing



Price each...	\$5.80
---------------	--------

Bridgebuilders' Tools

A bridgebuilder's tool that is worthy of the name must first of all be manufactured from the very best quality of tool steel that is practicable for the purpose. It must also be forged by skilled workmen—men who are thoroughly familiar with every detail of their trade—men who know the hard usage to which each tool will be subjected and who realize that careful workmanship is almost as necessary as high quality steel. Of just such high quality tool steel and by just such workmen are Channon bridgebuilders' tools manufactured. We guarantee them to be the very best obtainable for the price and unhesitatingly recommend them to the contractor or workman who wants the very best.

Riveting, Flogging and Napping Hammers



No. 100



No. 101



No. 102

No.	Description	Weight, Pounds	Face, Inches	Length, Inches	Price Each
100	Riveting.....	4	1 1/2 and 1 3/4	8 1/2	\$2.70
101	Flogging.....	7	1 3/4	7	5.20
102	Napping.....	3	1 1/2	6	2.70

Cutting Tools



No. 95

No. 96

No. 97

No. 98

No. 99

No.	Name and Description	Weight, Pounds	Face or Bit, Inches	Length, Inches	Price Each
95	Rivet "Buster".....	2 1/2	1 1/2 Square	6	\$1.70
96	Straight Blade Cold Cutter.....	3 1/2	1 3/4 Square	6 1/2	1.70
97	Cross Blade Cold Cutter.....	3	1 1/2 Square	6 1/2	1.70
98	Side Set, or Cutter.....	3 1/4	1 1/2 Square	6 1/2	1.70
99	Handle Gouge.....	2 1/2	1 1/2 Square	6 1/2	1.80

Riveting Dollies



FIG. 108



FIG. 110



FIG. 109

CLUB DOLLY



FIG. 112

No.	Name and Description	For Rivets, Inches	1/2	3/8	1/4	3/16	Price Each
108	Straight Dolly.....	Weight, pounds.....	17 1/2	23 1/2	25 1/4	27	\$ 5.50
109	Club Dolly.....	Weight, pounds.....	17 1/2	21	20	23	6.50
110	Spring Dolly.....	Weight, pounds.....	12 1/2	18	29 1/2	29 3/4	10.00
112	Heel Dolly.....	Weight, pounds.....	11 1/4	22	.....	30 3/4	9.00

Special Rivet Tongs



No. 103

Pick-up tongs, 18-inch.	Price pair.....	\$1.60
Heating tongs, 30-inch.	Price pair.....	1.60

Hand Rivet "Snaps" or "Sets"



No. 92

For Button Head or
Conical Head Rivets

Unless specified we send snaps for button head rivets.						
Rivet size, inch.....	3/8	1/2	5/8	3/4	7/8	1
Weight, lbs.....	2	2	2	3	3	3
Price each.....	\$2.50	\$2.50	\$2.50	\$2.60	\$2.80	\$3.00



"Drift" Pins—Harrel Shaped

No. 93 Average length about 7 inches.						
Size of pins, inches.....	3/8	1/2	5/8	3/4	7/8	1 1/2
Rivet size, inches.....	3/8	1/2	5/8	3/4	7/8	1
Weight, ounces.....	8	8	12	14	16	20
Price each.....	\$0.20	\$0.22	\$0.24	\$0.32	\$0.34	\$0.35



No. 94

"Backing Out" Punches

No. 94 3/4 to 1 1/2-in. Price each \$1.70						
3/4 to 1-in. Price each 1.90						
Rivet sizes, inch.....	3/8	1/2	5/8	3/4	7/8	1
Length, inches.....	6	6	6 1/2	7	7 1/2	8
Weight, pounds.....	2 1/2	2 1/2	2 1/2	2 3/4	2 3/4	3

Special Riveting Clamp For Bridge Builders and Contractors

Hand made from best materials.

Price each.....\$7.50



Fig. 104



Samson Rail Benders

Will bend 100-pound rails into position when taking kinks out of track, without drawing spikes. Can be operated by one man. Frame is of open hearth steel, extra strongly made. Screws are of steel, working in bronze nut and provided with anti-friction washers. Thrust is of hardened steel. Weight each 100 pounds, price each. \$60.00



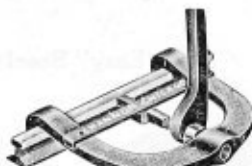
Roller Rail Benders and Straighteners

Place the bender over rail as shown in illustration, then turn up nut on center screw until it is set for the desired curve; place socket wrench on pin in center roller, put long lever on the top of socket and then one or more men can turn the center roller which causes bender to move forward on rail bending same as it moves. For the purpose of straightening rails, place bender on the opposite side of curve and operate as above.

Number	1	2	3	4	5	6
For Rails	20 to 40 lbs.	41 to 60 lbs.	61 to 70 lbs.	71 to 80 lbs.	81 to 90 lbs.	91 to 100 lbs.
Weight each, pounds	300	360	400	470	520	830
Price each	\$105.00	\$115.00	\$140.00	\$180.00	\$230.00	\$400.00

"Jim Crow" Rail Benders

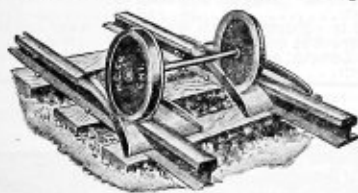
Forged from solid machine steel; machine cut square thread screws, heavy bracing bar for supporting shaft.



Number	For Rails	Weight Each, Pounds	Price Each
1	100 lbs. and lighter	225	\$34.00
2	75	180	30.00
3	56	110	22.50
4	30	80	15.50
5	20	60	15.50

Car Replacers

Johnson Wrecking Frogs or Car Replacers



These are in general use by Standard and Logging Railroads, Contractors and Mines. Have three points of contact for support—at small end by rail, at broad end by rail and tie. Straddle the rail and replace wheels on both sides of rail at one setting. Do not require bolts, clamps, spikes or wedges to hold in place while in operation. Fit all sections of T rail from 6 inches down. These frogs will also de-rail.

Type	For Rail up to	Capacity Locomotive	Wt., Lbs.	Price per Pair
M	45	20 ton	30	\$22.00
C	65	30 ton	60	27.50
B	80	50 ton	110	36.30
A	100	80 ton	145	40.70
Z	100	100 ton	165	44.00
AA	100	200 ton wreck outfit	275	72.60

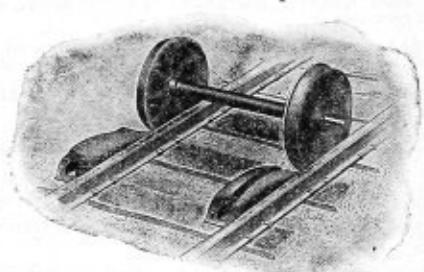
Fig. 1

Fig. 2



Number	Rail Applicable to	Weight per Pair	Price per Pair
1	60 lbs. and less	195	\$25.00
2	60 to 80 lbs.	227	28.00
3	60 to 100 lbs.	242	31.50
4	80 to 100 lbs.	184	29.00

The Aldon Car Replacers



Frogs are marked right and left. The right frog is always placed adjacent to the right rail, the left frog to the left rail. Place the high ends as close to the rail as possible. The wings at the low end of the frogs must never be placed on top the flange of the rail.

No.	Material	Equipment Suitable For	For Rail Up to	Wt., Lbs.	Price per Pair
1	Cast Steel	Heaviest	100	200	\$31.50
2	Cast Steel	Modern	85	180	29.00
3	Mall. Iron	Elec. Sub'n	70	100	23.20
3 1/2	Mall. Iron	Elec. Sub'n	50	100	23.20
4	Mall. Iron	Industrial	35	55	19.50
5	Mall. Iron	Street R'y	40	40	9.50

Buda Car Replacers

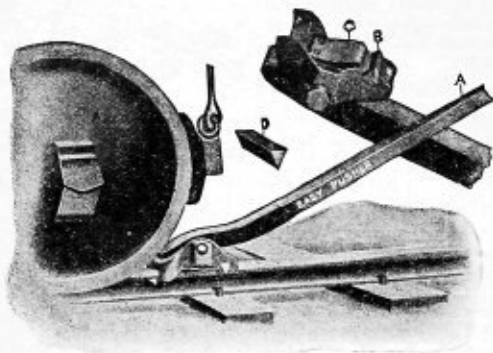
Fig. 1 shows Inside Replacer which should be placed to the rail so that sufficient space is left for flange to enter. Fig. 2—Outside Replacer which should be placed as close as possible to the rail.

Replacers are furnished in four different sizes. Nos. 1, 2 and 3 are of heavier construction and designed for extra heavy equipment and service. No. 4 is similar in every respect to No. 3, but lighter in weight.

In order to eliminate chance of error please refer to the table herewith, when ordering.

Car Movers

"Easy" Steel Car Pushers

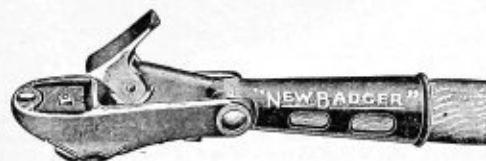


As shown in the cut the heel has lugs extending downward on both sides of the rail so as to hold it firmly in position and prevent it from slipping sideways. The triangular bit, or steel cuts into the rail when pressure is applied and prevents slipping backward, even though the rail is icy, greasy or wet. This bit can be inverted. Each one has three sharpened edges. When the pressure is released, the steel spring lifts the steel bit from the rail, thus preventing it from being dulled by sliding over the rail when following the wheel. Two triangular steels with each pusher.

The bar "A" is steel; the shoe is malleable; the bit "D" is of the finest tool steel; the spring "C" is also of fine steel. Weight 20 lbs. Length 5½ feet.

Price each.....\$10.00
Triangular spurs, each......50

"Badger" Car Mover



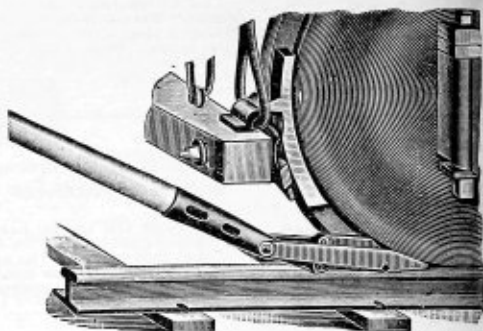
This car mover has a quick-acting compound leverage that will move the heaviest loaded cars, and 50 ton cars can be handled with ease and rapidity. Is light, well-balanced and made of malleable iron. It has double concave spurs which grip the corner of the rail firmly and when moving a car it is impossible for them to slip even when dulled by long wear. The spurs are made of best tool steel and held in place by a spur plate which can be changed, or new ones inserted if necessary, with the aid of a common wrench. Handle is hard maple. Weight 17 lbs. Length, 5½ feet.

Price each.....\$10.00

Extra or Repair Parts for "Badger" Car Movers

Malleable Shoe No. 9.	Price each.....	\$3.00
Socket No. 8.	Price each.....	3.00
Cam No. 7.	Price each.....	1.50
Clip for Spur No. 16.	Price each.....	.80
Small Bolt No. 21.	Price each.....	.10
Large Bolt No. 23.	Price each.....	.10
Pin No. 24.	Price each.....	.10
Steel Spurs No. 22.	Price each.....	.50
Handle No. 20.	Price each.....	2.00

"Atlas" Car Movers



A very powerful device for starting and moving loaded cars by hand. The compound lever arrangement causes the wheel to go forward and does not lift it from the rail as in the case of many car movers. It will work on any rail whether wet or greasy and can be had with either single straight spur or double spurs set at an angle; when worn by long use they may be taken out by simply loosening a nut and bolt and turned to a new edge.

No. 8 has single spur and can be used on any rail. Weight 19 lbs. Length, 5½ feet.

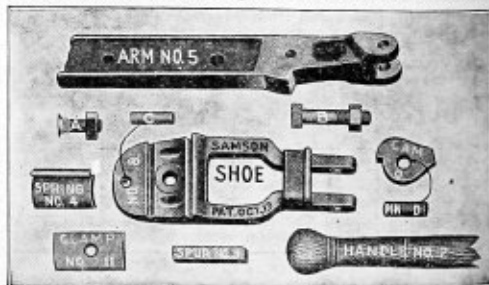
Price each.....\$10.00
No. 10 is equipped with double spurs for use if the rail is unobstructed on the sides one-half inch down. Weight 19 lbs. Length, 5½ feet.

Price each.....\$10.00

"Samson" Car Movers



Weight 16 lbs. Price complete.....\$10.00



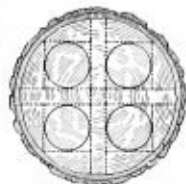
Extra or Repair Parts

No. 0.	Cam in end of arm.	Price each.....	\$0.20
No. 11.	Clamp, to hold spur 3.	Price each.....	.30
No. 2.	Wood handle.	Price each.....	1.00
No. 3.	*Spur, that rests on rail.	Price each.....	.25
No. 4.	Spring that slides on rail.	Price each.....	.25
No. 5.	Arm, bolted to handle 2.	Price each.....	1.25
No. 8.	Shoe, bolted to arm 5.	Price each.....	1.25
ABCD steel bolts and pins. Price each.....1.25			
*When ordering state if required square or triangular.			



Cross section of an ordinary style roller, showing checks from the heart.

Quartersawn Rock Maple Rollers



The Channon Quartersawn Maple Rollers have no hearts in them to check.

Channon Quartersawn Maple Rollers are turned from the best and toughest part of sound, selected Rock maple logs. There are no hearts in them to weaken them and checking from the heart is eliminated.

They will stand twice the strain of the old roller and last many times longer, and they cost only a trifle more. A big saving is effected when the additional service rendered by these rollers is considered. Given a trial quartersawn rollers will always replace the cheaper heart rollers.

The Treatment and Care of Maple Rollers

Checking in rollers is caused by the fact of the surface of the roller drying out faster than the inside, and the outer rim of fast drying wood having to accommodate itself to the still damp and larger core.

No matter how many years a maple square has lain in pile there is always some moisture present inside it and as soon as it is turned into a roller it starts drying out further. Checking can be eliminated by taking care of the rollers and seeing that they dry out evenly throughout.

Hearts in rollers are poor investments, for the useless heart wood is not of the same tensile strength, fibre, density or weight as the select sap wood surrounding it and cannot be made to dry out at the same rate as the sap wood.

A heart roller weighs just as much as a Channon roller. Channon rollers last more than twice as long as others and the freight saving alone will just about pay the difference in cost.

We ask at least one week's time on each order for rollers, as they are never carried in stock but turned to suit the individual requirements of the order as it comes in, and then oiled, painted and inspected twice before leaving.

No.	Diam., Inches	Length, Feet	Weight Each, Lbs.	Price Each	No.	Diam., Inches	Length, Feet	Weight Each, Lbs.	Price Each
1	3	3	7	\$0.50	19	7	5	68	\$ 4.90
2	3	4	8	.70	20	7	6	81	6.00
3	4	3	11	.90	21	7	7	95	7.10
4	4	4	15	1.20	22	7 1/2	4	64	4.60
5	4	5	19	1.50	23	7 1/2	4 1/2	74	5.50
6	4	5 1/2	21	1.70	24	7 1/2	5	80	5.90
7	5	3	20	1.40	25	7 1/2	6	96	7.20
8	5	4	26	1.90	26	8	4	74	5.40
9	5	5	33	2.40	27	8	4 1/2	86	6.40
10	5	6	39	2.90	28	8	5	93	6.90
11	6	3	30	2.10	29	8	6	111	8.40
12	6	4	40	2.80	30	8	7	130	10.00
13	6	4 1/2	47	3.30	31	8 1/2	5	110	9.00
14	6	5	50	3.55	32	8 1/2	6	132	10.75
15	6	6	60	4.25	33	8 1/2	7	154	13.00
16	7	3	40	2.90	34	9	5	130	12.00
17	7	4	54	3.90	35	9	6	156	14.00
18	7	4 1/2	62	4.55	36	9	7	172	16.00

Special Maple Rollers and Squares

We can supply rollers of 10 inches to 14 inches in diameter if desired and large maple squares or heavy planking with no hearts in lengths up to 16 feet.

We can also supply rollers with iron bands on the ends and with steel shafts through and projecting from each end for Mine and Conveyor rollers, etc., etc.

H. Channon Company Chicago



Sterling Pike Poles

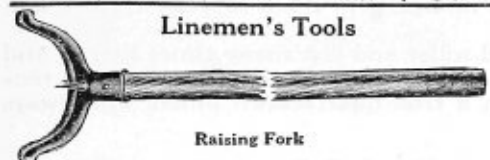
Pike and hooks are hand forged from one piece of crucible steel. Ferrules are made seamless from Norway iron and are very strong; cannot possibly become loose.



With Pike and Hook

With Pike Only

Length, Feet	Weight per Doz.	Prices With Pike and Hook		Weight Per Doz.	Prices With Pike Only		Per Doz.	Prices Handles Only, No Irons	
		Each	Per Dozen		Each	Per Dozen		Each	Per Dozen
8	75	\$2.00	\$20.00	80	\$1.65	\$16.50	60	\$0.90	\$ 9.00
10	80	2.10	21.00	75	1.80	18.00	65	1.05	10.50
12	85	2.35	23.75	80	2.05	20.75	70	1.10	11.25
14	100	2.85	28.50	95	2.55	25.50	85	1.35	13.75
16	110	3.50	35.00	105	3.20	32.00	95	1.75	17.50
18	120	4.50	45.00	115	4.20	42.00	105	2.50	25.00
20	130	6.00	60.00	125	5.70	57.00	115	3.75	37.50

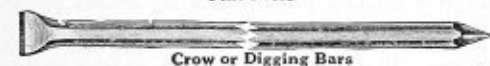


Linemen's Tools

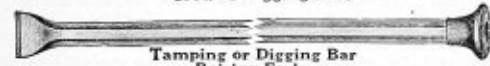
Raising Fork



Pike Poles



Crow or Digging Bars



Tamping or Digging Bar Raising Forks

Length Over All, Feet	Diameter Handles, Inches	Price Each	Price Dozen
12	1 1/4	\$2.55	\$25.50
14	1 1/4	2.70	27.00
16	1 1/4	3.00	30.00
12	2 1/4	3.00	30.00
14	2 1/4	3.20	32.00
16	2 1/4	3.40	34.00
18	2 1/4	3.60	36.00

Pike Poles

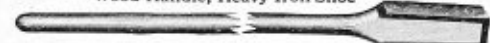
Length Over All, Feet	Diameter Handles, Inches	Price Each	Price Dozen
12	1 1/4	\$1.50	\$15.00
14	1 1/4	1.70	17.00
16	1 1/4	2.00	20.00
12	2 1/4	2.05	20.50
14	2 1/4	2.35	23.50
16	2 1/4	2.65	26.50
18	2 1/4	3.00	30.00
12	2 1/2	2.35	23.75
14	2 1/2	2.75	27.50
16	2 1/2	3.15	31.50
18	2 1/2	3.50	35.00

Crow and Tamping Bars—Octagon Steel

Length Over All, Feet	Diameter, Inches	Crow		Tamping	
		Weight, Pounds	Price Each	Weight, Pounds	Price Each
6	1 1/8	23	\$3.50		
8	1	24	3.30		
8	1 1/8	30	4.25		
8	1			25	\$3.80
8	1 1/8			31	4.50

Tamping Bar

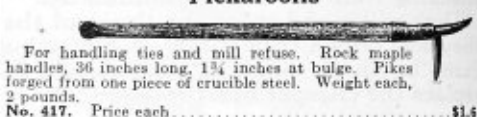
Wood Handle, Heavy Iron Shoe



		Price Each	Price Dozen
3800-7.	7 foot; weight 12 1/2 pounds.	\$2.10	\$21.00
3808-8.	8-foot; weight 13 1/2 pounds.	2.40	24.00

Tamping end shod with 1 1/2 x 3/8-inch steel shoe riveted through select hardwood handle. A high-grade tamping bar.

Pickaroons



For handling ties and mill refuse. Rock maple handles, 36 inches long, 1 1/4 inches at bulge. Pikes forged from one piece of crucible steel. Weight each, 2 pounds.

No. 417. Price each \$1.51

Hookaroons with Axe Handles

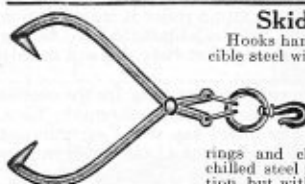


For handling pulp wood, cedar posts, etc. Weight about 2 1/2 pounds each.

Price each \$1.69

Skidding Tongs

Hooks hand forged from best crucible steel with plain swivel grab hook.



Giant Tongs

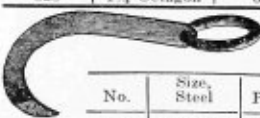
All hand forged of best hammered crucible steel with rings and clevises of Norway iron, chilled steel rivets. Same as illustration, but without grab hook.

Skidding Tongs—Prices and Sizes

No.	Size, Steel	Open, Inches	Weight, Pounds	Price Each	Price Dozen
507	1 1/2 x 1/4 Flat	32	23	\$ 6.60	\$66.00
504	1 Octagon	24	18	7.80	78.35
505	1 1/4 Octagon	32	26	8.60	86.60
506	1 1/4 Octagon	36	31	10.20	102.00

Giant Tongs—Prices and Sizes

No.	Size, Steel	Opens, Inches	Weight, Pounds	Price Each
512	1 1/4 Octagon	32	45	\$12.50
513	1 1/4 Octagon	36	48	13.15
514	1 1/4 Octagon	42	51	14.40
525	1 1/2 Octagon	42	75	21.25
526	1 1/2 Octagon	48	80	22.50
527	1 1/2 Octagon	54	85	23.75
528	1 1/2 Octagon	60	91	25.50



Steel Loading Hooks

No.	Size, Steel	Point	Wgt., Lbs.	Price Each	Price Dozen
561	1 x 1/2 flat	Chisel	1 1/8	\$1.25	\$12.55
559	3/4 square	Round	2 1/8	1.50	15.00



Steel Swamp Hook

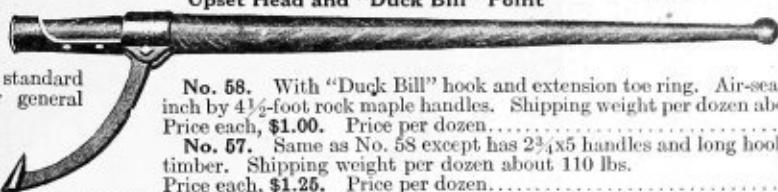
No.	Size, Steel	Point	Weight Each, Pounds	Price Each	Price Dozen
550	1	Round	6	\$3.00	\$30.00
551	1 1/4	Round	7	3.25	32.50
552	1 1/4	Round	10 1/2	3.75	37.50

"Sterling" Standard R. R. and Contractors' Cant Hooks

Malleable Iron Clasp and Extension Toe Ring. Crucible Forged Steel Hook, $\frac{1}{4} \times \frac{3}{8}$ -inch with Heavy Upset Head and "Duck Bill" Point

These are the standard cant hooks for general use. No. 58 always sent unless otherwise specified.

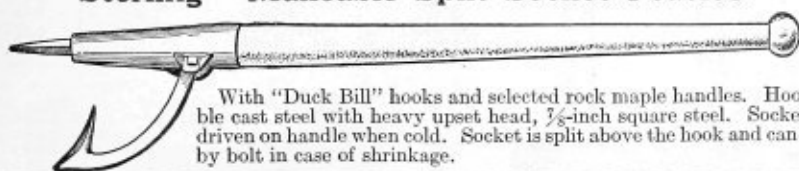
No. 56. Same as No. 58 except has 3x5 handles for hard service. Shipping weight per dozen about 125 lbs. Price each, \$1.60. Price per dozen, \$28.85



No. 58. With "Duck Bill" hook and extension toe ring. Air-seasoned, $2\frac{1}{2}$ -inch by $4\frac{1}{2}$ -foot rock maple handles. Shipping weight per dozen about 100 lbs. Price each, \$1.00. Price per dozen, \$19.00

No. 57. Same as No. 58 except has $2\frac{3}{4} \times 5$ handles and long hook for heavy timber. Shipping weight per dozen about 110 lbs. Price each, \$1.26. Price per dozen, \$23.15

"Sterling" Malleable Split Socket Peavies

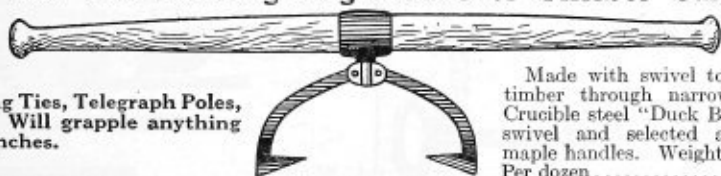


With "Duck Bill" hooks and selected rock maple handles. Hooks are crucible cast steel with heavy upset head, $\frac{1}{8}$ -inch square steel. Sockets fitted and driven on handle when cold. Socket is split above the hook and can be tightened by bolt in case of shrinkage.

No.	Size of Handles	Weight Each	Price Dozen	No.	Size of Handles	Weight Each	Price Dozen
81	$2\frac{3}{4}$ in. x $4\frac{1}{2}$ ft.	9 lbs.	\$30.40	83	$2\frac{3}{4}$ in. x $5\frac{1}{2}$ ft.	11 lbs.	\$35.60
82	$2\frac{3}{4}$ in. x 5 ft.	10 lbs.	31.10	84	$2\frac{3}{4}$ in. x 6 ft.	12 lbs.	36.30

No. 106 Sterling Lug Hooks or Timber Carriers

For Handling Ties, Telegraph Poles, Timber, etc. Will grapple anything from 3 to 16 inches.



Made with swivel to permit carrying timber through narrow passage ways. Crucible steel "Duck Bill" hooks, strong swivel and selected air-seasoned rock maple handles. Weight about 9 lbs. Per dozen, \$27.37

Cant Hooks and Peavie Handles

Rock Maple Extra Grade, Selected and Finished

$2\frac{1}{2}$ -inch by	4 ft.	$4\frac{1}{2}$ ft.	5 ft.
Price per dozen	\$3.10	\$3.40	\$3.80
Weight per dozen, pounds	40	45	50
$2\frac{3}{4}$ -inch by	5 ft.		
Price per dozen	\$4.60		
Weight per dozen, pounds	58		
3-inch by	$5\frac{1}{2}$ ft.	6 ft.	
Price per dozen	\$5.80	\$6.20	
Weight per dozen, pounds	80	90	

Lug Hook Handles

Rock Maple

Length, feet	4	$4\frac{1}{2}$	5
Weight per dozen, pounds	40	53	70
Price per dozen	\$4.00	\$4.50	\$5.00

Extra Parts for Lumbering Tools

Hooks for Peavies and Cant Hooks, Heavy Upset Heads, Round Duck Bill or Diamond Points



Duck Bill Hook

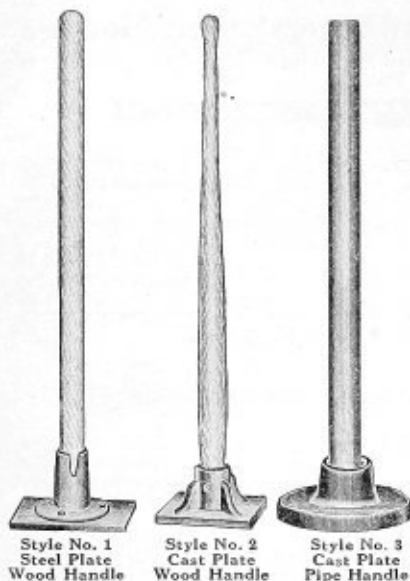
Round Point Hook

Size Steel, Inches	Price Dozen
$\frac{3}{8} \times \frac{1}{4}$	\$11.00
1 x $\frac{1}{8}$	12.50
1 x $\frac{1}{2}$	15.00
$1\frac{1}{2} \times \frac{1}{2}$	17.50
$1\frac{1}{4} \times \frac{1}{2}$	21.00
$1\frac{1}{2} \times \frac{1}{2}$	25.00

Malleable Iron Clasps with Bolts



For Tools, Inches	Price per Dozen
$2\frac{1}{2}$	\$5.00
$2\frac{3}{4}$	5.30
3	7.00

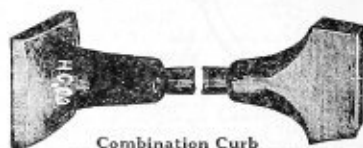


Tampers

Correct Design, Best Material and Workmanship.

Price List

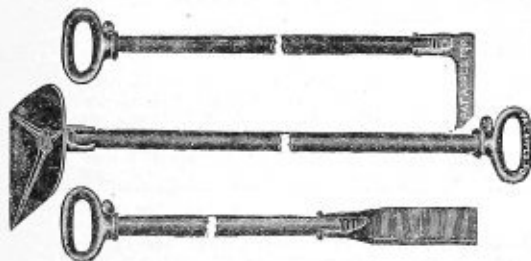
Style	Size of Base, Inches	Weight Finished, Pounds	Price	
			Each	Dozen
1	8x8	13	\$2.00	\$20.00
1	10x10	16	2.20	22.00
1	12x12	26	2.40	24.00
2	5x6	9	1.20	12.00
2	6x7	13	1.40	14.00
2	7x8	14	1.50	15.00
2	8x8	15	1.60	16.00
2	10x10	20	1.80	18.00
2	5x6	24	2.20	22.00
3	7-inch Diam.	20	2.30	23.00
Curb	1x3½	3	.95	9.50
Curb	4x4	5½	1.20	12.00
Curb	3½x6	6½	1.25	12.50
Combination Curb	1x3½ (On one Handle)	8½	2.15	21.50



Combination Curb

Firing Tools

Iron Pipe Handles



These tools are furnished with ends so that they may be fitted to any length of pipe desired. All black-smithing is done away with.

Cut pipe the desired length with full thread at each end. Make up tight in hoe, hook or slash bar, screw on grip, tighten set screws and tool is ready to use.

Sizes and Prices

Article	No.	Size, Inches	Wt., Lbs.	Size Pipe for Handle, Inch	Price with Grip	Price Each
Hoe	1	7 x 10	6¾	1	\$3.05	\$2.85
Hook	1	9 x 6	4	1	3.05	2.85
Bar	1	13½ x 3½	6¾	1	3.05	2.85
Grip	1	4 x 2	2½	1		.20
Hoe	2	6¾ x 8	4½	3¼	2.85	2.65
Hook	2	8 x 6	2½	3¼	2.85	2.65
Bar	2	14½ x 3	4½	3¼	2.85	2.65
Grip	2	4 x 2	2½	3¼		.20

Full set, including fire hoe, fire hook, slash bar and three grips. No. 1 to fit 1-inch pipe handle. . . . \$9.10

Full set, including fire hoe, fire hook, slash bar and three grips. No. 2 to fit ¾-inch pipe handle. . . . \$8.50

Boiler Room Tools

Wrought Iron

Any size or special design will be made to order.



Length, Feet	Diameter of Bar, Inches	Price Each			
		Hoe	Slide Bar	Clinker Hook	Poker
6	5½	\$1.50	\$1.20	\$1.50	\$1.00
7	5½	1.85	1.55	2.00	1.35
8	5½	2.25	1.90	2.30	1.65
9	5½	3.25	2.85	2.85	2.00
10	7½	3.85	3.80	3.60	2.50
11	1	4.75	4.75	4.50	3.00
12	1	5.75	5.75	5.50	3.50

Railroad Adzes



Laid bit. Ebony finish.
Cut 4, 4½, 5, 5½-inch.
Price each \$ 1.80
Dozen 18.00

Ship Adzes



Laid bit. Extra steel.
Polished ebony finish.
Cut 4, 4½-inch.
Price each \$ 3.00
Dozen 30.00

Genuine Barrett Lifting Jacks



No. 1 Trip or Track Jack



No. 10 Combination Jack



No. 223 Mine Jack

No. 1 Track or Trip Jack has compound double acting leverage, that is, the load is raised half a notch on both upward and downward strokes of lever. Load can be instantly dropped from any elevation by means of trip at side of lever socket. It is positive, speedy and durable, and is the recognized standard track jack adopted by the leading railroads. The No. 17 Jack is the same as No. 1, except that it is single acting, raising load on down stroke of lever only.

No. 6 Track Jack is especially recommended for ballast gangs. It has greater height and raise than the other track jacks shown here and has handles on both sides for convenient carrying. The No. 20 Jack is the same as No. 6, but is single acting. No. 7 Jack is also very similar to No. 6, being single acting and with medium height and raise.

No. 10 Combined Trip and Automatic Lowering Jack will lift, lower and trip or drop loads from any elevation in its range, making it a very popular number. It is double acting, raising load on both upward and downward motion of lever. No. 10 Jack can be used for general purposes as well as track work, but all other numbers described above are intended for track work only.

Nos. 26 and 23 Mine Jacks are especially suitable for surfacing, ballasting and leveling mine track and for handling equipment that does not require gradual lowering. They are of the Trip Jack type, embodying a trip which pulls the pawls out of mesh with rack when desired, thus instantly dropping the rail or other load to the ground. They are light, quick acting and reliable, single acting, recommended for track work only.

Nos. 226 and 223 are especially popular for adjusting coal cutters. There are only three simple operating parts; the machine cut steel rack, socket lever and retaining pawl. These jacks may be lowered notch by notch when under load, or may be dropped instantly when free. There are no parts to rust out or to get clogged with fine rock, grit or dirt.

Specifications and Prices

Number	1	6	17	7	20	10	226	223
Capacity, tons	10	15	10	15	15	10	2 1/2	4
Height, inches	24	31	24	24	31	24 1/2	18 1/2	22
Raise, inches	13 1/2	19	13 1/4	13 1/4	19	14	10 1/4	13
Weight, pounds	65	110	65	87	110	75	31	44
Price each	\$22.00	\$32.00	\$22.00	\$32.00	\$32.00	\$25.00	\$18.00	\$25.00

No. 101 New Barrett Track Jack

The No. 101 Track Jack is a new modified No. 1 Jack, embodying sweeping improvements in design and construction. It has only four operating parts; rack, two pawls and socket lever. Fulcrum pin, side plates and rivets are entirely eliminated, the socket lever being made of steel with trunnions cast integrally therewith, and with openings cut in shrouding of pawl bearings, so that pawls may be easily slipped into place. Trunnion bearings have closed-end steel bushings, packed with grease sufficient for a year's lubrication. If trip should become lost or broken, an emergency trip lug, embodied in the lower pawl, interlocking with a slot in upper pawl, may be conveniently used for tripping. Repair cost is reduced fully 50% due to the effective lubrication made possible by the closed end bushings and elimination of fulcrum pin, side plates and rivets.

No. 101. Capacity 10 tons. Height 24 inches. Raise 13 1/2 inches. Weight 65 pounds. Price each..... \$25.00

No. 119 New Barrett Automatic Lowering Jack

This Jack is the same height and rated capacity as No. 19, is single acting and designed for car repair work, having important structural improvements. Due to its easier operation it will raise heavier cars than the No. 19 jack.

The reversing mechanism is reduced to only four parts, less than half the usual number, and renewable at less than half the usual cost. The socket lever is of high grade carbon special analysis steel (not malleable iron) having trunnions cast integrally, eliminating the ordinary fulcrum pin. Side plates and rivets are also done away with by the new shrouded and slotted pawl bearing design. Pawls are double pointed so that four teeth are always in mesh. This makes raising easier, and stripping of teeth or slipping of pawls impossible. Improved rib reinforcement of base increases its strength greatly without adding to its weight.

No. 119. Capacity 15 tons. Height 28 inches. Raise 17 1/2 inches. Weight 91 pounds. Price each..... \$35.00



No. 101 Track Jack



No. 119 Jack

Barrett Automatic Lowering Jacks



No. 51



No. 2



No. 18



No. 19

Nos. 50, 51, 2, 3, 4 and 5 Jacks are all double acting, raising the load one notch on both upward and downward strokes of lever.

They lower the load gradually, cannot be tripped, hence their name "automatic lowering jacks." The direction, up or down, is controlled by the convenient eccentric at side of jack.

Nos. 50 and 51 are especially popular for mining, agricultural and contractors' machinery.

No. 2 is the standard for all general utility purposes and is used universally by contractors, bridge builders, electric and steam railways, etc.

Nos. 150, 151, 18, 19, 39 and 49 Jacks are single acting, raising load on down stroke of lever only.

Nos. 150 and 151, 5-ton jacks are very popular for mining, agricultural and contractors' machinery of moderate weight.

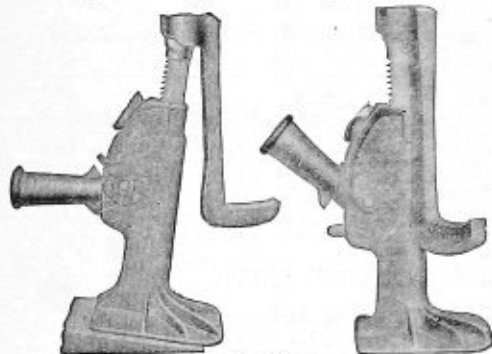
No. 18 is the standard single acting jack for all general utility purposes.

No. 19 is the standard jack for repairing empty and lightly loaded freight cars, and is made in three heights as listed below (Nos. 19, 39 and 49) to suit the height requirements of various types of cars.

Specifications and Prices

Number	50	51	2	3	4	5	150	151	18	39	49
Capacity, tons	5	5	10	12	15	15	5	5	10	15	15
Height, inches	16	21	21	26 1/2	22	28	16	21	21	22	35
Raise, inches	8	13	- 10	15	10	15	8	13	10	11 1/2	24 1/2
Weight, pounds	35	42	73	95	106	124	35	42	75	106	122
Price each	\$16.00	\$18.00	\$25.00	\$30.00	\$35.00	\$40.00	\$16.00	\$18.00	\$25.00	\$35.00	\$45.00

Single Acting Emergency Car Jacks



No. 239

The most powerful non-geared emergency car jack made. Carried on every car of many important electric roads for use in cases of accidents and derailments. Also coming into extensive use for other special and general lifting purposes due to the convenient forged claw, hung on a ball and socket joint so that it is free to swivel sideways 120 degrees (around the jack) and out from the base of jack when the latter is set in an inclined position or used as a car replacer. The full rated load, 15 tons, may be lifted on this claw, when jack is inclined up to 15 degrees under full load and jack may be tipped to 40 degrees angle under lighter loads, as long as head is supported by side of load.

No. 239. Capacity 15 tons. Height 22 inches. Raise 10 1/2 inches. Weight 97 pounds.

Price each \$55.00

Geared Automatic Lowering Jacks



No. 29

No. 230

Nos. 29 and 130 Jacks are provided with powerful machine cut steel reducing gears, providing ample leverage for operation under heaviest loads within their respective rated capacities. They are single acting, raising or lowering load on down stroke of lever only.

No. 29 has a forged steel toe lift at the side and No. 130 can, when desired, be provided with a separate drop forged claw hung from top of rack. The cost of such a claw is additional to the price shown below. Both of these jacks are sturdy, simple and efficient.

No. 29. Capacity 25 tons. Height 28 inches. Raise 17 inches. Weight 190 pounds. Price each, \$95.00

No. 230. Capacity 35 tons. Height 28 inches. Raise 17 inches. Weight 240 pounds.

Price each \$120.00



Jack Screws Locomotive or Screw Jacks

The stands of these jacks are cast from the best quality grey iron that can be procured. Screws are wrought steel with machine cut threads; levers are extra and are sent only when ordered. Sizes other than those shown are not carried in stock, but are furnished upon short notice.

Diam. Screw, Ins.	Price Each	Height Stand, Ins.	Capacity, Tons	Wt. Each, Lbs.	Diam. Screw, Ins.	Price Each	Height Stand, Ins.	Capacity, Tons	Wt. Each, Lbs.	Diam. Screw, Ins.	Price Each	Height Stand, Ins.	Capacity, Tons	Wt. Each, Lbs.
1 1/4	\$3.90	4	10	8	2	\$ 7.50	12	20	30	2 1/4	\$13.25	16	28	51
1 1/4	3.10	6	10	10	2	8.25	14	20	35	2 1/4	14.50	18	28	57
1 1/4	3.40	8	10	12	2	9.25	16	20	37	2 1/4	15.75	20	28	60
1 1/4	3.80	10	10	13 1/2	2	10.25	18	20	42	2 1/4	18.25	24	28	75
1 1/4	4.20	12	10	15	2	11.50	20	20	46	2 1/4	26.00	32	28	105
1 1/2	3.75	6	12	12	2 1/4	8.25	10	24	30	3	19.50	14	36	63
1 1/2	4.25	8	12	14	2 1/4	9.00	12	24	34	3	20.75	16	36	68
1 1/2	4.75	10	12	17	2 1/4	10.00	14	24	41	3	22.00	18	36	78
1 1/2	5.25	12	12	19	2 1/2	7.75	6	28	27	3	23.25	20	36	84
2	5.00	5	20	16	2 1/2	8.75	8	28	31	3	25.75	24	36	103
2	5.25	6	20	19	2 1/2	9.75	10	28	35	3	30.00	30	36	125
2	6.00	8	20	23	2 1/2	10.75	12	28	44					
2	6.75	10	20	26	2 1/2	12.00	14	28	44					

2 1/2-inch and 3-inch sizes are factory shipments.



Bell Base Ratchet Jack Screws

Bell base ratchet jack screws have wrought steel screws with machine cut threads. Stands and caps are cast from the best quality grey iron. Ratchet, pawls and handles are steel.

Diameter of Screw, Inches	Height of Stand, Inches	Height Over All, Inches	Rise of Screw, Inches	Capacity, Tons	Price Each	Weight Each, Pounds
2	8	12 1/4	5	24	\$16.00	27 1/2
2	12	16 1/4	9	24	17.50	34
2	16	20 1/4	13	24	19.00	41
2	20	24 1/4	17	24	20.50	49
2	24	28 1/4	21	24	22.50	58
2	26	30 1/4	23	24	23.50	71
2 1/4	14	18 1/4	10 1/4	28	19.00	42
2 1/4	20	24 1/4	16 1/4	28	22.00	57
2 1/4	26	30 1/4	22 1/4	28	27.00	76
2 1/4	12	18 1/4	28 1/4	32	25.50	49
2 1/4	18	24 1/4	14 1/4	32	25.50	49
2 1/4	24	30 1/4	20 1/4	32	29.00	64
2 1/4	30	36 1/4	26 1/4	32	35.00	101
3	18	24 1/4	14 1/4	36	30.00	80
3	24	30 1/4	20 1/4	36	34.00	89
3	18	24 1/4	13 1/4	40	35.00	84
3	30	36 1/4	25 1/4	40	48.00	122

Car Box Jack Screws

Car box jack screws have swivel caps same diameter as head, closed at top to prevent any dirt from entering between cap and screw. Cap is held in place by set screw running in groove at top. These jacks are not carried in stock in Chicago, but can be furnished promptly from factory.

Diameter of screw, inches.....	1 1/4	1 1/2	1 3/4	1 1/2	1 1/2	2	2	2
Height of stand, inches.....	5	6	8	10	12	5	6	8
Height over all, inches.....	8	9	11	13	15	9	10	12
Rise at screw, inches.....	2 1/4	3 1/4	5 1/4	7 1/4	9 1/4	2	3	5
Capacity, tons.....	12	12	12	12	12	20	20	20
Price each.....	\$4.00	\$4.25	\$4.75	\$5.25	\$5.75	\$5.50	\$5.75	\$6.50
Diameter of screw, inches.....	2	2	2 1/4	2 1/4	2 1/4	2 1/2	2 1/2	2 1/2
Height of stand, inches.....	10	12	14	16 1/2	8	10	12	14
Height over all, inches.....	14	16	18	11	12 1/2	14 1/2	16 1/2	20 1/2
Rise of screw, inches.....	7	9	11	2 1/4	4 1/4	6 1/4	8 1/4	10 1/4
Capacity, tons.....	20	20	20	28	28	28	28	28
Price each.....	\$7.25	\$8.00	\$8.75	\$8.50	\$9.25	\$10.25	\$11.25	\$13.75



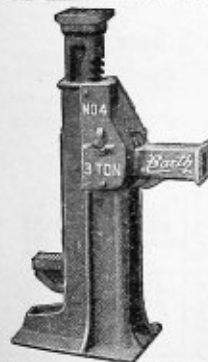
Barth Jacks

Very simple to operate and suitable for all kinds of heavy lifting. To raise load, turn the eccentric, flat part up. To lower, turn down.

Nos. 4 and 5 jacks are made of best malleable iron and are fitted with steel pins.

No. 6 also has crucible steel rack and pawls.

No.	Price	H'gt Rack Down, Ins.	Rise of Rack, Ins.	Wt., Lbs.	C'p'y Tons
4	\$6.00	14	8	20	3
5	9.00	18	11	33	6
6	16.00	20	12	68	10



House Raising Jacks



Best quality grey iron castings. Screws are cast with seamless threads, making them smooth and uniform. 3x24-inch (the standard size) carried in stock; other sizes furnished on short notice. Prices include cap.

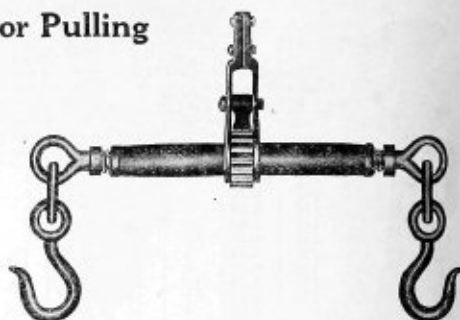
Height, inches.....	18	20	22	24	26
Price each.....	\$3.25	\$3.50	\$3.75	\$4.00	\$4.25
Height, inches.....	28	30	32	34	36
Price each.....	\$4.50	\$4.75	\$5.00	\$5.25	\$5.50

H. Channon Company Chicago

Channon Steamboat Ratchets or Pulling and Pushing Jacks



With Locking Link

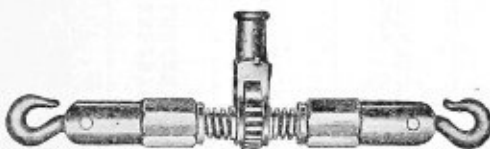


With Hooks

Steel and malleable iron, strong and well made in every respect; screws have square cut threads. Extensively used by railroads, contractors, etc.

No.	Length, Inches	Diameter Screw, Inches	Weight Pounds	Price Each	No.	Length, Inches	Diameter Screw, Inches	Weight Pounds	Price Each
1	18	1 3/8	40	\$ 8.50	6	24	1 3/4	80	\$17.00
2	24	1 3/8	45	9.50	8	30	1 3/4	87	18.00
3	30	1 3/8	51	10.00	9	36	1 3/4	90	19.00
4	36	1 3/8	58	11.00	10	48	1 3/4	107	20.00

Pearson Pulling and Pushing Jacks



Nos. 1 and 2 With Hooks For Pulling Only



Nos. 3 and 4 for Pulling and Pushing

Made in two sizes, of malleable iron and steel. Largely used in repairing steel cars and trucks; also in all classes of structural work, pile driving, etc. A valuable addition to wrecking outfit.

No.	Capacity in Tons	Weight, pounds	Length, Closed	Run of Screw, inches	Price Each	No.	Capacity in Tons	Weight, pounds	Length, Closed	Run of Screw, inches	Price Each
1	7	35	33	12	\$17.50	3	7	45	33	12	\$17.50
2	10	50	33	12	22.50	4	10	93	33	12	22.50

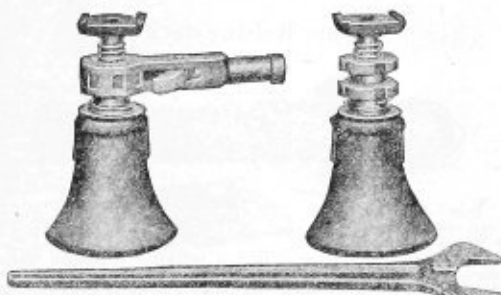


Fig. 2, at left, has ratchet lever. Fig. 1, at right, has wrench lever shown at bottom

Telescopic Steel Jack Screws

These jacks consist of two screws, one working within the other. By this method of construction, the screw can be run out nearly twice the height of the base, making the shortest jacks in use for the length of lift.

No.	Price Each		Capacity Tons	Stand inches	Screw inches	Net Rise inches	Whole Length inches	Weight Pounds
	Figure 1	Figure 2						
1	\$14.00	\$20.00	10	7 1/2	14	11	21	31
2	18.00	24.00	25	11	20	16	30	59
3	22.00	28.00	25	13 1/2	27	23	40	68
4	28.00	30.00	25	18	35	31	52	75
5	30.00	36.00	25	22 1/2	40	36	61	85

Channon Improved Stone and Machinery Jacks

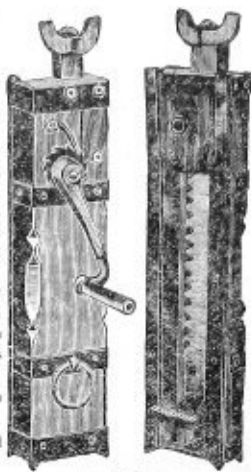
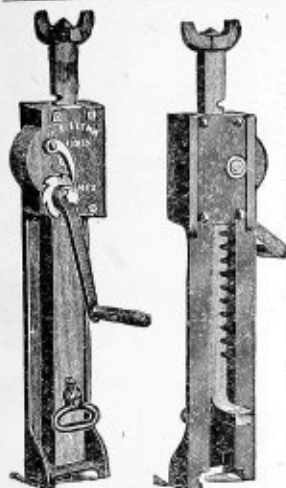
These jacks are largely used by stone companies, marble works, quarries and stone yards, safe movers, foundries, machine and bridge shops, mining companies, etc. They are safe, simple and reliable, consisting only of rack, pinion and gears contained in and protected by the iron housing. There are no cams, springs or tripping devices to get out of order or become lost. The pinions and gears are milled from solid forged steel casting blanks, racks from forged bars.

The iron frame jacks are preferred by most as the frame is unbreakable and has no wooden parts to shrink or split.

At a slight advance we furnish jacks with all bearings bushed with our self-lubricating bronze bushings which require no oil or attention.

Jacks may be operated at any angle. Note the points at base to prevent slipping.

All jacks furnished with foot-lifts, cranks and swivel heads.



Iron Frame
Front View Back View

Sizes and Prices

Wood Frame
Front View Back View

Tonnage	Height, Inches	Weight, Lbs.	Price	Tonnage	Height, Inches	Weight, Lbs.	Price
2	34	95	\$ 45.00	12	38	230	\$120.00
3	34½	110	50.00	15	39	275	140.00
4	35	120	55.00	18	39	300	150.00
5	36	135	62.00	20	39	315	162.50
6	36½	150	70.00	25	39	350	175.00
8	37	185	85.00	30	39	400	200.00
10	37½	200	110.00				

Capacity when lifting on claw is one-half the above rating.

Repairs for Channon Stone Jack



Combined Gear
and Pinion

A6 for Wood Frame.

B6 for Iron Frame.

2-ton...	\$10.00 each
3-ton...	11.00 each
4-ton...	12.00 each
5-ton...	12.00 each
6-ton...	14.00 each
8-ton...	15.00 each
10-ton...	16.00 each
12-ton...	19.00 each
15-ton...	20.00 each

Crank for All
Size Stone Jacks

A2 for Wood Frame
B2 for Iron Frame

\$3.50 each



Dog for All Size
Stone Jacks

A3 for Wood Frame

B3 for Iron Frame

\$1.00 each

Rack Bar

A7 for Wood Frame

B7 for Iron Frame

2-ton...	\$12.00 each
3-ton...	13.00 each
4-ton...	14.00 each
5-ton...	16.00 each
6-ton...	19.00 each
8-ton...	22.00 each
10-ton...	24.00 each
12-ton...	27.00 each
15-ton...	31.00 each



Small Crank Pinion

A5 for Wood Frame

B5 for Iron Frame

2-ton...	\$ 7.00 each
3-ton...	7.00 each
4-ton...	7.00 each
5-ton...	7.00 each
6-ton...	7.00 each
8-ton...	7.00 each
10-ton...	8.00 each
12-ton...	8.00 each
15-ton...	8.00 each



Base

For Wood Frame

2-ton...	\$3.00 each
3-ton...	3.00 each
4-ton...	3.50 each
5-ton...	3.75 each
6-ton...	3.75 each
8-ton...	4.00 each
10-ton...	4.50 each
12-ton...	5.00 each
15-ton...	6.00 each



Ratchet for All
Size Rackbars

A1 for Wood
Frame

B1 for Iron Frame

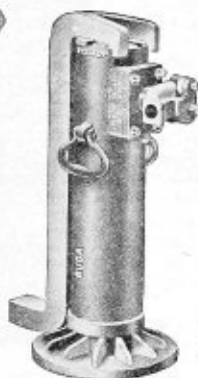
\$0.75 each



Buda Ball Bearing Jacks



Nos. 101-102



No. 110



Nos. 113, 114, 115



Nos. 116, 117, 125



No. 127 Extra Heavy

Car Locomotive Jacks

The ball bearings are held in place by a phosphor bronze cage which prevents them from rubbing together.

All screws are made of high carbon steel and cut with great accuracy. The bronze nut through which main screw passes is well supported by heavy shoulders. All gears are machine cut from solid steel forgings, no cast gears being used.

"Postop" Bridge Jacks

"Postop" Jacks are so called on account of the nut at the bottom of the main screw which prevents screw from being turned higher than the limit intended. Hence bent screws are impossible. For raising heavy loads these jacks are excellent for speed, safety and convenience. They weigh much less than hydraulic and other heavy duty jacks. They will not trip or run down, so that loads may be left standing on them with perfect safety.

Car and Locomotive Jacks

No.	Price	Capacity, Tons	Hght., Ins.	Rise, Ins.	Diam. of Base, Ins.	Wght., Lbs.	Extra for Hook
101	\$ 95.00	25	33	20	12	154	\$6.00
102	75.00	15	34	20	12	154	6.00
109	80.00	25	20	9	10	106	6.00
110	85.00	25	24	11	13	149	6.00
111	90.00	25	26	13	12	164	6.00
0	125.00	35	26	13	12	165	8.00
0X	135.00	35	31	18	12	190	8.00

"Postop" Bridge Jacks

No.	Price	Capacity, Tons	Hght., Ins.	Rise, Ins.	Diam. of Base, Ins.	Wght., Lbs.	Diam. of Head, Ins.
113	\$130.00	35	22	10	8x9	190	5 1/4
114	90.00	25	22	10	8x9	136	5 1/4
115	90.00	25	26	13	8x9	157	5 1/4
104F	60.00	15	22	10	7x9	80	.....
105F	70.00	15	26	13	7x9	110	.....
116	150.00	50	24	9	14	270	10 1/2
117	150.00	50	27	13	14	292	10 1/2
125	175.00	60	26	12	14	323	10 1/2
127	200.00	75	26	12	14	385	12

Buda Mine Jack

Single Acting

Particularly adapted for use in mines. This jack is of ample capacity for the kind of work for which it is intended and very convenient to use in cramped locations.

It is single acting, operating on the downward stroke of the lever. The construction is very simple and there are no complicated parts to get out of order or become lost. In addition there are no springs liable to become rusted out by mineral waters.

It is also useful on narrow gauge roads and for use in connection with wagons.

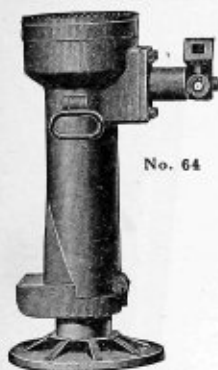
This jack is much more substantial than the usual jack of this type. It is well constructed throughout and particularly high grade for a small capacity jack.

Is especially suited for small and medium loads where the jack must be applied in various ways and under rugged conditions.



Number	Capacity in Tons	Height Bar Down, Inches	Rise of Bar, Inches	Height Bar Raised, Inches	Weight, Pounds	Price Each
502	2	18 1/4	10	28 1/2	28	\$10.00
504	4	22 1/4	12 1/4	34 1/4	43	15.00

Duff Ball-Bearing Screw Jacks



No. 64


Nos.
60
and
68

These Jacks are accurately made of highest grade materials. Screw is of crucible steel and revolves in a specially compounded bronze nut. Load is carried on a large ball-bearing, reducing friction on the head of jack 90%. Jack is operated by a simple ratchet and bevel gear.

No.	Cap., Tons	Height, Inches	Raise, Inches	Weight, Pounds	Price Each
*55	10	14	7	62	\$ 22.00
*56	10	20	10	94	24.00
66	15	22	10	120	60.00
60	15	26	13	132	70.00
67	25	22	10	167	90.00
61	25	27	13	196	96.00
68	35	22	10	220	130.00
62	35	26	13	250	138.00
64	50	27	13	320	150.00

*These Jacks have cone bearings.

Duff High-Speed Ball-Bearing Jacks



In these Jacks the high operating speed is obtained by means of the high pitch double thread screw, which also tends to high mechanical efficiency, making raising very easy and permitting a boy to lower the heaviest load by simply turning small crank handle without ratcheting. Shell and stem are of cold drawn steel. Nut is of special bronze, having a tensile strength of 90,000 lbs. Each ball in the bearing tests up to a strain of 110,000 lbs. and the two ball bearing plates are of chrome nickel steel.

No.	Cap., Tons	Height, Inches	Raise, Inches	Weight, Pounds	Price Each
590	35	20	8	135	\$145.00
591	35	26	13	153	150.00
595	35	33	19	173	160.00
594	35	40	24	193	175.00
575	50	20	8	204	175.00
576	50	26	14	225	180.00
579	50	38	24	267	220.00
580	50	40	26	273	225.00

Norton High-Speed Ball-Bearing Jacks

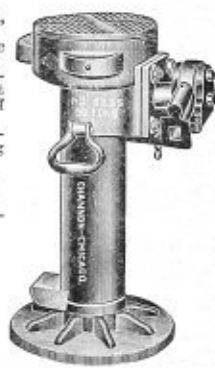
All Norton Jacks are not high-speed, therefore to avoid confusion, kindly order by number.

Norton High-Speed Jacks are absolutely safe and cannot slip or drop the load. They are positive, reliable and guaranteed in every respect.

No. 5380 is intended for heavy service where long lift is required for Pull-man cars, heavy coaches, etc. It is of crucible steel and one of the lightest jacks made for this service. Nos. 5200, 5260, 3200, 3260 and 3330 are of the same general pattern as No. 5380, differing in capacity.

Nos. 5205, 5265, 3205 and 3265 are equipped with a foot lift on which one-half the full capacity may be lifted, adapting them to bridge and wrecking service.

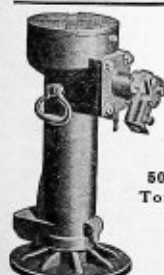
Number	Price Each	Capacity, Tons	Height, Inches	Rise, Inches	Diam. of Base, Ins.	Weight, Lbs.
5380	\$220.00	50	38	26	16	310
5200	175.00	50	20	8	14	215
5260	180.00	50	26	14	14	244
3200	145.00	35	20	7	12	140
3260	150.00	35	26	13	12	148
3330	160.00	35	33	20	14	190
5205	185.00	50	20	8	14	225
5265	190.00	50	26	14	14	260
3205	150.00	35	20	7	7x9	145
3265	155.00	35	26	13	7x9	153



Norton Ball-Bearing Bridge Jacks

These are Ratchet Screw Jacks with ball-bearings. They have no valves or packing, require no filling or attention, but are always ready for use. Gears machine cut from solid forged steel and are kept perfectly adjusted by a set screw. These jacks are used by railroad contractors and bridge builders all over the country.

50 Ton	No.	Price Each	Capacity, Tons	Height, Inches	Rise, Ins.	Diam. of Base, Ins.	Diam. of Head, Ins.	Weight, Lbs.
	1	\$ 60.00	15	22	10	8x8	5 1/2	115
	2	96.00	25	26	13	8x9	5 1/2	157
	3	90.00	25	22	10	8x9	5 1/2	136
	4	130.00	35	22	10	8x10	6 1/2	190
	5	138.00	35	26	13	8x10	6 1/2	230
	6	150.00	50	24	9	14	10 1/2	270
	7	150.00	50	27	13	14	10 1/2	288
	8	175.00	60	27	12	14	10 1/2	340
	9	200.00	70	27	12	14	10 1/2	340



Jacks will lift on foot about one-half their rated capacity



15 and 35 Ton

Duff Bethlehem Forged Steel Hydraulic Jacks



Plain Base

This type of jack is made with a round base and is used where a firm foundation can be secured and the working space will not admit a larger base. This is a very popular model.



Broad Base

The broad base gives a very solid foundation. These jacks are used extensively by railroad, machine, car and locomotive works. Base is a solid steel working integral with cylinder.



Fixed Claw

Used principally for railroad wrecking cars or other outside work, and is fitted with an extra steel sleeve which prevents dirt or other foreign matter from reaching the ram.



Wrecking

Where there is not sufficient room to get head of jack underneath load, this jack is very convenient. Claw or toe piece, is drop forged, an exclusive feature of Duff Bethlehem jacks.

The Duff-Bethlehem Forged Steel Hydraulic Jacks have several special features embodied in their construction, not found in other hydraulic jacks.

The cylinder and ram are constructed of open hearth fluid compressed forged steel, very much superior to forged steel or cast steel, as the former has greater uniformity and closeness of grain, and from 30 to 60% higher tensile strength. These jacks can, therefore, be made nearly twice as light as other jacks of the same capacity. A weight of 150 pounds at the end of the operating lever balances the maximum rated lift of the ram, thus one man can readily operate a jack to its normal capacity.

The most difficult and troublesome packing to make tight in hydraulic jacks is at the bottom of the cylinder. This packing is eliminated in the Duff-Bethlehem Jacks

by forging the cylinder and base in one piece, thus the usual packing at this joint is entirely dispensed with.

Another packing which frequently causes trouble is also obviated, viz., the one insuring closure of the ram piston from the pump socket, as the Duff-Bethlehem jacks have a practically solid ram bottom, integral with the pump barrel.

The operating mechanism contains a minimum number of parts, all of simple and strong construction, and readily duplicated. Duff-Bethlehem jacks have from 30 to 60% fewer interior parts than any other hydraulic jack on the market and are correspondingly less likely to get out of order. There are no operating valves projecting beyond the body of the jack, which minimizes the opportunity for breakage from careless handling and rough usage.

Specifications and Prices

Capacity, Tons	Height, Inches	Raise, Inches	Plain Base		Broad Base		Fixed Claw		Wrecking*	
			Price, Each	Weight, Pounds	Price Each	Weight, Pounds	Price Each	Weight, Pounds	Price Each	Weight, Pounds
10	22 $\frac{1}{4}$	12	\$ 65.00	70	\$ 78.00	80				
10	28 $\frac{1}{4}$	18	75.00	78	90.00	90				
15	22 $\frac{1}{2}$	12	82.00	80	100.00	100	\$125.00	105	\$110.00	121
15	28 $\frac{1}{2}$	18	94.00	90	120.00	114	140.00	132	120.00	158
20	20	9			110.00	106	145.00	140		
20	23 $\frac{3}{4}$	12	100.00	94	120.00	114	165.00	160	125.00	157
20	29 $\frac{1}{4}$	18	118.00	106	140.00	126	185.00	180	142.00	172
30	21 $\frac{1}{4}$	9	120.00	100	135.00	124	185.00	195	150.00	192
30	24 $\frac{1}{4}$	12	140.00	110	150.00	135	210.00	210	170.00	219
30	30 $\frac{1}{4}$	18	165.00	125	175.00	150	245.00	240	190.00	246
40	21 $\frac{3}{8}$	9			165.00	129				
40	24 $\frac{3}{8}$	12	155.00	116	180.00	141	250.00	217	200.00	224
40	30 $\frac{3}{8}$	18	185.00	135	220.00	160	280.00	250	240.00	258
50	26 $\frac{3}{8}$	12	180.00	160	210.00	190	280.00	270	275.00	290
50	33 $\frac{3}{8}$	18	215.00	187	260.00	212	340.00	300	325.00	330
60	27	12	210.00	195	290.00	230			335.00	373
60	33 $\frac{1}{2}$	18	250.00	236	350.00	253			400.00	415

*The prices and weights of wrecking pattern include claw.

Wilmington Hydraulic Jacks

Plain Hydraulic Jacks



These jacks are intended for use where a firm foundation can be secured and for operating in close quarters where the space will not admit a jack with a larger base. The valves are so arranged that these jacks will operate in horizontal, inclined or vertical positions. To secure the best results a fluid consisting of one part grain alcohol and two parts water should be used, adding one ounce of sperm oil to amount necessary for one jack.

Capacity, tons	Price Each	Rise, inches	Height Closed, inches	Size of Base, in. square	Approx. Weight, pounds
4	\$ 50.00	12	24 1/2	4 1/4	55
5	42.00	4	12	4 1/4	27
7	54.00	12	25 1/4	4 1/2	67
7	60.00	18	31 1/4	4 1/2	77
7	64.00	24	38	4 1/2	95
10	60.00	12	25 1/4	6	95
10	70.00	18	31 1/4	6	108
10	78.00	24	38 1/2	6	128
15	76.00	12	25 1/2	6 1/2	125
15	86.00	18	31 1/2	6 1/2	145
15	100.00	24	38 1/2	6 1/2	155
20	90.00	12	26 1/4	7	160
20	108.00	18	32 1/4	7	185
20	130.00	24	38 1/2	7	197
30	110.00	9	22 1/2	8 1/4	176
30	128.00	12	26	8 1/4	200
30	152.00	18	32	8 1/4	230
40	144.00	12	26 1/2	9	228
40	170.00	18	33	9	252
50	168.00	12	27	10	270

Claw Hydraulic Jacks



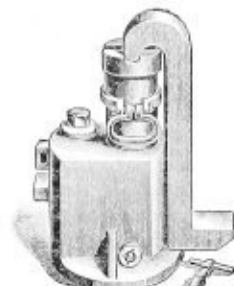
The claw on this style jack, being very close to the ground, is intended for raising loads that are not of sufficient height to admit the head of jack. The valves are so arranged that jack will operate in horizontal, vertical or inclined position. When a jack is not in continual service, it is well to pump it up occasionally to keep the valves and leathers in working condition. In ordering repairs, give capacity of jack as well as shop number stamped on lever socket.

Capacity, tons	Price Each	Rise, inches	Height Closed, inches	Height of Claw, inches	Approx. Weight, pounds
4	\$ 58.00	12	24 1/2	4 1/2	78
7	68.00	12	25	4 1/2	95
7	70.00	18	31	4 1/2	107
10	76.00	12	26	5	135
10	86.00	18	32	5	153
15	94.00	12	26 1/2	5 1/2	175
15	112.00	18	32	5 1/2	195
20	118.00	12	26 1/4	5 1/2	210
20	140.00	18	32 1/4	5 1/2	240
30	158.00	12	26 1/2	6	280
30	190.00	18	32 1/4	6	300
40	184.00	12	26 1/2	6 1/2	295

Broad Base and Low or Horizontal Hydraulic Jacks



Broad Base



Low or Horizontal

The increased area of base of the broad base jack gives it a solid foundation where steadiness is required. The 40, 50 and 60 ton jacks are all steel.

The horizontal or low jacks are so called because they will run out as far horizontally as vertically and are about five inches lower than regular style jacks of equal capacity.

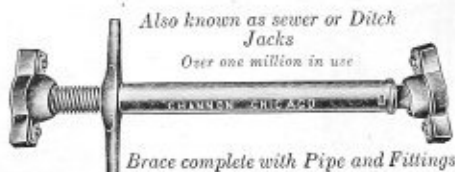
Broad Base

Capacity, tons	Price Each	Rise, inches	Height Closed, inches	Diam. of Base, inches	Approx. Weight, pounds
4	\$ 56.00	12	24	9 1/2	70
7	64.00	12	25	10	88
7	68.00	18	31 1/2	10	98
7	70.00	24	37 1/2	10	110
10	70.00	12	25 1/2	12	110
10	82.00	18	31 1/2	12	130
10	94.00	24	37 1/2	12	150
15	92.00	12	25 1/2	12	150
15	108.00	18	31 1/2	12	170
15	124.00	24	38	12	190
20	110.00	12	26 1/2	13	190
20	130.00	18	32 1/2	13	210
20	156.00	24	38 1/2	13	231
30	124.00	9	23	13 1/2	215
30	138.00	12	26 1/2	13 1/2	225
30	160.00	18	32 1/2	13 1/2	250
40	166.00	12	26 1/2	13 1/2	257
40	206.00	18	33	13 1/2	290
50	190.00	12	28	15	285
50	230.00	18	34 1/2	15	355
60	240.00	12	28	15	355

Low or Horizontal

Capacity, tons	Price Each	Rise, inches	Hght. Closed, inches	Diam. of Base, inches	Approx. Wt., Lbs.	Extra for Claw
7	\$ 64.00	12	20	9x5 1/2	100	\$ 8.00
7	72.00	18	26	9x5 1/2	115	10.00
10	72.00	12	20	10	140	8.00
10	82.00	18	26	10	155	10.00
10	94.00	24	32	10	170	12.00
15	92.00	12	20	12	180	10.00
15	108.00	18	26	12	200	12.00
15	124.00	24	32	12	220	14.00
20	116.00	12	20	12	210	12.00
20	134.00	18	26	12	240	15.00
20	156.00	24	32	12	270	18.00
30	150.00	12	21	13	245	16.00
30	174.00	18	27	13	280	21.00
40	162.00	12	21	13	280	20.00
40	188.00	18	27	13	320	25.00
50	182.00	12	21	14	315	24.00
50	206.00	18	27	14	350	29.00
60	206.00	12	21	14	345	28.00
60	232.00	18	27	14	380	33.00
80	236.00	12	22	17	460	34.00
100	272.00	12	22	18	575	40.00

"Dunn" Extensible Trench Braces



Absolute insurance against cave-ins. The ends or shoes have lugs and are fastened on ball and socket joints which immediately assume the angle of the planking and take a firm bearing. Costly cave-ins—always a possibility, where plain timber struts are used—are thereby absolutely prevented. All malleable iron except screw and piping.

Quickly screwed in position, as the double thread is of steep pitch and accurately machined of wrought iron. Wide range of adjustment permitted by the long screw.

Standard Complete Brace with 1½ Inch Screw and 1½ Inch Pipe

Number of Brace.....	No.	40	41	42	43	44	45	46	47	48
Length closed.....	inches	16	18	21	24	27	30	36	42	48
Length of Screw.....	inches	11	12	14	14	16	16	18	18	18
Safe extension.....	inches	6	7	8	8	9	9	10	10	10
Weight per dozen.....	pounds	200	210	222	234	246	256	280	312	325
Price.....	per dozen	\$23.00	\$23.00	\$24.00	\$24.00	\$26.00	\$26.00	\$27.00	\$28.00	\$29.00

Extra Heavy Pattern with 2x18 inch Screw and 2 Inch Pipe

Number of Brace.....	No.	49	50	51	52	53
Length closed.....	inches	36	42	48	54	60
Weight per dozen.....	pounds	542	564	586	608	630
Price.....	per dozen	\$51.00	\$52.00	\$53.00	\$54.00	\$55.00

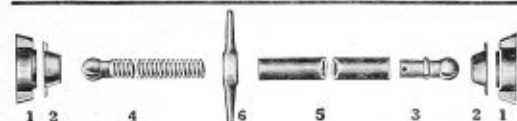
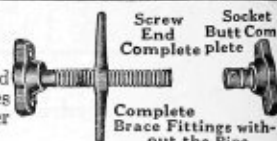
Length of braces are listed overall and when closed. Take extreme width of trench, deduct for planking on both sides (usually about 8 inches) and several inches more for variation in width of cut—the remainder will give length of brace wanted—the screw being extended to tighten the brace into position.

"Dunn" Brace Fittings

Complete Ready for Pipe to be Attached

Standard wrought pipe is required for the barrel, no machine work required except drilling a hole for ¼ inch cotter pin ½ inch from one end, cut pipe 7 inches shorter than length of complete brace wanted, when closed. Longer or shorter pipe may be substituted at any time to suit width of trench.

Number.....	No.	54	55	56	57	58
Size of Screw.....	inches	1½x12	1½x14	1½x16	1½x18	2x18
Weight per dozen.....	pounds	185	192	204	208	440
Complete.....	price per dozen	\$20.00	\$21.00	\$22.00	\$23.00	\$45.00
Screw Ends only.....	per dozen	15.00	16.00	17.00	18.00	33.00
Socket Butts only.....	per dozen	5.00	5.00	5.00	5.00	12.00



- No. 1—Shoe } Forming
No. 2—Ring } Socket
No. 3—Ball } Butt
No. 4—Screw.
No. 5—Pipe or Barrel.
No. 6—Lever Nut or Handle.

"Dunn" Brace Repairs

For 1½ in. Screw For 2 in. Screw

(1) Shoes.....	\$2.50 doz.	\$6.00 doz.
(2) Rings.....	1.00 doz.	2.40 doz.
(3) Balls.....	1.60 doz.	3.60 doz.
(6) Lever Nuts.....	4.00 doz.	9.60 doz.

"Dunn" Timber Brace Fittings

For wide and deep trenches 2 to 30 feet, also for vertical bracing. Bore holes in timber straight to prevent binding of screws.

Number.....	No.	59	60	61	62	63	64	65
Size of Screw.....	inches	1½x14	1½x14	1½x18	2x18	2x18	2x18	2x18
Size of Cap.....	inches	4x4	6x6	6x6	6x6	6x8	10x10	9x12
Weight per dozen sets.....		175	192	214	384	410	450	444
*Price per dozen sets.....		\$18.00	\$20.00	\$22.00	\$38.00	\$40.00	\$42.00	\$44.00
Butt Caps per dozen.....		3.00	4.00	4.00	5.00	7.00	10.00	11.00

*Without Butt End Caps which are sold Extra.



Explosives and Blasting Supplies

Dynamite



Dynamite is a high explosive, commonly used in mining and quarrying operations, excavating and moving earth, breaking log and ice jams and improving agricultural lands.

It consists of an absorbent saturated with nitroglycerin, packed in paper cartridges 8 inches long and 1 to 5 inches in diameter. The cartridge is dipped in paraffin to render it substantial and packed in 25 to 50 pound wooden cases.

There is a grade and strength of dynamite adapted to every blasting operation. **Nitroglycerin** or "Regular" is the original dynamite grade and is suitable for work requiring a quick, shattering blow.

Gelatine Dynamite is a plastic, waterproof explosive adapted to submarine work, wet quarry blasting, tunnel excavations and difficult, hard rock blasting where water is encountered.

Low Freezing Dynamite is less sensitive to cold than the other grades and eliminates much of the thawing required when using them. This grade is rapidly becoming the favorite all around explosive.

Contractors' Powder is a special honeycombed gunpowder to which a small percentage of nitroglycerin has been added. It has a pushing or lifting effect and some of the shattering force of dynamite. Used for moving earth, clay and material too soft and yielding to be removed economically with dynamite.

For earth blasting, excavating and soil blasting use 20 to 30% dynamite.

For stumps, boulders, ordinary rock and all around work use 40% dynamite.

For hard rock, tunnel driving, well digging and ditching use 60% dynamite.

The **standard grade** acts with a heaving or pushing effect.

The **nitroglycerin** grade delivers a quick shattering blow.

The **gelatine grade** is quick, plastic and practically waterproof.

The **low freezing grade** is an all around explosive, not easily affected by cold weather.

Nitroglycerin Dynamite

Strength.....	25%	30%	40%	50%	60%
Price, per pound.....	\$0.34	\$0.36	\$0.38	\$0.42	\$0.46

Gelatine Dynamite furnished in 35% to 75% strength only, at above prices.

Low-Freezing Dynamite

Strength.....	20%	30%	40%	50%	60%
Price, per pound.....	\$0.32	\$0.34	\$0.36	\$0.38	\$0.40

Contractors' Powder, packed in strong paper bags, 12½ lbs. each, 4 bags in a case. Price, per pound.....\$0.14

An interesting booklet giving full instructions and information relative to dynamiting will be sent on request.

Blasting Powder

The advantage of black blasting powder over high explosives for blasting soft materials, is that it exerts a strong push, rather than the blow of a high explosive. This renders it very valuable for quarries, coal mines, etc., where it is desirable to obtain the material in large blocks.

Price per 25-lb. keg for sizes FFFF, FFF, FF, F, C, CC and CCC.....\$3.00



H.Channon Company Chicago

Blasting Caps

Made of a copper tube, about $\frac{1}{4}$ inch diameter and $1\frac{1}{2}$ inches long, closed at one end and containing a small charge of fulminate of mercury, and exploded by a small spark from burning fuse. They are sure fire and reliable. We recommend the use of a No. 6 cap or stronger. A strong cap will develop more force from the blast and greater efficiency from the dynamite.

Number	5	6	7	8
Price per 1000	\$23.50	\$27.80	\$16.00	\$47.50

Safety Fuse

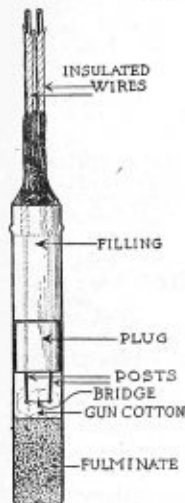
Used for firing blasting powder directly by its spark from the burning powder coil; also for firing dynamite through the medium of a blasting cap, which is exploded by a spark from the burning fuse.

Price Per Thousand Feet

Cotton for use in dry ground	\$ 9.50
Single Tape for use in wet ground	10.50
Anchor Brand for ordinary work	12.30
Double Tape for use in very wet ground	12.50
Triple Tape for use in water	15.30

Anchor Brand is a well made, durable fuse, finished in white. A favorite with blasters for ordinary work. Burns at the rate of about three feet per minute.

Electric Detonators



An Electric Detonator is a copper tube about the size of an ordinary blasting cap, containing a charge of fulminate, and the ends of two copper wires connected by a fine platinum wire, or "bridge" surrounded by gun-cotton. The electric current burns out the fine platinum wire and flashes the gun-cotton which sets off the fulminate. The explosive charge in Electric Detonators is the same as in Blasting Caps.

Detonators with wires from 4 to 14 feet are packed in cartons containing 50.

Detonators with wires from 16 to 30 feet are packed in cartons containing 25.

10 cartons in a wooden case.

Price Per 100

Length of wire feet	4	6	8	10	12	14	16
No. 6 Double Strength	Prices upon application.						
No. 7 Triple Strength	Prices upon application.						
Length of wire feet	18	20	22	24	26	28	30
No. 6 Double Strength	Prices upon application.						
No. 7 Triple Strength	Prices upon application.						

We recommend the use of a No. 6 Electrical Detonator. It means increased efficiency in the blast.

Blasting Machines

Lion Brand

The Lion Brand Blasting Machine is a small dynamo operated by hand, put up in convenient shape for carrying around the field. The machine is in a compact wooden case and is operated by pushing down a plunger which makes the dynamo revolve, supplying the current for firing several blasts.



The machines will last for several years with care. Blasting machines are rated according to the number of holes they will fire at once.

No. 1 will go good work on the farm or well digging.

No. 3 is a general favorite with blasters. It is small enough to pack around easily, and powerful enough for all ordinary work. The average blaster seldom needs to fire more than 25 charges at once.

No.	Capacity, Charges	Height, Inches	Weight, Pounds	Price Each
1	8 to 10	11	18 $\frac{1}{2}$	\$24.00
3	20 to 25	13 $\frac{1}{2}$	22 $\frac{1}{2}$	36.00
4	30 to 50	18	45 $\frac{1}{2}$	70.00
5	50 to 100	20 $\frac{1}{2}$	66 $\frac{1}{2}$	110.00

Blasting Sundries

Leading Wire for connecting detonator to blasting machine. In 500 foot coils. Weight per coil 2 lbs. Price per coil.....\$12.50

Connecting Wire for connecting charges for simultaneous discharging. In 2 lb. spools of 500 feet. Price per pound.....\$1.50

Rubber Insulating Tape. Makes joints waterproof. Can be used under water. $\frac{3}{4}$ inch wide in $\frac{1}{2}$ pound rolls. Price per roll.....\$0.75

Friction Tape. Used alone or in connection with rubber tape under water. $\frac{3}{4}$ inch wide in $\frac{1}{2}$ pound rolls. Price per roll.....\$0.50

Cap Crimpers. Price each.....\$0.35

IMPORTANT

Dynamite, caps or powder cannot be shipped with hardware or other goods, neither can they be shipped by express. When entered on order with other goods, we will ship direct from nearest magazine. Shipments of 200 pounds dynamite, or more, will be delivered to any point on the line of transportation companies accepting high explosives. Shipments of less than 200 pounds f. o. b. nearest distributing point.

Tools for blasting purposes such as stone drills, earth augers, chisels, etc., are listed elsewhere in this catalog. See index.

Contractors' Heavy Plows Railroad or Grading Plows



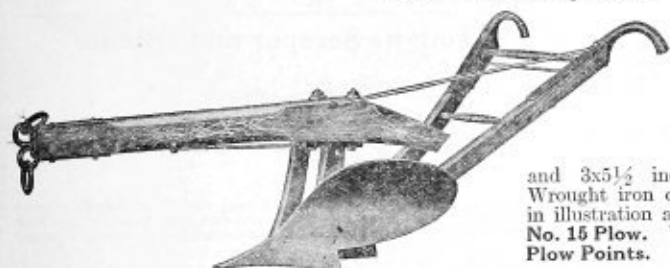
The standard, mould-board and point of this plow are made of extra quality wrought steel. The mould-board and point are made of the best, plow steel and both double shinned. The handles and beam are of the best second growth hardwood, with hand holds of solid steel. Plows Nos. 101 and 103 are provided with a heavy improved steel shoe or runner upon the side to protect the handles when plow is dragging. The principle strain is carried by heavy steel draft rod underneath the beam and the entire plow is constructed to withstand the very hardest usage.

No. 106.	Horses required	2 to 4; cuts 10 inches; weight 150 pounds, price each	\$45.00
No. 105.	Horses required	4 to 6; cuts 10 inches; weight 175 pounds, price each	48.00
No. 101.	Horses required	6 to 8; cuts 12 inches; weight 228 pounds, price each	57.00
No. 103.	Horses required	12 to 14; cuts 12 inches; weight 290 pounds, price each	79.00

Extra Plow Points

No. 6.	For No. 106 plow; weight 24 lbs., price each	\$10.00	No. 1.	For No. 101 plow; weight 45 lbs., price each	\$13.00
No. 5.	For No. 105 plow; weight 24 lbs., price each	10.00	No. 3.	For No. 103 plow; weight 50 lbs., price each	14.00

No. 15 Township Plow



No. 15 Plow will run perfectly steady in all kinds of ground and is very light draft for two horses, but is frequently used with four. Cuts a furrow 10 inches wide and from 6 to 12 inches deep, as desired. Beam is made of specially selected plow beam stock, length 6 feet, 2 inches

and 3x5½ inches at standard. Iron hand-holds Wrought iron clevis, with two heavy rings as shown in illustration and patent reversible cutter.

No. 15 Plow. Weight 145 pounds, price each...\$39.70
Plow Points. For No. 15 Plow, price each... 10.00

For heavy railroad work and grading, the Rail-roader is one of the finest plows built. It is especially intended for the hardest kind of work. Fitted with steel mould-board, steel share and cast steel land-slide, steel coulter and adjustable gauge shoe; a very heavy iron beam, second growth white oak handles, ironed and braced. Provided with draft rod from clevis to rear end of beam. Furrow capacity 9x14 inches. A clevis and wrench are provided with each plow. The Railroader is hand made throughout and for the purpose intended cannot be excelled. Weight 210 lbs.

No. 26. Railroader Plow, price each...\$42.00
Extra Plow Points. Price each... 6.00

No. 26 "Railroader" Plow Hand Made Throughout With Adjustable Gauge Shoe Furrow Capacity 9x14 In.

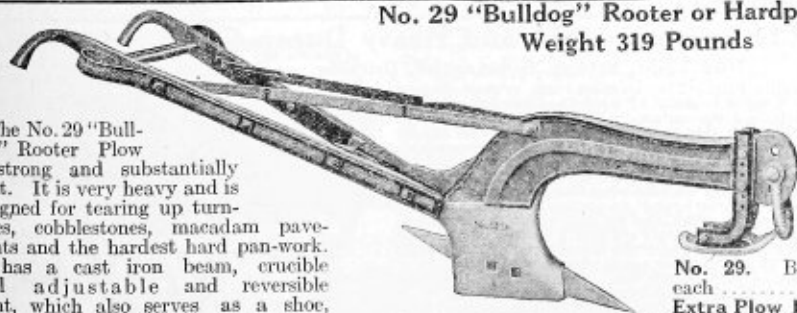


No. 29 "Bulldog" Rooter or Hardpan Plow Weight 319 Pounds

The No. 29 "Bulldog" Rooter Plow is strong and substantially built. It is very heavy and is designed for tearing up turn-pikes, cobblestones, macadam pavements and the hardest hard pan-work. It has a cast iron beam, crucible steel adjustable and reversible point, which also serves as a shoe,

white oak handles, iron bound and braced and adjustable gauge shoe. This plow is warranted to give satisfaction. Clevis and wrench are included in price. Weight 319 pounds.

No. 29. Bulldog Plow, price each...\$52.00
Extra Plow Points. Each 5.00



Channon Improved Wheeled Scraper

Square Box—Western Pattern

Much more material can be carried a greater distance by the Channon Improved Wheeled Scraper, often at no more expense than with the ordinary drag scraper and always at less expense per cubic foot of material handled. The No. 1 size can be loaded and dumped by one man and two horses pull it up an incline almost as easily as a drag scraper, while the No. 2 (the most popular size) sometimes requires two men for filling, but can always be dumped by one man. Two men are required to fill the No. 3, but one experienced scraper man can dump it. One team pulls and dumps any of the three sizes. A snatch team is necessary for loading the No. 3 size, and when the material is very heavy with the No. 2.

Channon Improved Square Bowl Steel Scraper is the best of its type on the market. It has strong wood wheels provided with malleable iron hubs, which are sand proof and can be replaced. Bowls are made from single sheet of high carbon steel.



No. of Scraper	Price Each	Dimensions of Box, inches				Diameter of Wheels	Size of Tires, inches	Track Gauge, inches	Capacity, cubic feet	Approx. Weight, pounds
		Length at Bottom	Width at Back	Depth at Back	Depth at Front					
1	\$45.00	36	36 1/2	12 1/4	11 1/4	3 ft. 2 in.	2 1/2 x 1 1/4	53	9	490
2	50.00	36 1/4	38 1/4	13 1/2	12 1/2	3 ft. 4 in.	3 x 3/8	56	12	690
2 1/2	53.00	39 1/4	38 1/4	13 1/2	12 1/2	3 ft. 8 in.	3 x 3/8	56	14	760
3	55.00	41 1/2	44	15	14 1/4	3 ft. 10 in.	3 x 3/8	61 1/2	16	835

Flat Board Scraper



The peculiar shape and attachment of the curved draw bars make this scraper very easy to operate. It is built of heavy lumber, bolted together with all wear points fully protected.

No. 42 Scraper, width 48 inches, weight 75 pounds. Price Each.....\$12.00

No. 1 Tongue Scraper and Ditcher



For making and leveling roads, cutting and cleaning, irrigation and other large ditches. Well adapted to moving dirt short distances. Cut of scraper is regulated by length of chain as desired to suit material being worked.

Box and handles of well seasoned lumber.

Quarter-inch steel blade, 4 inches wide, 48 inches long. Shoes and drawers of steel. All points of wear well protected.

No whistle trees or yoke furnished with scraper.

Price Each.....\$16.00

Easy Dump Box



There are no complicated parts and any blacksmith can make repairs. Shipping weight about 500 pounds.

No. 1.	Capacity 1 cubic yard.....	\$80.00
No. 1 1/2.	Capacity 1 1/2 cubic yards.....	\$85.00
No. 2.	Capacity 2 cubic yards.....	\$95.00

Fits any form gear and regular teaming gear that has a 7-foot wheel base.

Box capacity is 1 cubic yard, which is flared to make 1 1/2-yard or 2-yard capacity. It will fit any width between stakes; 38, 40, 42 or 44 inches. Easy to dump. Any boy that can handle a team can dump this box.

Bottom construction allows this dump to sit lower on the gear than any other dumper. Handles stone, dirt or sand equally well. Hinge on side gives full width of opening for quick dump. Foot release—driver does not stop or lose control of his team.

Can be shipped knocked down or set up.

Contractors' Light and Heavy Dump Carts

Dirt Tight, Strong, Substantial, Durable

These carts are especially suitable for hauling rock, gravel, clay or other heavy material. They are made of hardwood lumber and are thoroughly braced and bolted throughout. The framing consists of heavy side and cross sills, each side-board being secured to its sill by four anchor bolts. The front of the bed is bound together by two heavy tie-rods, which also pass through cross cleats on the front end-gate, securing the latter in place. The front end gate is fitted between heavy strips on each side board, and, by withdrawing the bed tie-rods, is removable. The side boards are iron braced on the rear. Note the solid rear framing. Side sills are not weakened by galling at the points of connection with cross piece. These joints are firmly bolted, and further tied by extensions of the iron with which the ends of the sills are shod.

Heavy Cart.—Capacity 24 cu. ft., inside dim.: Leng. 67 1/2 x 44 x 12 in., deep; diam. wheels 54 in., wt. 934 lbs. Price each.....\$110.00

Light Cart.—Capacity 21 cu. ft., inside dim.: Leng. 66 x 44 x 12 in., deep. Diam. wheels 54 in., wt. 705 lbs. Price each.... 95.00



Prices are F. O. B. factory in Ohio.

Channon Solid Steel Drag Scraper



- The "Channon" is the strongest slip scraper made, and the easiest on the operator and horses. The bowl is stamped from a single sheet of specially rolled, high-carbon steel plate which gives the longest wear, even under the roughest conditions. It is without lap, seam, joint, angle or sharp corner. No bolts, braces or stay rods of any kind are used. The handles are strongly riveted to the top edge of bowl and the bail which is of steel is fastened to the sides. The bottom is provided with steel runners which greatly prolongs the serviceability of the scraper. This scraper will work in practically any kind of soil whether plowed or not and "scours" nicely. The shape of the bowl gives it great strength combined with large capacity. Being of uniform width throughout it fills easily with minimum draft.
- No. 1. Capacity 7 cubic feet. Used for long hauls or down grade. Size of bowl, top of back to cutting edge, 34 inches; width 33 inches; depth 10 inches; weight about 105 pounds. Price each.....\$11.00
- No. 2. Capacity 5 cubic feet. For all ordinary grading work. Size of bowl, top of back to cutting edge, 31½ inches; width 29½ inches; depth 9½ inches; weight about 97 pounds. Price each.....11.25

The "Boss" Drag Scraper

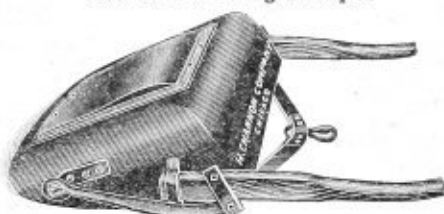


The "Boss" Drag Scraper is stamped to the same special shape as the "Channon" and is a high grade scraper in every way. Among its points of superiority over other drag scrapers are: Even distribution of wear over entire bottom, light draft at filling, large capacities and great strength of form. Bowl is made of the same special steel as the "Channon" Scraper bowls.

The main difference between the "Boss" and the "Channon" Scraper is in the way the handles and bail is attached to the bowl, as is clearly shown in illustration. The "Boss" is equipped with steel bottom runners.

- No. 1. Capacity 7 cu. ft.; dimension same as "Channon"; weight about 95 lbs. Price each.....\$11.00
- No. 2. Capacity 5 cu. ft.; dimensions same as "Channon"; weight about 87 lbs. Price each.....10.50

The Victor Drag Scraper



The "Victor" is a double bottom, square back slip scraper. Bowl is made from a single sheet of steel, formed cold. It is provided with an extra heavy ball, double at center to form a swivel bearing, extra bar being heavily riveted to bail.

It is furnished only with an extra heavy pressed steel double bottom. The front of the bottom plate is ground to a blade edge the same as the scraper cutting edge. The rivets attaching it are through the flanges so that all rivet heads are protected from wear.

- No. 1. Capacity 5½ cu. ft.; weight about 105 lbs. Price each.....\$11.00
- No. 2. Capacity 4½ cu. ft.; weight about 95 lbs. Price each.....11.20

Heavy Pressed Steel "Ox Shovels"

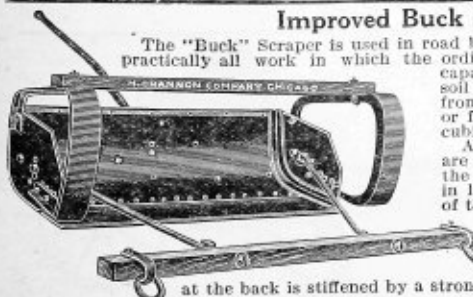
These scrapers are not intended for regular railroad grading with ordinary team. They are drawn usually by locomotive and are used for ditching along railroad tracks. They are equipped with extra heavy steel ball as shown in illustration, and also steel bottom runners. These Ox Shovels are of the same construction as the "Channon" Drag Scrapers, being stamped from a solid sheet of specially rolled steel.



- No. 0. Capacity 10 cu. ft.; size of bowl, top of back to cutting edge, 34 in.; width 35 in.; depth 11½ in.; weight 135 lbs. Price each.....\$25.00
- No. 00. Capacity 13 cu. ft.; size of bowl, top of back to cutting edge, 37 in.; width 35 in.; depth 13½ in.; weight 191 lbs. Price each.....\$48.00
- No. 000. Capacity 17 cu. ft.; size of bowl, top of back to cutting edge, 44 in.; width 43 in.; depth 16 in.; wt. 262 lbs. Price each.....58.00

Improved Buck Scrapers—Fresno Type

The "Buck" Scraper is used in road building, irrigation leveling, railroad construction, in fact, for practically all work in which the ordinary drag slip scraper can be used. On account of their large capacity, they are especially recommended for use in loose or sandy soil and for leveling land for irrigating purposes. Its capacity is from 12 to 18 cubic feet, depending upon the size. With two large or four ordinary horses, one man can move up to 150 and 200 cubic yards in ten hours.



Although adapted to all work in which the ordinary drag scrapers are used, the "Buck" has a great advantage in the distribution of the load in dumping. It may be adjusted to distribute the load in layers ranging in depth from 1 to 12 inches, leaving the surface of the embankment in perfect condition. The draw bars are attached by means of adjustable clevises, the position of which regulate the thickness of the load distribution.

These scrapers are made of very heavy, specially hardened steel plate securely joined. The top edge of the body plate at the back is stiffened by a strong angle which is riveted along its entire length.

- No. 1. Capacity 18 cubic feet. Cutting edge 5 feet. Approximate weight 308 pounds. Price each.....\$37.00
- No. 2. Capacity 14 cubic feet. Cutting edge 4 feet. Approximate weight 249 pounds. Price each.....35.00
- No. 3. Capacity 12 cubic feet. Cutting edge 3½ feet. Approximate weight 236 pounds. Price each.....32.00

H. Channon Company Chicago

Monarch Full Bolted Railroad Wheelbarrows



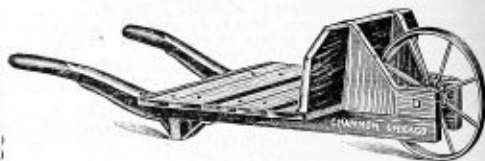
Well bolted barrow of selected hardwood. The bowl is full size, bent, planed, cleated and strapped together. Bottom boards are tongued and grooved and tied together with steel staples. The legs serve as extra braces to the bowl, **running upward the full length and bolted securely with four bolts.** Wood cleats extend down front of tray to the handles, with iron braces in place of quarter blocks. Wheel revolves true and evenly on a fixed 2-inch axle bolt. Wheel is of heavy steel, 16½ inches in diameter, with ⅝-inch round spokes, and a 1½ x ¼ inch tire. Weight 588 lbs. per dozen.

Price per dozen.....\$41.00 Price each.....\$4.00

Bent Handle Stone Barrows

Made purposely for heavy work, such as stone or pig iron use. Built of selected hard wood, well ironed and bolted. Exceptionally strong handles braced thoroughly. The handles are 5 ft. 10 in. long. Cross pieces at legs 2 x 3 inches. Bottom 11 inches thick by 26 inches wide by 25 inches long. Dashboard 9½ inches high supported by strong braces of wood and iron. Legs supported by extra heavy cross-piece. Furnished with Patent Steel Spoke Wheel, 16½ inches diameter; tire 1½ x ⅝ inches. Axle bolt ½ inch. Weight 76 lbs.

Price, per dozen, with steel wheel.....\$100.00
Price, each.....10.00

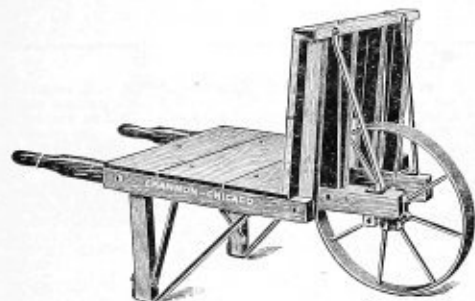


Brick Barrows With Tight Bottoms

In every brick or tile yard will be found a wheelbarrow of this type as it is especially adapted for handling green brick. It is built of selected hardwood, air seasoned, well braced and substantially made throughout. Its construction and material combined make it one of the strongest barrows made. It is built for hard usage.

Handles 58 inches long Dash 24 inches wide, 18 inches high. Legs 15½ inches high. Wheel 19 inches in diameter. Tire 1½ x ⅝ inches. Bottom 24 inches wide. Axle bolt ½ inch. Painted dark blue, wheel black. Weight 67½ lbs. Shipped knocked down. This barrow is carried in stock and can be shipped promptly. Furnished with steel wheel only.

Price, per dozen.....\$100.00
Price each.....10.00



No. 114. Tight Bottom, Steel Wheel

Folding Wooden Barrows

Removable Side Boards, Double Frame

These barrows are made of carefully selected seasoned hardwood and consist of a double frame firmly bolted. Can be easily knocked down and folded flat for shipping purposes by merely removing the axle bolt and two nuts, thereby securing the lowest rate of freight. Set up in a minute. Mostly used for stable and garden work. The bed measures 11 x 17½ at front by 21½ at rear by 32½ inches and has a capacity of 3¼ cubic feet. Steel leg braces, bent under leg to form broad shoe, which serves to protect sod. Steel axle bearing clips. Made with steel wheel only. Length of handle 5 ft. Approximate weight per dozen 588 lbs. Each, 49 lbs.

Price per dozen.....\$80.00
Price each.....8.00

Also made in a larger size.



Easily knocked down and quickly set up

Bullock Steel Tray Wood Frame Barrows



An excellent barrow for street paving and general use. Exceptionally well made, with iron braced wooden legs.

The tray is formed from the best grade of heavy steel, and is pressed from a single sheet, without joint seam or rivet. The tray flange is turned over a $\frac{1}{4}$ inch steel rod. This prevents breaking and bending of the edges. Much stronger than any riveted barrow can be. Has steel axle bearing clips and steel wheel $18\frac{1}{2}$ inches in diameter; spokes $\frac{3}{8}$ inch round; tire, $1\frac{3}{8}$ by $\frac{3}{8}$ inch; axle, $\frac{5}{8}$ inch. Weight, each, 60 pounds; per dozen, 720 pounds.

Greatest length of tray, 2 ft. 9 in. Greatest width of tray, 2 ft. 7 $\frac{1}{2}$ in. Depth at wheel end, 9 $\frac{1}{4}$ inches. Depth at handle end, 6 $\frac{1}{4}$ inches.

Price, per dozen.....\$75.00
Price, each.....7 50

Channon Contractors' Barrow

The "Channon" contractors barrow No. 2B is designed to serve the double purpose of general utility work in wheeling sand and gravel as well as handling batch or semi-liquid material. Especially adapted for hauling concrete in street work. The tray is placed on "risers" which hold it practically level in wheeling. The wheel is placed well back under the load. The increased leverage gained in this manner makes the wheelbarrow much more easily handled. It also has the steel tipped handle extension for dumping over the wheel. Strongly built frame equipped with angle iron legs and braces. Knocks down completely for shipping and is easily set up. Tray, 2 ft. 4 $\frac{1}{2}$ in. by 2 ft. 11 $\frac{1}{2}$ in.

Price, per dozen.....\$90.00
Price, each.....9 00



Channon Concrete and Mortar Barrow



The shovel shape adds a very practical advantage to this tray. A pouring channel is so formed, which deposits flowing material in compact form at the exact point desired. On account of the narrowness of this tray it is easily dumped to either side, and can be handled conveniently in narrow passages. The extra low drop of the axle admits of placing the wheel well under the load so that large loads can easily be handled. The tray will hold 2 cubic feet of wet concrete or 6 cubic feet of dirt, which is about all one man can wheel. Size of tray, 57 $\frac{1}{4}$ inches by 24 $\frac{1}{2}$ inches; depth at front, 13 inches; depth at back, 8 $\frac{1}{4}$ inches; length of slope at front, 19 $\frac{1}{4}$ inches.

Price, per dozen.....\$95.00
Price, each.....9 50

No. 3 Steel Tray Wood Frame Wheel Barrows

This tray is built of the same material and in exactly the same manner as the one above, and will also permit of both side and forward dumping. These barrows while much lighter than those having iron frames, are equally as strong for all practical purposes and will stand the roughest usage. The frame is strongly built of seasoned hardwood lumber and well finished. Used mostly for earth, sand, cinders, ore, coal and coke. Wheel axle is held stationary by steel axle clips. Weight, each, 64 lbs.; per dozen, 768 lbs. Tray, 41 $\frac{1}{2}$ inches by 33 inches.

Price, per dozen.....\$95.00
Price, each.....9 50



Channon Tubular Steel Barrows

Seamless Pressed Steel Trays with Wheel Guards



Nos. 4 and 5

No. 10

The tubular iron which passes around in front and protects the wheels, also serves another purpose. When it is desired to dump forward or over the wheel, the piping will act as a rest upon which to tip the barrow. The piping is not weakened at any point by bolt or rivet. These barrows cannot be equalled for hauling coal or coke and for all general purposes. The tray flange is turned over a $\frac{1}{4}$ -inch steelrod, which passes around the tray, giving a smooth finish to the edges. This prevents breakage and greatly increases the strength. The spokes are secured in the flange against the hub and are held firm by a head on the outer and a shoulder on the inner side of the tire. It cannot come off. All wheels turn on malleable iron fixed axle bolts. The No. 4 barrow differs only from the No. 5 in the size of bowl. See table of specifications below.

No.	Gauge of Steel in Tray	Length on Top	Width on Top	Depth at Wheel	Depth at Handle	Greatest Height	Cubic Capacity	Weight	Price per Dozen	Price Each
4*	15	32 in.	29 in.	7 in.	5 in.	19 $\frac{1}{2}$ in.	3 ft.	71 lbs.	\$ 96.00	\$ 9.60
5*	14	35 $\frac{1}{2}$ in.	28 $\frac{1}{2}$ in.	8 $\frac{1}{2}$ in.	6 in.	21 $\frac{1}{2}$ in.	4 ft.	81 lbs.	106.00	10.60
10†	13	41 $\frac{1}{2}$ in.	33 in.	11 $\frac{1}{2}$ in.	8 in.	25 $\frac{1}{2}$ in.	6 ft.	103 lbs.	140.00	14.00

*Dirt barrows. †Coal or coke barrows, capacity 400 to 450 pounds of coal.

Spare and Repair Parts for Barrows

No.	Trays Only Price Each	Wheels Only		No.	Trays Only Price Each	Wheels Only		Handles per Doz. Pairs
		Each	Dozen			Each	Dozen	
4	\$4.50	\$1.80	\$18.00	Bullock.....	\$4.50	\$1.70	\$18.00	\$14.00
5	5.00	1.80	18.00	Contractors.....	5.50	1.70	18.00	15.00
10	8.00	2.00	22.00	Concrete and Mortar.....	6.80	1.80	18.00	15.00
				No. 3.....	7.20	1.90	18.00	15.00

Forward Dump Barrow

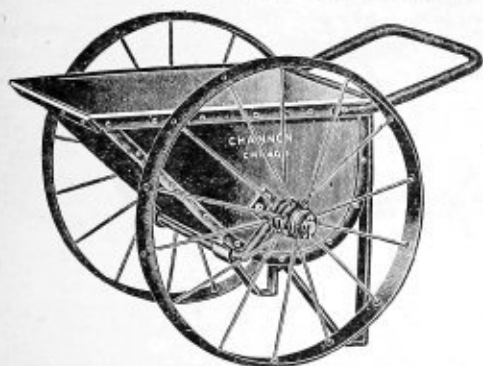


This type of barrow is especially designed for "wheeling in" coal at residences and apartment buildings as it is made narrow for getting through gates and between buildings. Also tapered at mouth for dumping into windows.

This barrow has a large capacity, carries the load on the wheel and is exceptionally well balanced. It dumps easily and the wheel guard prevents running back in dumping.

No.	Price Each	Width at Mouth, Inches	Width at Back, Inches	Capacity Anthracite Coal, Pounds
550A	\$16.00	20	28	250
550B	17.00	22	30	300

THE CHICAGO CONCRETE CART



Capacity 6 cu. ft.

One of the chief features of this cart is easy handling. The wheels, which are of exceptionally large diameter (36 inches), have crown faced tires for easy turning on soft ground, etc., where ordinary flat face tires are apt to grind.

The handle is made of one piece round bar. It is securely bolted to side stiffening angle and is perfectly rigid.

The bowl is of large capacity with axles bent around the bottom, making an additional support.

The sides of bowl are stiffened at top by heavy angles. The lip of bowl is stiffened and protected by a heavy bar.

Wheels have staggered spokes, which are shouldered and headed in tire. Axles are of 1 1/4-inch cold rolled steel. Axle box is replaceable.

Width inside, 20 inches. Length inside, 38 1/2 inches. Greatest depth, 20 inches. Tread 32 1/4 inches. Wheels, 36x2 1/2 inches. Weight about 204 lbs. Price each, \$36.00

TWO WHEELED BARROW—For Coal or Ore and Smelter

Built in two models, one for coal or ore and the other for smelter. The method of construction in these two barrows is identically the same with the exception of the wheels. Built especially for foundry and coal yard use. The Smelter barrow has stronger wheels throughout. An extra tire 2 1/4 x 3/8-inch is shrunk on over the wheel, the tray is 44 inches long, 32 1/2 inches wide at the back, and 39 1/2 inches wide at the front. Its greatest depth is 16 1/2 inches. The bottom and front of the tray are made of No. 10 steel while the sides are No. 12 steel. Handles are 1 1/4-inch pipe. The axle is 1 1/2-inch square by 38 1/2 inches. Legs 1/2-inch by 1 1/2 inches, braced by strips 1/2 x 1 1/4 inches. Its capacity, level full, is 8 cubic feet and it weighs approximately 275 pounds. Price, each, \$40.00



STEEL CHARGING BARROWS

For Limestone, Ore, Coal or Coke



Especially adapted for charging blast furnaces, also for use in gas works, boiler rooms, on coal docks or brick yards. Easiest running heavy charging barrow made. Has anti-friction steel ball bearings. Very easily handled by one man when loaded to its fullest capacity with any material not heavier than iron ore. Very easily dumped. Built of the best No. 10 and 12 gauge steel and heavily bolted throughout. Tire 2 inches wide and 3/4-inch thick. Will carry approximately 1,500 pounds iron ore; 500 pounds coal.

Specifications

	1	2
Size, Number	1	2
Price, each	\$84.00	\$80.00
Length of box, inside, inches	40	44
Width of box, inside, inches	26	26
Depth of box, inside, inches	23 1/4	20
Capacity, cubic feet	10	9 1/2
Gauge steel in bottom, No.	10	12
Gauge steel in sides, No.	12	12
Diameter of wheels, inches	34	34
Approximate weight, each	510	385

No. 1 is the popular size.

LOCOMOTIVE COALING BARROW

One Ton Capacity



Simplifies the handling of coal so that one ton can be easily handled by one man. Roller bearings and its sturdy balanced construction make this possible. The steel coal box is 9 feet long, 30 inches wide and 2 feet and 6 inches deep, giving it a capacity of 30 cubic feet or one ton. The bottom plate is 1/4-inch No. 10 gauge steel, the sides 1/4-inch No. 12 gauge steel. All plates are connected by angle iron, insuring rigidity and durability especially to the spout, which in addition to the regular angles has two short ones running from the bottom up on the outside of the spout and serving as bumpers. Exceptionally well braced and bolted throughout to stand the hardest usage. The wheels are 44 inches in diameter, 3 by 3/8-inch tire and has dust proof ball bearings. Wheel turns on 2-inch square steel axle with 4-inch drops. 14 cold drawn steel rollers 1/2 x 4-inch in each bearing. The swivel wheel is 9 inches in diameter. Handles 2-inch square steel with 4-inch drops. Price, each, \$140.00

"Triangle Mesh" Woven Wire Concrete Reinforcement

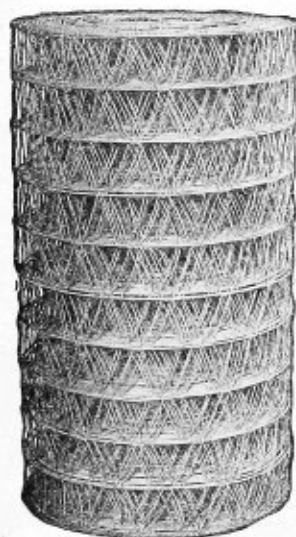
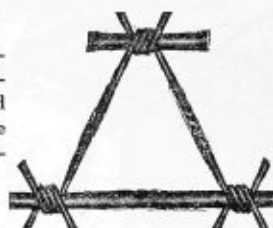


Fig. 8—4-inch Mesh
Made Galvanized and Plain

Low cost of installation and inspection—easily handled and stored on the work. Has high elastic limit.



Safety First

Provides a perfect mechanical band and even distribution of the steel reinforcing in every direction—the tension or carrying members are accurately spaced.

Triangle mesh reinforcement is the only design of woven wire fabric in which the cross or diagonal wires assist the longitudinal or tension members in carrying the load.

Made with either solid or standard longitudinal members, properly spaced by means of diagonals or cross wires so arranged as to form a series of triangles between the longitudinal or tension members; the longitudinal members being spaced 4 inches apart, the cross wires either 4 or 8 inches apart, providing either a 4-inch or 8-inch mesh. The sizes of both wires are varied in order to provide the cross sectional areas of steel required to meet the condition.

Triangle mesh provides a more even distribution of the steel, reinforcing in every direction. The tension or carrying members are accurately spaced. Provides a perfect mechanical band. When a specific size of fabric or area of steel is specified, it is impossible to leave out any portion of the reinforcement. Has an absolute continuous action from one end of the structure to the other and distributes the stresses, due to a concentrated load, over a greater area.

Number and Gauge of Wires, Areas Per Foot Width and Weights Per 100 Square Feet

Longitudinals Spaced 4 Inches

Cross Wires Number 14 Gauge Spaced 4 Inches

Style No.	Number and Gauge of Wires, Each Longitudinal American Steel & Wire Company's Steel Wire Gauge	Sectional Area Long't'd'l Sq. Ins. per Foot Width	Total Effective Long't'd'l Sec. Area Sq. Ins. per Ft. Widths	Apprx. Wght., Lbs. per 100 Sq. Feet
032	1-No. 12 gauge	.026	.032	22
040	1-No. 11 gauge	.034	.040	25
049	1-No. 10 gauge	.043	.049	28
058	1-No. 9 gauge	.052	.058	32
068	1-No. 8 gauge	.062	.068	35
080	1-No. 7 gauge	.074	.080	40
093	1-No. 6 gauge	.087	.093	45
107	1-No. 5 gauge	.101	.107	50
126	1-No. 4 gauge	.120	.126	57
146	1-No. 3 gauge	.140	.146	65
153	1-1½-inch	.147	.153	68
168	1-No. 2 gauge	.162	.168	74
180	2-No. 6 gauge	.174	.180	78
208	2-No. 5 gauge	.202	.208	89
245	2-No. 4 gauge	.239	.245	103
267	3-No. 6 gauge	.261	.267	111
287	3-No. 5½ gauge	.281	.287	119
309	3-No. 5 gauge	.303	.309	128
336	3-No. 4½ gauge	.330	.336	138
365	3-No. 4 gauge	.359	.365	149
395	3-No. 3½ gauge	.389	.395	160

Longitudinals Spaced 4 Inches

Cross Wires Number 14 Gauge Spaced 8 Inches

Style No.	Number and Gauge of Wires, Each Longitudinal American Steel & Wire Company's Steel Wire Gauge	Effective Sec. Area of Cross Reinf'c m't Sq. Ins. per Ft. Width	Effective Long't'd'l Sectional area Sq. Ins. per Ft. Width	Apprx. Wght., Lbs. per 100 Sq. Feet
036P	1-No. 12 gauge	.009	.036	17
044P	1-No. 11 gauge	.009	.044	20
053P	1-No. 10 gauge	.009	.053	24
062P	1-No. 9 gauge	.009	.062	27
072P	1-No. 8 gauge	.009	.072	31
084P	1-No. 7 gauge	.009	.084	35
097P	1-No. 6 gauge	.009	.097	40

Longitudinals Spaced 4 Inches

Cross Wires Number 12½ Gauge Spaced 8 Inches

Style No.	Number and Gauge of Wires, Each Longitudinal American Steel & Wire Company's Steel Wire Gauge	Effective Sec. Area of Cross Reinf'c m't Sq. Ins. per Ft. Width	Effective Long't'd'l Sectional area Sq. Ins. per Ft. Width	Apprx. Wght., Lbs. per 100 Sq. Feet
041R	1-No. 12 gauge	.014	.041	21
049R	1-No. 11 gauge	.014	.049	24
058R	1-No. 10 gauge	.014	.058	28
067R	1-No. 9 gauge	.014	.067	31
077R	1-No. 8 gauge	.014	.077	35
089R	1-No. 7 gauge	.014	.089	40
102R	1-No. 6 gauge	.014	.102	44

Length of rolls: 150-foot, 200-foot and 300-foot.

Widths: Approximately 16-inch, 20-inch, 24-inch, 28-inch, 32-inch, 36-inch, 40-inch, 44-inch, 48-inch, 52-inch and 56-inch.

Note.—Material may be furnished either plain or galvanized. Unless otherwise specified, shipments will be made of material not galvanized.

Eclipse Steel Wire Screens

For Screening Coal, Coke, Sand and Gravel

The wire used in these screens is of superior quality, drawn and tempered. Cloth or bottom is an extra heavy grade, the wires being double crimped, thus eliminating chances of slipping or sagging. Frames are made of thoroughly seasoned oak, strongly constructed and ironed at points of strain. Heavy pieces of iron are put over the cloth at top and bottom so that the wood will not be worn out by the material being screened.

All metal parts are japanned to prevent rusting. The foot board and leg are convenient attachments, the former elevates the screen so that a quantity of material can be run over before shoveling away and prevents the large pieces from mixing with the screenings. It also forms a solid body to shovel against. The leg is thoroughly braced and movable so the screen can be adjusted to any height required. When screens are furnished without the foot board and leg they are provided with a cleat fastened to the back at the top, so that screen can be rested

Plain Screen. on a board.

When ordering always be sure to state the size mesh wanted. By mesh is meant the number of openings per lineal inch. All meshed furnished at the same price.

No. 10. Plain Screen. Extra size, 34x76 in. Weight \$15.00
about 101 pounds. Price each.

No. 20. Plain Screen. Regular size, 31x69 in. Weight \$12.00
about 86 pounds. Price each.

No. 1. Screen with Foot Board and Leg. Extra size, 34x81 in. Weight 118 lbs. Price each \$17.25

No. 2. Screen with Foot Board and Leg. Regular size, 31x74 in. Weight 106 lbs. Price \$14.25

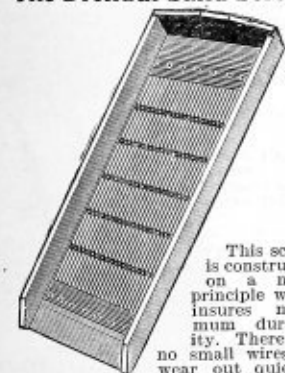


Challenge Screen

The frame of this screen is made of well seasoned oak, nailed together. Screen is steel wire, double crimped and japanned to prevent rusting. The screen is not equal to the Eclipse Screens nor as economical to use, but is equal if not superior to the average screen offered at the same price. If desired, we can furnish this screen with bolted frames for \$1.00 net extra. Weight about 70 pounds.

Challenge Screen. Size 29x71 inches. Price \$7.50
Any mesh furnished. State which is wanted in order.

The Drendul Sand Screen



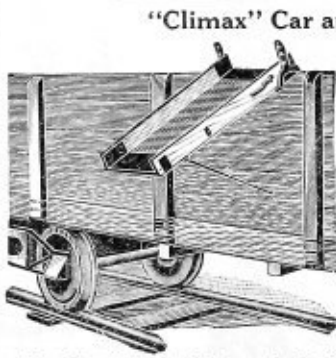
This screen is constructed on a novel principle which insures maximum durability. There are no small wires to wear out quickly,

leaving the screening surface loose and uneven. The heavy parallel wires are looped to pass through slots punched in narrow strip of sheet steel. Supporting rods are passed through loops at the back, holding wires firmly in position. At the top and bottom, wide steel plates are connected in the same manner. Frame is made of first class lumber.

Large size, 26x66 inches. Weight 42 lbs. Price each \$7.50

Small size, 22x60 inches. Weight 35 lbs. Price each \$6.00

Furnished from stock in 2, 3, 4 or 5 mesh. Two mesh has $\frac{3}{8}$ -inch space between wires, 3 mesh $\frac{1}{2}$, 4 mesh $\frac{5}{8}$ and 5 mesh $\frac{3}{4}$ space.



No. 24. Without Foot and Head Board, size 24x57 inches. Complete for car use. Weight each about 60 lbs. Price each \$13.50



No. 25. With Foot and Head Board, size 24x57 inches. Complete for car or yard use. Weight each about 75 lbs. Price each \$14.25

The "Climax" combined car and yard screen is substantially constructed and at the same time weight has been kept down as much as possible. Double crimped steel cloth is used and the frame is of hardwood covered with heavy sheet iron where the coal rolls down. The sides are strengthened with iron braces.

For car use the clamps are secured to the side-board and the iron leg adjusts it to the required incline, holding the screen firm and independent of the wagon. If it is required to screen from a box car, it can be secured to the grain door; for yard use the clamps are secured to the foot board, and the head board is fastened in position. Screen may be placed at any required incline and clamps secured so that the foot board is always vertical, thus insuring a firm surface to shovel against.

Handy Screens



The Handy Screens are intended for use in yards where there is but occasional need for them for screening ashes, sand and gravel. Frames made of clear spruce, well put together and braced with sheet iron. The cloth is a medium grade of steel wire, single crimped, japanned in the Nos. 6 and 7 and galvanized in the Nos. 9 and 10. We recommend screens with the Galvanized Screens as they are stronger, will not rust and meshes cannot slip as the wires are soldered at the crossings.

No. 6. Small size, 25x62 inches. Steel wire, japanned. Weight 33 lbs. Price each \$6.00

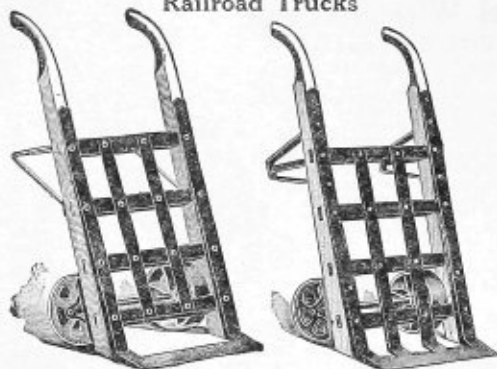
No. 7. Large size, 28x66 inches. Steel wire, japanned. Weight 37 lbs. Price each \$7.50

No. 9. Small size, 25x62 inches. Steel wire, galvanized. Weight 33 lbs. Price each \$7.50

No. 10. Large size, 28x66 inches. Steel wire, galvanized. Weight 37 lbs. Price each \$9.00

The following meshes are carried in stock, $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$, $\frac{1}{2}$ and 1-inch. Be sure to state which is wanted.

Railroad Trucks



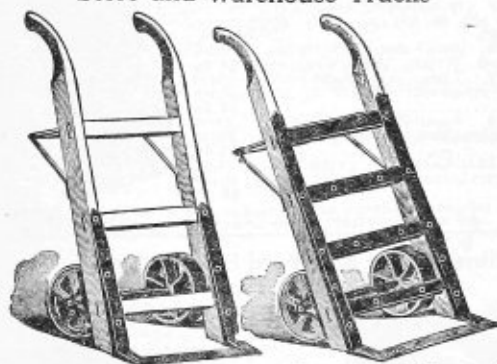
No. 4

No. 4XX

Best selected second growth hickory, oak or ash, turned steel axles, steel nose and side straps. Iron on cross bars extends through to outside of handles. Bolts passing through irons, tenons and handles. Axle and collars forged from one piece. All steel parts heavy and substantial.

No.	Length inches	Width, inches	Diameter inches	Weight, pounds	Price Each
4	60	24	10 3/4	120	\$20.00
4XX	60	24	10 3/4	144	28.00

Store and Warehouse Trucks



No. 1 Half Ironed

Nos. 2 & 3 Full Ironed

No.	Length Handles, in.	Width Truck, in.	Diameter Wheels, in.	Weight, pounds	With Iron Wheels Price Each
1	48	19	6 1/2	43	\$ 7.00
2	52	20	7 1/2	68	10.50
3	56	22	9	87	15.00

Barrel, Bag and Handy Trucks



Barrel

Bag

Handy

Style	Length Handles, in.	Width, inches	Diameter Wheels, in.	Weight, pounds	Price Each
Bbl. Trk. No. 2	52	20	8 1/2	75	\$11.00
Bbl. Trk. No. 3	56	22	9 1/2	90	16.00
Bag Truck, ...	42	11 1/2 x 10 1/4	6	19	4.50
Handy Truck, ...	46	12 x 17	6	27	6.00

Hercules Steel Warehouse Trucks



Easy running, strong and durable; for railroads, steamships, general warehouse and all heavy service. Constructed of the very best steel. Frames and axles made of steel and wheels of very best quality iron. The angular shapes combine extraordinary strength and lightness. All parts are bound and riveted together, making an exceptionally strong and rigid frame. Handles are first class hickory, strong and pleasing to the hands. Fully warranted against any imperfections in material and workmanship.

No. 3 Regular: For general work, medium heavy.

No. 4 Regular: For all purposes where a large truck is required.

No. 4A: Extra heavy; center straps, welded to dash; for hard service.

No.	Full Lgth.	Width, inches	Diam. Wheel, inches	Diam. Axles, inches	Wt. Lbs.	Price Each
3 Regular, ...	5	22	8 1/4	1 1/4	90	\$14.00
4 Regular, ...	5 ft. 7 in.	24	10 3/4	1 1/2	136	17.25
4A, ...	5 ft. 7 in.	24	10 3/4	1 1/2	150	20.25

Hercules Steel Barrel Trucks



No. 3

Full length, ...	5 feet
Width at nose, ...	16 inches
Width at handles, ...	25 inches
Diameter, wheels, ...	8 1/4 inches
Diameter, axle, ...	1 1/4 inches
Weight, ...	102 lbs.

Light, strong and made of steel throughout. No. 3 is a lighter truck and designed for ordinary barrels, while No. 4 is heavy and designed for extra heavy barrels.

No. 4

Full length, ...	5 ft. 7 in.
Width at nose, ...	17 inches
Width at handles, ...	25 inches
Diameter, wheels, ...	10 3/4 inches
Diameter, axle, ...	1 1/2 inches
Weight, ...	144 lbs.

No. 3. For regular work, ordinary barrels, etc., price each, ... \$17.25

No. 4. For heavy work, extra strong, price each, ... 20.25

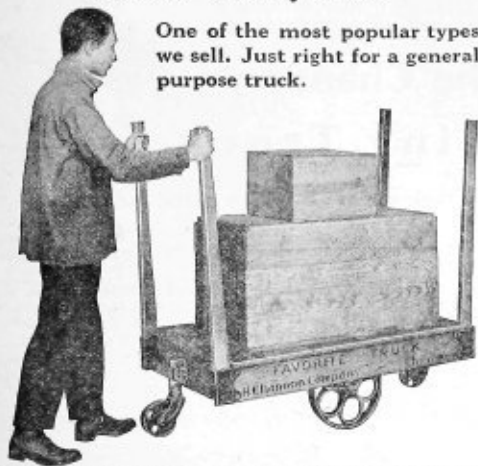
Skids



Length, feet	No. of Cross Bars	Price Each
6	2	\$ 7.50
8	3	10.00
10	3	12.50
12	4	15.00

"Favorite" Factory Truck

One of the most popular types we sell. Just right for a general purpose truck.



The high wheels on this truck enable it to be moved around very rapidly and the swivel casters on each end allow it to be turned completely around in a very small space. The entire area of the platform is available for load, the heavy iron stake pockets being set out over the frame. Four $\frac{1}{2}$ -inch iron rods pass across frame and rigid through the iron pockets, making truck strong and rigid by $\frac{1}{2}$ inches hardwood, strongly assembled; platform 1-inch hardwood, dressed; stakes 30 inches high, removable. Illustration shows truck No. 2. No. 3 has two casters at each end.

	Size Platform, inches	Diam. of Wheel, in.	Price Each
No. 2	28x48	14	\$14.00
No. 3	36x60	16	20.00

Wagon Truck



Fig. 700

Built of the best selected Vermont oak or ash lumber. Furnished with cast iron fifth wheel and the rear axle strongly braced to platform. Axles turned and wheels bored.

	Size Platform, ins.	Diam. of Wheel, ins.	Weight, Lbs.	Price Each
No. 1	24x36	7 $\frac{1}{4}$	110	\$14.00
No. 2	26x38	7 $\frac{1}{4}$	120	15.00
No. 3	28x40	7 $\frac{1}{4}$	130	16.00
No. 4	30x42	8 $\frac{1}{4}$	155	17.50
No. 5	32x44	8 $\frac{1}{4}$	158	18.50
No. 6	34x46	8 $\frac{1}{4}$	172	20.00

Baggage or Express Wagon

Made of carefully selected material heavily ironed and braced substantially. Same as used by all the express companies. No. 1 at large stations and No. 2 at smaller stations. Well painted and varnished.



Fig. 800

No.	Diam. Rear Wheels	Diam. Front Wheels	Size of Platform	Weight, pounds	Price Each
1	31	28	39 in. x 10 ft.	670	\$100.00
2	18	18	30 in. x 7 ft.	375	60.00

Channon's Improved Truck



Fig. 500

For Grocers, Mills, Factories, Warehouses, etc. Built strong and substantial.

This truck is especially adapted to the needs of merchants, millers, warehouse men and also used in factories and depots. Can be made to fit scales or elevators, thus doing away with transferring the load. The front wheels being casters truck will turn in its own length and can be run on scale or elevator at any angle. One man can handle nearly twice as much with this truck as the bulk of the weight comes over the wheels which are of large diameter. The caster wheels in front enable the operator to turn the truck in any direction with ease. For making up orders or unpacking shipments, this truck is indispensable. Regularly furnished with iron wheels, but rubber tires can be furnished if so desired, at extra price. This truck can be made in any size to meet special requirements; also with boxes having removable or hinged ends or sides. These prices will be quoted on application.

No.	Size of Platform, feet	Size of Wheels, inches	Size of Casters, inches	Weight, pounds	Price Each
A	2 x4	12x2	6x1 $\frac{1}{2}$	165	\$21.00
B	2 $\frac{1}{2}$ x4	12x2	6x1 $\frac{1}{2}$	170	22.00
C	3 x5	12x2	6x1 $\frac{1}{2}$	200	25.00
F	3 x5	18x2 $\frac{1}{4}$	8x1 $\frac{1}{2}$	240	32.00

These trucks are designed for handling bolts of goods. Regularly furnished with plain iron wheels, Channon universal rubber tired wheels can be furnished at extra prices. Cold rolled steel axles. Platform varnished, iron parts black.



Dry Goods Trucks

No.	Size of Platform, inches	Diam. of Wheels, inches	Height of End Racks, inches	Weight, pounds	Price Each
2	27x47	10	25	190	\$22.00

Fig. 820



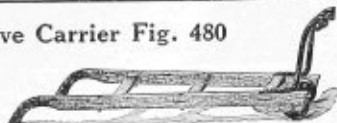
Baggage Barrow

Made of choice hickory or oak, heavily braced. Axles are turned and wheels bored.

No.	Width, inches	Length, inches	Size of Wheels, inches	Weight, pounds	Price Each
1	24	84	18x2 $\frac{1}{2}$	215	\$35.00
2	27	102	20x2 $\frac{1}{2}$	280	40.00
3	30	120	20x2 $\frac{1}{2}$	340	45.00

Stove Carrier Fig. 480

Light, but well made and strong. 4-in. wheels, 12 $\frac{1}{2}$ in. across bottom, 19 in. across top. Price each., \$8.00



The Channon Lifting Truck

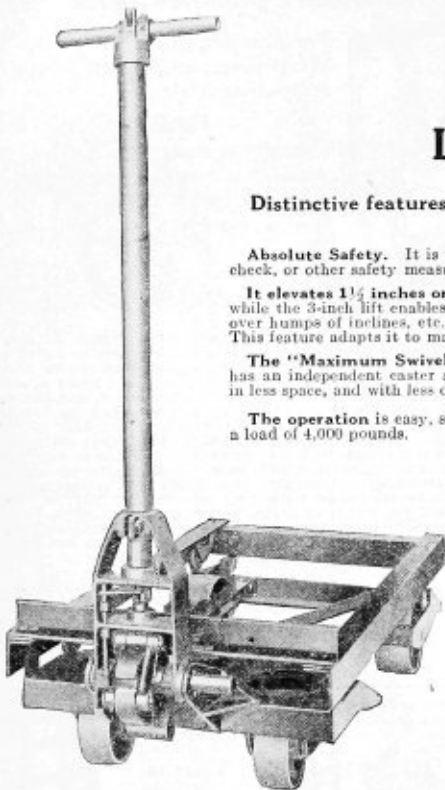
Distinctive features of this Truck which place it in a class by itself are

Absolute Safety. It is under perfect control of the operator at all times. No pneumatic release check, or other safety measure is necessary to prevent injury to workmen.

It elevates 1½ inches or 3 inches as desired. 1½ inch is sufficient on an ordinary smooth floor while the 3-inch lift enables it to clear high spots in an uneven floor and to pass in and out of cars, over humps of inclines, etc., where other lifting trucks would drag and stop, and possibly overturn. This feature adapts it to many conditions where trucks having less lift could not be used.

The "Maximum Swivel Caster," patented and used only on this truck. By its use the truck has an independent caster always under each front corner. These enable the truck to turn easier, in less space, and with less danger of upsetting than any other form of lifting truck made.

The operation is easy, simple and safe. A boy weighing 125 pounds can easily elevate and draw a load of 4,000 pounds.



They save space. One Channon Lifting Truck will do the work of many ordinary trucks because platforms are loaded and unloaded, not the trucks, which are always free for haulage purposes. The platforms are inexpensive and can be nested in small space.

Made in three standard sizes, but other sizes will be made to order.

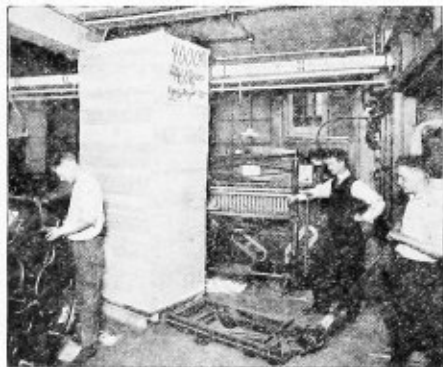
Style A. Capacity 2,000 pounds. Size of truck, 18x30 inches.
Price.....\$75.00

Style B. Capacity 4,000 pounds. Size of truck, 20x40 inches.
Price.....\$90.00

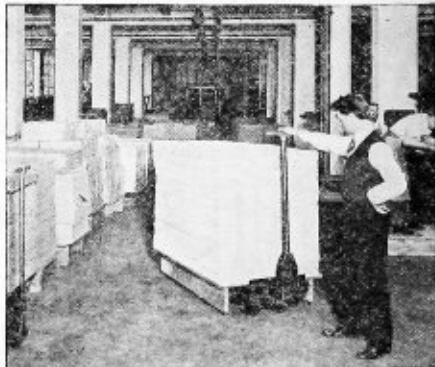
Style C. Capacity 6,000 pounds. Size of truck, 27x48 inches.
Price.....\$150.00

All parts bearing strain are of malleable iron or steel of best quality.

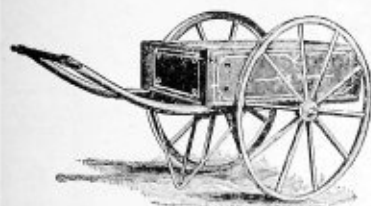
Standard trucks are equipped with 7-inch wheels but when lower platforms are used we can furnish 6-inch diameter wheels. Two platforms are furnished with each truck. We can furnish other sizes when ordered, or you can make them in your own plant.



Before loading or after unloading



Showing loaded truck



Nos. 0 and 3

mit easy handling. A boy can easily run it carrying its greatest capacity.

No. 4. A three-wheeled cart for all delivery purposes. The third wheel is built very substantially, for use in cities to assist in crossing gutters. Both ends and sides are removable, leaving a flat bottom. Built of the same material as the No. 3 cart. Both No. 3 and No. 4 carts are shipped with 1-inch tread wood wheels unless otherwise ordered.

Hand Carts

No. 3. A strongly built hand cart for painters, carpenters, bill posters, masons, etc., as well as for farm work and other heavy usage. It is also a handy cart for delivery purposes. The box is made of basswood with a steel band all around the top to protect against battered edges and broken corners. The sides and ends are removable. The frame is made of maple. The wheels are extra large to per-



Nos. 1 and 4

No.	Diameter of Wheels, inches	Diameter of Axles, inches	Size of Box, Outside, inches	Depth of Box, inches	Weight Each, pounds	Price Each with Steel Wheels	Price Each with 1-inch Tread Wheels
0	42	1	48x28	10	100	\$12.50	\$10.50
1	36	7/8	40x23	10	90	10.50	9.00
3	42	1	48x28	10	100	14.00	12.00
4	36	7/8	40x23	10	90	12.00	10.50

Timber Trucks or Dollies



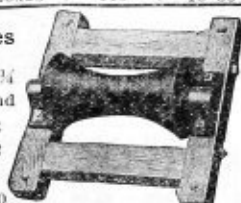
These trucks can be inverted and used as rollers. Frames are of hard maple, thoroughly bolted; rollers are of pipe with cast heads shrunk on.

No.	Diameter of Roller	Size of Frame	Weight, pounds	Price Each
2	5 in. reg. size...	18x18	46	\$ 7.00
3	6 in. reg. size...	18x18	55	8.50
4	7 in. heavy...	23x23	72	11.00
5	8 in. ex. heavy...	26x26	115	15.50

No. 6 Concave Dollies

Rollers 12 1/2 inches long, 7 1/4 inch diameter at each end and 3 1/2 inch diameter at center; frame 18x18 inches; weight 52 pounds.

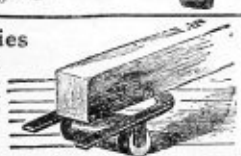
Price each.....\$10.50



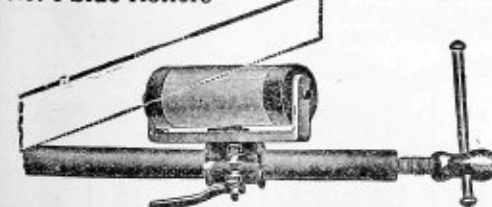
No. 7 Horse Shoe Dollies

For pushing lumber from or on to a pile. Can be placed near the edge and used from the ground. Roller 14x4 inches in diameter.

Price each.....\$6.00



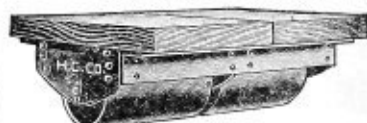
No. 9 Side Rollers



The roller is made of metal rubbing and is very strong. It is easily placed in car doors, hatchways of vessels, etc. The roller slides along the stock and can be clamped rigidly at any position required.

No. 9. Side rollers, price each.....\$15.00

Universal "Boggie" Roller



Capacity
4 tons

Has two independent rollers on the same axle, which work same as a two-wheel truck, swinging around as if on a pivot.

Maple platform with wrought iron frame riveted. Height over all, 8 inches; rollers, 5 1/2 inches; length, 24 inches; width, 18 inches; weight, 100 pounds.

Price each.....\$24.00

No. 8 End Rollers



These rollers are especially adapted for the ends of cars. Roller 14x4 inches in diameter.

Price each.....\$5.50

Box Trucks

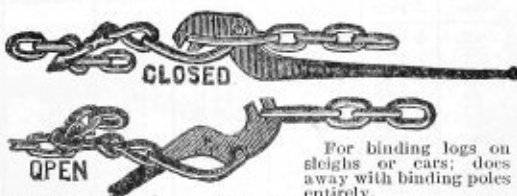


Low trucks, strong and well made, for handling large boxes or bales. Sharp cone head bolts to prevent package from slipping. Axles turned and wheels bored.

No.	Width, inches	Length, inches	Size, Wheels	Weight, pounds	Price Each
1	18	18	4x13 1/2	27	\$5.00
2	18	26	4x13 1/2	32	5.50

Axles are 1/2-inch square.

Log Binders



For binding logs on sleighs or cars; does away with binding poles entirely.

Price each.....\$3.90 Price per dozen...\$39.00

Anti-Friction Casters

Common Stem

Oblong Plate



Strong and durable. Plate rests on a series of steel rollers, all weight being carried outside of center of main wheel. This relieves all friction on the pivot and all strain upon the fastening screws.

No. 188 and larger sizes used for trucks.
To designate rubber wheels when ordering, add $\frac{1}{2}$ to iron wheel number, as 188 $\frac{1}{2}$.

Price Per Set of Four

Number	Rubber Wheels	Iron Wheels	Size of Wheels, Inches	Size of Plate, Inches	Height, Inches	Capacity, Pounds
182-33		\$ 0.70	1 $\frac{1}{2}$ x $\frac{3}{4}$	1 $\frac{1}{2}$ x 2	1 $\frac{3}{4}$	250
182-37	\$ 2.25	.60	1 $\frac{1}{2}$ x $\frac{3}{4}$	1 $\frac{1}{2}$ x 2	1 $\frac{3}{4}$	250
183-33	2.90	.75	1 $\frac{1}{2}$ x $\frac{3}{4}$	1 $\frac{1}{2}$ x 2 $\frac{1}{2}$	2	350
183-37	2.90	.75	1 $\frac{1}{2}$ x $\frac{3}{4}$	1 $\frac{1}{2}$ x 2 $\frac{1}{2}$	2	350
184-33	4.20	.95	1 $\frac{1}{2}$ x $\frac{3}{4}$	1 $\frac{1}{2}$ x 2 $\frac{1}{2}$	2 $\frac{1}{4}$	450
184-37	4.20	.95	1 $\frac{1}{2}$ x $\frac{3}{4}$	1 $\frac{1}{2}$ x 2 $\frac{1}{2}$	2 $\frac{1}{4}$	450
186-33	7.00	1.25	2 $\frac{1}{2}$ x $\frac{3}{4}$	2 $\frac{1}{2}$ x 3 $\frac{1}{2}$	2 $\frac{3}{4}$	600
186-37	7.00	1.25	2 $\frac{1}{2}$ x $\frac{3}{4}$	2 $\frac{1}{2}$ x 3 $\frac{1}{2}$	2 $\frac{3}{4}$	600
188	9.00	2.75	2 $\frac{1}{2}$ x $\frac{3}{4}$	3 x 4 $\frac{1}{2}$	3 $\frac{1}{2}$	1000
190	12.00	4.00	3 $\frac{1}{2}$ x 1 $\frac{1}{2}$	3 $\frac{1}{2}$ x 4 $\frac{1}{2}$	4 $\frac{1}{2}$	1500
190L	15.00	5.00	4 $\frac{1}{2}$ x 1 $\frac{1}{2}$	3 $\frac{1}{2}$ x 4 $\frac{1}{2}$	5 $\frac{1}{2}$	1200
190S	17.50	6.50	4 $\frac{1}{2}$ x 1 $\frac{1}{2}$	3 $\frac{1}{2}$ x 4 $\frac{1}{2}$	6	1200
191	15.60	6.50	3 $\frac{1}{2}$ x 1 $\frac{1}{2}$	3 $\frac{1}{2}$ x 4 $\frac{1}{2}$	5	1200
191L	32.00	12.00	5 x 1 $\frac{1}{2}$	4 $\frac{1}{2}$ x 5 $\frac{1}{2}$	6 $\frac{1}{2}$	1200
192	25.00	12.00	4 x 2 $\frac{1}{2}$	4 $\frac{1}{2}$ x 6 $\frac{1}{2}$	6	2000
193	40.00	17.50	5 x 2 $\frac{1}{2}$	4 $\frac{1}{2}$ x 6 $\frac{1}{2}$	7	4000
195	80.00	45.00	6 x 3 $\frac{1}{2}$	6 $\frac{1}{2}$ x 9 $\frac{1}{2}$	9	6000

Note.—Sizes up to 186 are made in different styles. Style 33 denotes common stem with iron wheel, style 37 denotes oblong plate with iron wheel.



Thread Guard Casters

This line of casters is exactly the same as the corresponding numbers noted above and in addition they have a steel guard around the axle which prevents threads from winding around it and binding it.

Number.....184-37 186-37 188 190 *8 *10
Per set of 4.....\$1.60 \$1.75 \$4.25 \$6.00 \$4.00 \$5.30
*These sizes are stationary and do not swivel. For dimensions, refer to table across the page.

Stationary Truck Casters

This series of casters is intended to match Payson Anti-Friction casters listed on top of page.

To designate rubber wheels add $\frac{1}{2}$ to number, as No. 8 $\frac{1}{2}$.



Anti-Friction Double Wheel Truck Casters



Two wheels in a single frame loosely pivoted to the plate. Anti-Friction wheel runs directly over the axis, the weight thus resting entirely on the axis of the floor wheel and not on the pivot.

The feature of their construction is maximum strength with minimum friction.

No. 82 and larger used for trucks.

Prices Per Set of Four

No. Oblong Plate	Price per Set of Four	Size of Plate, Inches	Size of Wheel, Inches	Height, Inches	Capacity, Pounds
22	\$ 0.80	1 $\frac{1}{2}$ x 1 $\frac{3}{4}$	1 x $\frac{1}{2}$	1 $\frac{1}{2}$	.....
32	.95	1 $\frac{1}{2}$ x 2 $\frac{1}{4}$	1 $\frac{1}{2}$ x $\frac{3}{4}$	1 $\frac{3}{4}$	.....
42	1.10	1 $\frac{1}{2}$ x 2 $\frac{3}{4}$	1 $\frac{1}{2}$ x $\frac{3}{4}$	2 $\frac{1}{4}$	.....
52	1.25	2 $\frac{1}{2}$ x 3 $\frac{1}{2}$	1 $\frac{1}{2}$ x $\frac{3}{4}$	2 $\frac{3}{4}$	.....
62	1.40	2 $\frac{1}{2}$ x 3 $\frac{1}{2}$	1 $\frac{1}{2}$ x $\frac{3}{4}$	2 $\frac{3}{4}$	1500
72	1.50	2 $\frac{1}{2}$ x 3 $\frac{1}{2}$	2 $\frac{1}{2}$ x $\frac{3}{4}$	3 $\frac{1}{4}$	1500
82	2.00	3 $\frac{1}{2}$ x 4 $\frac{1}{2}$	2 $\frac{1}{2}$ x $\frac{3}{4}$	3 $\frac{1}{4}$	2000
102	2.50	3 $\frac{1}{2}$ x 4 $\frac{1}{2}$	3 $\frac{1}{2}$ x $\frac{3}{4}$	4 $\frac{1}{4}$	2500
112	3.75	3 $\frac{1}{2}$ x 5	3 $\frac{1}{2}$ x $\frac{3}{4}$	4 $\frac{1}{2}$	3000
122	7.00	4 $\frac{1}{2}$ x 6 $\frac{1}{2}$	4 $\frac{1}{2}$ x 1 $\frac{1}{2}$	5 $\frac{1}{2}$	4000
142	11.00	5 $\frac{1}{2}$ x 7 $\frac{1}{2}$	4 $\frac{1}{2}$ x 1 $\frac{1}{2}$	6	5000

Stationary Truck Casters

This series is exceptionally well made and is intended for use with the double wheel swivel casters, listed in the opposite column.



No.	Price per Set of Four	Size of Wheels, Inches	Size of Plate, Inches	Height, Inches	Corresponds to Truck Caster
241	\$2.25	2 $\frac{1}{2}$ x 1 $\frac{3}{4}$	3 x 4 $\frac{1}{2}$	2 $\frac{3}{4}$	62
242	2.60	2 $\frac{1}{2}$ x 1 $\frac{3}{4}$	3 x 4 $\frac{1}{2}$	3 $\frac{1}{4}$	72
243	3.00	3 $\frac{1}{2}$ x 1 $\frac{3}{4}$	3 x 4 $\frac{1}{2}$	3 $\frac{1}{4}$	82
244	3.40	3 $\frac{1}{2}$ x 1 $\frac{3}{4}$	3 $\frac{1}{2}$ x 4 $\frac{1}{2}$	4 $\frac{1}{2}$	102
245	5.50	4 $\frac{1}{2}$ x 1 $\frac{3}{4}$	3 $\frac{1}{2}$ x 5 $\frac{1}{2}$	4 $\frac{1}{2}$	112
246	8.25	5 $\frac{1}{2}$ x 1 $\frac{3}{4}$	3 $\frac{1}{2}$ x 7	5 $\frac{1}{2}$	122
247	10.45	5 $\frac{1}{2}$ x 1 $\frac{3}{4}$	4 $\frac{1}{2}$ x 7	6	142
248	14.85	7 x 1 $\frac{3}{4}$	4 $\frac{1}{2}$ x 8 $\frac{1}{2}$	7 $\frac{1}{2}$	.....

Bullock Highest Grade Contractors' and Railroad Shovels

Made of the highest quality raw materials obtainable. The blades are made from the finest crucible steel of 70 to 80-point carbon and great tensile strength. Handles are carefully selected second growth Northern Ash with an absolutely accurate bend. Blade is carefully secured and the new socket straps grip the handle like a vise, successfully resisting all prying pressure from any direction.

Widely used by railroads and contractors. Adapted for the hardest service in handling crushed stone ballast, concrete, gravel, etc.

Standard No. 2 size shovels, blade $9\frac{3}{4} \times 12$ inches, with square or round point, black finish, wood or malleable "D" handle or plain long handle.

About 85 per cent of our shovels are furnished with wood D handles as shown in illustration.

"Plain Back" or "Strapped" Shovels

Round Point
Long Handle



Square Point
Long Handle

Shovels with square or round points, "D" or long handles are all furnished at the same price

The utmost care and attention is given each operation in the manufacture of our shovels and the system of inspection and testing is the most thorough and complete of any factory in the country. Every blade undergoes three separate tests in the forge department and every weld is guaranteed absolutely perfect. Alignment of blade and handle is correct in every detail, resulting in accurately balanced shovels with just the proper "hang." Every shovel is subjected to a severe breaking strain of 200 pounds for two minutes before being bundled for shipment.

BULLOCK BRAND. Our extra grade. Will outlast any other make. Adapted for the very hardest service such as handling crushed stone, ballast, gravel, concrete, etc. Widely used by railroads and contractors.

WINFIELD BRAND. Our regular first grade shovels. Blades are made of best crucible steel with good ash handles. This grade is perhaps our most popular among contractors and other large users of shovels.

HELMER BRAND. This grade is not intended for the hardest service, but is a good light weight shovel. It is a commercial grade about the same as found in hardware stores throughout the country.

Size Number	Size Blade, Inches		Bullock Brand Price per Dozen	Winfield Brand Price per Dozen	Helmer Brand Price per Dozen
	Width	Length			
2	9 $\frac{3}{4}$	12	\$16.50	\$14.50	\$ 9.00
3	10	12 $\frac{1}{2}$	17.00	15.00	9.50
4	11	13	17.50	15.50	10.00

Bullock Brand

The highest possible quality. Blades $8\frac{1}{4} \times 9$ inches.

Price per dozen . . . \$16.50



Sewer or Brick Shovels

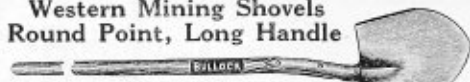
Helmer Brand

A trifle lighter weight than Bullock but very serviceable. Same size blade. Price per dozen . . . \$9.50

Our Sewer or Brick Shovels are designed and intended for the hardest service. Blades are made from the very best crucible steel. Handles are straight grained, white and free from imperfections. Blade is properly shaped for the various uses to which a Sewer Shovel is used. A sharp bend in handle brings the lifting hand close to load, which is usually heavy, giving great leverage.

"Plain Back" or "Socket Strapped" Shovels

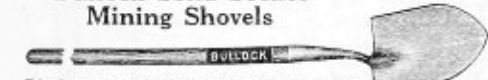
Western Mining Shovels Round Point, Long Handle



Bullock and Winfield Plain Back Western Mining Shovels are made with best quality genuine crucible steel blades, highly polished and strictly Northern Ash Handles, thoroughly waxed, thus protecting them from rotting out in water. Made in No. 2 size only, $9\frac{1}{2} \times 12\frac{1}{4}$ inch blades. Furnished with **Stiff Point, Half Spring or Full Spring Blade**. Unless otherwise ordered, we always furnish **Half Spring**.

Bullock Brand, price per dozen.....\$15.00
Winfield Brand, price per dozen.....12.50

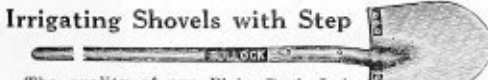
Bullock Solid Socket Mining Shovels



Blade, neck and socket forged by patent process from one piece of highest grade crucible steel, full polished thick blade, oil tempered and hardened. Neck 1 inch in diameter; closed socket $6\frac{1}{4}$ inches long, fitted with highest grade white ash handles securely wedged into socket. Bullock Brand only. Size blade, $9\frac{1}{2} \times 12\frac{1}{4}$ inches.

per dozen. Price per dozen.....\$19.00

Irrigating Shovels with Step



The quality of our Plain Back Irrigating Shovels is exactly the same as the Plain Back Western Mining Shovels. They are, however, made with steel steps on blade of the same gauge as used in the blade, securely riveted on with three rivets. Blades are full polished. Handles, selected Northern Ash, medium lift.

Bullock Brand, price per dozen.....\$17.50
Winfield Brand, price per dozen.....15.50

Bullock Concrete Spades with Step



These spades are intended for use by contractors on concrete form work. When the semi-liquid concrete is poured into the forms, the larger stones find their way to the outside, thus leaving an irregular wall. By using these concrete spades, the stones may be forced back to the center of the form and the holes in the blade permit the liquid concrete to flow to the outside leaving it perfectly smooth.

Bullock Concrete Spades are strictly first quality and are of the socket strap or plain back pattern. Best quality crucible steel blade and straps, carefully tempered. Size of blade $7\frac{1}{2} \times 15$ inches. Selected ash handles either long or wood "D".
Price per dozen.....\$19.00

Spades with Wood "D" or Long Handles



Socket Strap Pattern with step. Blade and strap of highest grade crucible steel carefully tempered, full polished and edges sharpened; size $7\frac{1}{2} \times 12$ inches. Handles of selected Northern ash. Either long or wood "D" handles at same price.

Bullock Brand, price per dozen.....\$15.00
Helmer Brand, price per dozen.....9.00

Ditching and Drain Spades



Ditching and Drain Spades are a specialty with us. They are made with blades of the toughest steel obtainable and extra selected handles (wood "D") only, intended for hard, rough service. Blades full polished. Rigorously inspected before leaving factory.

Length blade, inches.	14	16	18	20
Weight per doz., lbs.	60	63	67	70
Bullock, per dozen	\$21.00	\$21.50	\$22.00	\$22.50
Helmer, per dozen	14.00	14.50	15.00	.....

Moulders' Shovels

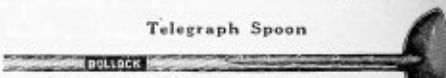
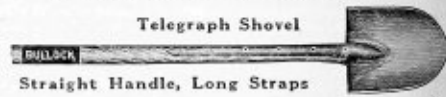


With Regular or
Split Wood "D" Handle

Special attention is called to our Moulders' Shovels. They are made of very high quality steel, and the perfect polish on both back and face of blade permits them to "clean" or shed the sand easily and quickly. The blade and handle are perfectly aligned and the lift is designed to make them accurately balanced. Size of blade $10\frac{1}{2} \times 12$ inches. Furnished with either regular wood "D" or split "D" handle.

Bullock Brand, price per dozen.....\$17.60
Winfield Brand, price per dozen.....15.60
Helmer Brand, price per dozen.....9.50

Telegraph Shovels and Spoons



Straight Handle, Long Straps

Our Telegraph Shovels and Spoons are equal if not superior to any on the market, regardless of price asked. The blades are forged from extra high grade crucible steel and finished black. Plain back; socket strap 22 inches long; fitted with extra heavy fine grade straight grained ash handles. Ninety per cent of all telegraph shovels and spoons are furnished with 8-foot handles. Both 8 and 9-foot are carried, other sizes shipped promptly from factory.

Telegraph Shovels

Size of blade, $9\frac{1}{2} \times 12$ inches.		
Length handle, feet.	8	9
Per dozen, Winfield Brand	\$24.50	\$28.50

Telegraph Spoons

Size of blade, $8\frac{1}{2} \times 9\frac{1}{2}$ inches.		
Length handle, feet.	8	9
Per dozen, Winfield Brand	\$26.00	\$30.00

Hollow Back Shovels



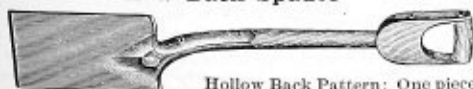
Square Point

Round Point

Hollow Back Shovels are made out of a single piece of steel. There are no welds in their entire construction. They cost less to manufacture than socket strap pattern and are, therefore, lower in price. For general and constant use, however, they are not so satisfactory as the plain back type. Furnished with good quality handles (wood "D" only). Size of blade 9½x11¼ inches. Boughton Brand, full polished; Kongo Brand, black.

Boughton Brand, price per dozen.....\$13.50
Kongo Brand, price per dozen.....8.00

Hollow Back Spades



Hollow Back Pattern: One piece good quality steel blade and socket, selected ash handle.

Boughton Brand, price per dozen.....\$13.50
Kongo Brand, price per dozen.....8.00

Coal or Coke Shovels

Square Point, Wood "D" or Long Handles



The dies from which our Hollow Back Coal Shovels are stamped, were designed from data gathered by diligent research and careful investigation among the actual users of these shovels in the coal fields. The shape of blade is exactly right to meet the approval of a large majority of our customers. The bowl is deep; frog is long and high, giving great capacity and extra stiffness, support and strength, preventing any buckling of blades. Bend in socket gives the proper lift and balance and brings "D" end of handle in the right place (just above knee) when in a shoveling position.

Boughton Shovels are made with a blade of genuine crucible steel 80 per cent carbon content. In Kongo Brand a high grade of open hearth steel is used. Blades are furnished finished black unless otherwise ordered.

Number	1	2	4
Size blade, inches.....	13½x14	14½x14½	14½x16
Weight per dozen, pounds.....	60	70	78
Boughton, price per dozen.....	\$14.00	\$14.50	\$15.50
Kongo, price per dozen.....	8.00	8.50	

Hollow Back Scoops



Steel in blades is of extra high carbon content, giving maximum strength and durability with minimum weight. Good ash handles. Boughton Brand, black finish. Kongo Brand, polished.

Number	Size of Blade, Inches	Boughton Brand, Dozen	Kongo Brand, Dozen
2	11 x 15	\$14.00	\$ 8.00
3	11½ x 15½	14.50	8.50
4	12 x 16	15.00	9.00
5	12½ x 16½	15.50	9.50
6	13 x 17	16.00	10.00
7	13½ x 17½	16.50	10.50
8	14 x 18	17.00	11.00
9	14½ x 18½	17.50	11.50
10	15 x 19	18.00	12.00
12	15 x 20	19.00	13.00

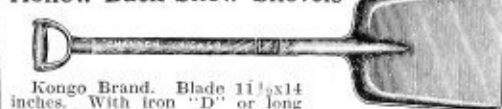
Hollow Back Ore Shovels "D" or Long Handles



Made with the same careful attention to details as our coal shovels. Blade of special steel combines lightness with great strength, black finish. Wood "D" or long handles as desired.

Number	Size of Blade, Inches	Boughton Brand, Dozen	Kongo Brand, Dozen
4	10½x13½	\$14.50	\$12.00
5	11½x13½	15.00	12.50

Hollow Back Snow Shovels



Kongo Brand. Blade 11½x14 inches. With iron "D" or long handles.

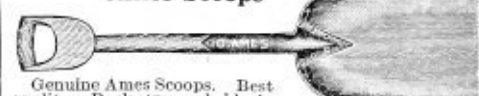
With long handles, price per dozen.....\$7.00
With iron "D" handles, price per dozen.....8.00

Hollow Back Furnace Scoops



Kongo Brand. Blade 9x14 in. Made with wood "D" handles only. Price per dozen.....\$8.00

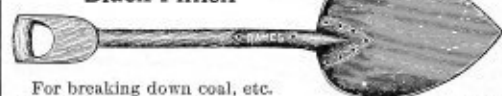
Ames Scoops



Genuine Ames Scoops. Best quality. Back strapped, black. No. 7 is re-enforced, as in cut.

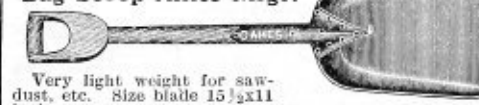
Number	3	4	5	6	7	8	7
Width, in.	11½	12	12½	12¾	13¾	14	13¾
Length, in.	15½	16	16½	17	17	17½	17
Dozen.....	\$19.00	\$19.50	\$20.00	\$20.50	\$21.25	\$22.00	\$22.00

Ames V Pointed Scoops Black Finish



For breaking down coal, etc. No. 8 only. Price per dozen.....\$22.00

Reeds "D" Handle or Bag Scoop Ames Mfr.



Very light weight for sawdust, etc. Size blade 15½x11 inches. No. 3 only. Price per dozen.....\$12.00

Ames Shovels, Black



Square point, "D" handle. Size blade 9¾x11¾ inches. Price per dozen.....\$15.00

Ames Sewer or Brick Shovels

No. 2. Shorter and heavier blade than regular Ames shovel. Price per dozen.....\$15.00

Bullock Coal and Coke Forks Diamond Tines



Our "Bullock Brand" Coal and Coke Forks are forged from one solid piece of steel for the tines, head and shank. Tines are diamond shaped and carefully oil tempered. Wide strap ferrules and heavy caps are used. Strong, selected 30-inch wood "D" handles are regularly furnished or malleable "D" handles, if specially ordered.

In the specifications given below, the width of fork is measured across center, not points of tines.

Coal Forks

Numbers	C110	C112	C112S	C114
Number of tines	10	12	12	14
Length of tines, inches	15	15	15	15
Width of tines, inches	1 1/2	1 1/2	1 1/2	1 1/2
Space between tines, in.	3/4	3/4	1	3/4
Weight per doz., lbs.	84	95	110	105
Price per dozen	\$25.00	\$29.00	\$29.00	\$33.00

Coke Forks

Numbers	K10	K12	K14	K116
Number of tines	10	12	14	16
Length of tines, inches	17	17	17	17
Width of tines, inches	14	18	20 1/2	19 1/2
Space between tines, in.	1 1/2	1 1/2	1 1/2	1
Weight per dozen, lbs.	88	100	110	120
Price per dozen	\$24.00	\$28.00	\$33.00	\$40.00

Bullock Stone or Ballast Forks Square Tines



This fork is a favorite with railroads and quarries for handling broken stone. The tines are made exceptionally strong and the fork is hung to accommodate heavy lifting. Natural finish; finely tempered; wide strap ferrules and heavy caps; wood "D" ash handles.

Numbers	B8	B10	B112	B212
Number of tines	8	10	12	12
Length of tines, inches	13 1/2	13 1/2	13 1/2	13 1/2
Width of tines, inches	10 1/2	14	13	11 1/2
Space between tines, inches	1 1/4	1 1/4	3/4	3/4
Weight per dozen, pounds	74	84	94	85
Price per dozen	\$20.00	\$25.00	\$29.00	\$29.00

Wood "D" Fork Handles



With strap ferrules and caps attached. For coal and coke forks. Weight 24 pounds per dozen.
No. XXWD. Per dozen.....\$6.50

Bullock Four Tine Spading Forks Triangular Tines



Highest grade crucible forged steel polished tines, bronzed finish, angular (or diamond back) shape, tempered and thoroughly tested. Length of tines about 11 inches. Handles are selected, second growth hardwood, 1 3/4 inches in diameter, with malleable "D" grip. Approximate weight 54 pounds per dozen.

No. 1. Plain ferrule, per dozen	\$21.75
No. 2. Strap ferrule, per dozen	23.75

Bullock Manure Forks Oval Tines



Four full polished, bronze finish, oval tines. Length 12 inches. Handles either plain, 4 1/4 feet long or malleable "D", 1 3/4 inches in diameter. Weight about 41 pounds per dozen.

No. Y44 1/2. Plain ferrule, 4 1/2-foot handle:	
Price per dozen	\$15.50
No. Y4D. Plain ferrule, malleable "D" handle:	
Price per dozen	16.75

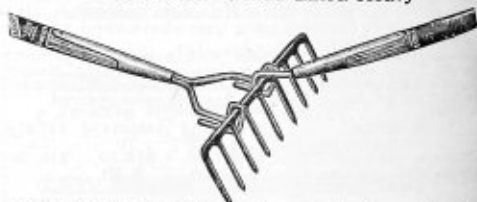
Steel Asphalt or Tar Rakes



Square, straight shank, 18 inches long. Strap ferrule. Black finish. Head and shank made of the best crucible forged steel. Fourteen straight teeth. Handles of selected ash, 5 feet long. Weight about 66 pounds per dozen.

No. A14, price per dozen	\$26.50
--------------------------	---------

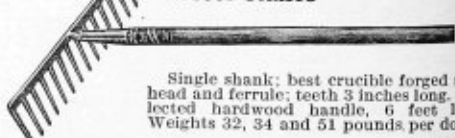
Two-Man Rake Blue Finish—Made Extra Heavy



This is an especially good road rake for contractors. Operated by two men, it levels a load of broken stone in a quarter the time required by the old way. It is exceptionally strong and well made to withstand the rough service for which it is intended. It has nine 6-inch teeth. Head 14 1/2 inches wide. Handles of hardwood, 6 feet long. Weight 125 pounds per dozen.

No. 2M9. Price per dozen	\$56.00
--------------------------	---------

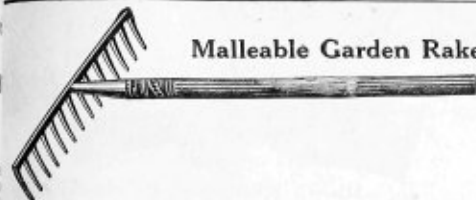
Steel Rakes



Single shank; best crucible forged steel head and ferrule; teeth 3 inches long. Selected hardwood handle, 6 feet long. Weights 32, 34 and 51 pounds per dozen.

	Per Doz.
No. S12. 12 teeth, Garden	\$16.25
No. S14. 14 teeth, Garden	17.75
No. S16. 16 teeth, Road	19.25

Malleable Garden Rakes



Single shank, blue finish, straight teeth, handle 5½ feet long, weight, No. M.S.12, 27 pounds per dozen.
No. MS12. 12 teeth. Price per dozen \$6.00
No. MS14. 14 teeth. Price per dozen 6.50
No. MS16. 16 teeth. Price per dozen 7.00

Mortar Hoes



Special crucible forged steel tempered, polished blade. Gold bronzed ferrule, cap and shank. Solid shank, 10-inch blade, selected 6-foot handle. Weight about 52 pounds per dozen.
No. MR10. Price per dozen \$25.40

Garden Hoes



Crucible steel, polished blade, size 7x4½ inches. Solid shank or solid socket as desired. Illustration shows solid socket. Bronze finish. Selected handles 4½ feet long. Weight 27 pounds per dozen.
No. YG7. Solid shank. Price per dozen \$13.25
No. YSG7. Solid socket. Price per dozen 14.75

Side Walk Cleaners



Solid steel blade and shank. Extra heavy blade with bead on both sides, vermilion finish. Blade about 7x8. Handle about 1½ inches in diameter, 4½ feet long. Weight 43 pounds per dozen.
No. SSC. Price per dozen \$8.00

Kongo Side Walk Cleaners



Pressed out of one piece of steel. Blade 7 inches. Handle 4½ feet long.
Price per dozen \$4.00

Post Hole Augers



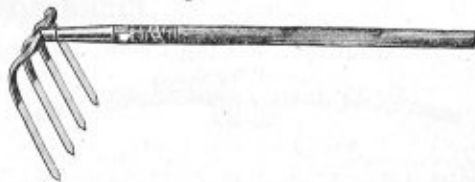
Steel pipe handles. Forged steel blades. Malleable iron tops and points painted black. inches long by ½ inch thick. Handle 44
Size, inches. 4 6 8 10 12 14
Regular post hole
Price per doz. \$18.00 \$18.00 \$18.00 \$18.00
For telegraph poles, heavy, 5 ft. handle, each. \$7.00 \$8.00 \$ 9.00
8 ft. handle, each. 8.00 9.00 10.00



Union Boot Protector

For use in excavating, trench and railroad work. Made of sheared steel, rust proof. Fitted with webbing strap.
Price per dozen \$7.00

Steel Hop or Stone Hooks



Highest grade crucible forged steel tines. 8½ inches long, extra heavy, oil tempered and tested. Diamond back shape. Solid steel head and shank. Steel ferrule. Bronze finish. Selected 5-foot handles. Weight 45 pounds per dozen.
No. 45H. Price per dozen \$22.50
No. 4M. Manura, 4 tines, 6-foot handle. \$17.50

Mortar Mixer Hoes



Solid shank. Full polished blade, with two holes as shown, size of blade 6x10 inches. Bronze finish. Handle 6 feet long. Weight 55 pounds per dozen.
No. MM10. Price per dozen \$27.90

Turf Edgers



Crucible forged steel polished and sharpened blades. Bronze finish steel ferrule and cap. Solid shank. Selected 4-foot handle. Weight 30 pounds per dozen.
No. TE. Price per dozen \$11.50

Railroad Scuffle Hoes



Special forged steel tempered blade, bronze finished steel cap. Selected straight 5-foot handle. Heavy malleable shank. Size of blade 4x8½ inches. Weight 46 pounds per dozen.
No. RSH. Price per dozen \$12.00

Post Hole Diggers



Eureka Pattern

No. C2. Eureka Pattern. Half round handles; steel blades; size 9¼x4¼ inches; 14 gauge. Digs holes 6 inches diameter. Handles 4 feet long. Weight per dozen 120 pounds. Packed three to a bundle.
Price per dozen \$13.50

Hercules Pattern



No. C3. Hercules Pattern. Steel blades. Malleable handle sockets bolted to round hardwood handles 4 feet long. Blades 9¼x4¼ inches; 14 gauge. Digs holes 6 inches in diameter. Weight per dozen 120 pounds.
Price per dozen \$21.00

Picks and Mattocks

Railroad or Clay Picks



With Tool Steel Points

Adze eye—pick and chisel point—high grade solid steel. The points of these picks are made of the best quality tool steel. Will give better and longer service than two ordinary picks. Especially adapted for working in rock and brick. Takes standard railroad pick handle.

Weight 7½ pounds. Price per dozen. \$16.00
Weight 8½ pounds. Price per dozen. 18.00

No. 33 Standard Dirt Picks



Point and Chisel

Furnished in the 6 to 7-pound size, unless otherwise ordered.

Weight 5 to 6 pounds. Price per dozen. \$14.00
Weight 6 to 7 pounds. Price per dozen. 15.00
Weight 7 to 8 pounds. Price per dozen. 16.00
Weight 8 to 9 pounds. Price per dozen. 18.00
Weight 9 to 10 pounds. Price per dozen. 20.00

Railroad Tamping Picks



High grade solid steel. V head, adze eye.
Weight 6 to 7 pounds. Price per dozen. \$18.00
Weight 8 to 9 pounds. Price per dozen. 20.00

Drifting Picks



Adze eye. Points of best grade crucible tool steel.
Weight 4½ pounds. Price per dozen. \$15.00
Weight 6 pounds. Price per dozen. 17.50

Short Ear Coal Picks



Cutting and mining shape. Tool steel points, soft steel center. Adze eye.
Weight 3½ pounds. Price per dozen. \$10.00
Weight 4½ pounds. Price per dozen. 11.00

Poll Picks



Solid hard steel, tempered, crucible steel points.
Weight 3½ pounds. Price per dozen. \$15.00
Weight 4½ pounds. Price per dozen. 17.00

Wrecking Picks



Similar to poll pick, but has a railroad pick eye. Used for prying and stripping, lifting, etc. Solid hard steel.
Weight 5 pounds. Price per dozen. \$18.50

Cutter Mattock



Best tempered steel. Made for service and durability. Long or short cutter. Specify which is wanted.

Style	Weight Pounds	Size Blade, in.	Size Cutter, in.	Price Per Doz.
Short cutter	5	3½x7½	2½x4½	\$16.00
Long cutter	6	3½x7½	2½x5½	16.00

Pick Mattock



Same as above, but with pick end of hardened steel.
Weight, Pounds. Size Blade, in. Size Pick, in. Price per Doz.
5½ 7½x3½ 8½ \$16.50

Special Asphalt Mattock



This make is made with best quality crucible steel point and cutter. Intended for hard service. Oil finished.

Weight 9 pounds. Price per dozen. \$25.00

Asphalt Mattock



Asphalt mattocks with double cutters are sometimes called asphalt axes. Oil finished.

Weight 8 pounds. Price per dozen. \$24.00

Poll Mattock



A very handy combination tool. Designed for contractors. Made of high grade steel.

Weight 5 to 7 pounds. Price per dozen. \$25.00

Contractors' Caisson Grub Hoe



A superior tool of the highest grade, for difficult digging and cutting work. Eye is shaped for regular pick handle. Body of hoe made of soft steel, heavy and strong. Blade of crucible steel securely inserted and welded to eye. Extra heavy for hard pan; 8 pounds; 3x12 inches.
Price per dozen. \$45.00



Grub Hoe

Adze eye. Made of good quality steel and properly tempered.

No.	Weight, Pounds	Size, Inches	Price per Doz.
1	3½	3½x10½	\$13.00
2	4	4x11½	13.50
3	4½	4½x11½	14.00

Heavy pattern; 5 pounds; 4½x11½ inches.
Price per dozen. \$18.00

Tool Handles

We take particular pride in both the quality and the size of our stock of tool handles. This section of our business has grown to large proportions, because of the uniformly high quality of the handles and our ability to make immediate shipments from our immense stock. The illustrations below have been made from actual photographs and accurately show the proportions of the different sections of the handles. Only the styles generally called for are shown and carried in stock. The approximate weights quoted are net and do not include packing.

Grades

Extra Grade: Carefully carved from second growth hickory with wax finish; absolutely clear and white and free from all imperfections. For those who demand and expect the very best.

No. 1 Grade: Second growth hickory; plain finish; small sound knots permitted, but otherwise free from blemish and strictly serviceable.

Hammer Handles
Extra Grade Only

Adze Eye Nail

Packed 5 dozen in a case



Length, inches.....	14
Weight per dozen, pounds.....	5
Price per dozen.....	\$2.25

Riveting



Length, inches.....	12
Weight per dozen, pounds.....	3
Price per dozen.....	\$2.00

Machinists'



Length, inches.....	14	16	18
Weight per dozen, pounds.....	3½	4	4½
Price per dozen.....	\$2.25	\$2.50	\$2.65

Blacksmiths'



Length, inches.....	18	20	22	24
Weight per doz., pounds.....	6	7	8	9
Price per dozen.....	\$1.60	\$1.80	\$2.00	\$2.20

Hatchet Handles
Extra Grade Only

Broad

Packed 5 dozen in a case



Length, inches.....	18
Weight per dozen, pounds.....	8½
Price per dozen.....	\$2.75

Regular



Length, inches.....	14
Weight per dozen, pounds.....	6
Price per dozen.....	\$2.25

Axe Handles

Packed 2 dozen in a case



Single Bit, Oval



Double Bit, Oval



Boys' Axe Handle

Kind	Single Bit	Double Bit	Boys
Length, inches.....	36	36	28
Weight per dozen, pounds.....	16	18	13
Price per dozen, Extra Grade.....	\$9.80	\$9.80	\$6.80
Price per dozen, No. 1 Grade.....	4.90	4.90	3.90

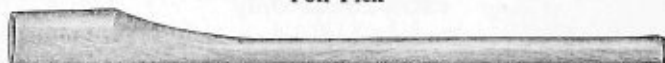
Railroad Pick Handles

Length 36 inches. Packed 5 dozen in a crate. Weight about 30 pounds per dozen.

Extra Grade, price per dozen.....	\$11.50	No. 1 Grade, price per dozen.....	\$6.00
Excelsior Grade, price per dozen.....	8.00		

Mining Pick Handles
Extra Grade Only

Drifting and Coal Miners

**Poll Pick**

Drifting and Coal Miners'

Poll Pick

Length 34 inches. Price per dozen.....	\$9.80	Length 34 inches. Price per dozen.....	\$9.80
Packed 5 dozen in a case. Weight about 25 pounds per dozen.			

Sledge, Tool and Maul Handles

Extra Grade

No. 1 Grade

Length 30 inches. Weight about 13 pounds per dozen.

Length 30 inches. Weight about 13 pounds per dozen.

Price per dozen..... \$5.60

Price per dozen..... \$3.70

Length 36 inches. Weight about 16 pounds per dozen.

Length 36 inches. Weight about 16 pounds per dozen.

Price per dozen..... \$6.70

Price per dozen..... \$4.00

Packed 5 dozen in a case.

Grub Hoe Handles
Extra Grade Only



Length 36 inches. Weight about 30 pounds.

Price per dozen..... \$11.50

Adze Handles for Railroad, House Carpenter and Ship Adzes
Extra Grade Only



Length 34 inches. Weight about 18 pounds per dozen.

Price per dozen..... \$10.10

All weights quoted above are approximate only and are net; weights of packing not included.

Shovel, Spade and Scoop Handles

Wood "D" Handle for Chisholm Shovel-Spade or Scoop



Straight or Bent, for Hollow or Open Pattern.
Length 27½ Inches

	Price Each	Price per Doz.
Bent.....	\$0.41	\$4.10
Straight.....	.41	4.10

Regular "D" Ames Bend for Socket and Backstrap Pattern



Length 30 inches.

Each.....	\$0.42
Per dozen.....	4.25

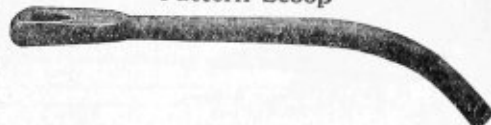
Wood "D" Spade for Socket and Backstrap Pattern Shovel



Length 30 inches.

Each.....	\$0.41
Per dozen.....	4.10

Wood "D" Scoop for Backstrap Pattern Scoop



Length 29 inches.

Each.....	\$0.42
Per dozen.....	4.25

Wood "D" for Coal and Coke Forks



With caps and strap ferrule.

Each.....	\$0.65	Per dozen.....	\$6.50
-----------	--------	----------------	--------

Malleable "D's" Manure and Spading Fork



Bent, Bored and Chucked

Each.....	\$0.33
Per dozen.....	3.25

Long Handles

Ames or Regular Bend for Socket and Backstrap Shovels



Length 4½ feet.

Each.....	\$0.41	Per dozen.....	\$4.10
-----------	--------	----------------	--------

Hay Fork Handles



Chucked and bored

Length, feet	Each	Per Doz.
4	\$0.17	\$1.65
4½	.18	1.75
5	.20	2.00
6	.26	2.60

Telegraph Shovel and Spoon Handles



We carry 8-foot XX grade only in stock.

Shovel Handles

Spoon Handles

Length, Feet	Each	Per Dozen	Length, Feet	Each	Per Dozen
8	\$1.25	\$12.50	8	\$1.35	\$13.50
9	1.65	16.50	9	1.75	17.50
10	2.05	20.50	10	2.15	21.50

Malleable "D" Tops

For Shovel and Fork Handles



No. 1 Wood Head

Style

Per Doz. Each

No. 1. Wood grip, malleable fork and socket.....

\$2.00 \$0.20

No. 2. All iron for railroad tamping.....

3.00 .30



No. 2 Iron Head

H. Channon Company Chicago

Bellows



Our Hand Bellows are made of lightweight kiln-dried lumber and sheepskin leather. They can be used in household, office or factory. Will remove dust from pianos, typewriters and other places difficult to reach.

Our Standard Moulders' Bellows have boards fastened together with steel hinge which relieves the leather from strain. Covered with heavy sheepskin. Nozzle of galvanized iron reinforced to keep its shape.

Hand Bellows			Moulders' Bellows		
Size, Inches	Weight per Dozen, Pounds	Price per Dozen	Size, Inches	Weight per Dozen, Pounds	Price per Dozen
6	15	\$12.00	10	40	\$20.00
8	20	16.00	12	50	26.00
10	30	20.00	14	60	32.00
			16	70	36.00

Salamanders

For Builders, Contractors, Shops, Etc.



These Salamanders are substantially designed and made for hard service. The pan, body and legs are of heavy steel, and the grates of cast iron. The ash pan is raised a good distance from the ground and projects past the edge of shell so as to prevent the coals dropping out. Fitted with handles for convenience in moving about.

For temporary heating in cold weather or for use in buildings where the regular source of heating is not available, these salamanders will be found extremely useful and economical. The fuel ordinarily used is coke.

Diameter of body, 16 1/4 inches. Height of body, 15 inches. Total height 28 1/2 inches.

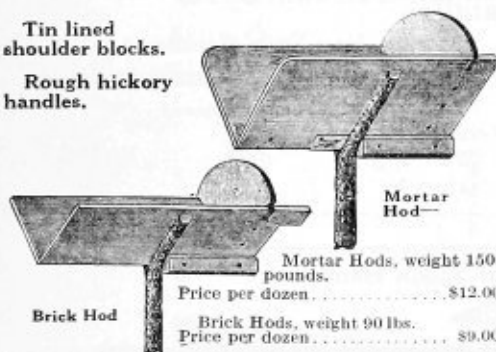
With body of 16-gauge iron, price each.....\$4.00
 With body of 18-gauge iron, price each.....3.50
 Hood for salamander, extra each.....2.00
 Extra grates, price each.....1.00



Wooden Mortar and Brick Hods

Tin lined shoulder blocks.

Rough hickory handles.



Mortar Hods, weight 150 pounds.
 Price per dozen.....\$12.00
 Brick Hods, weight 90 lbs.
 Price per dozen.....\$9.00

Steel Mortar and Brick Hods

Strongly reinforced on edges and at dumping point.

No. 162 size: 23x7x10 inches.
 Weight with handle about 8 lbs.

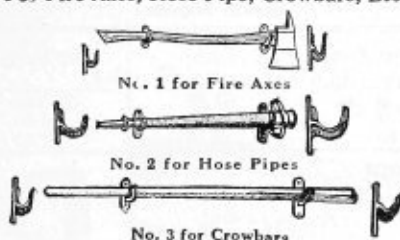


Brick Hod No. 162
 Extra strong and durable.
 Double reinforced.

No. 158, size 24x11 1/4x12 inches.
 Weight with handle, about 11 lbs.
 No. 158 Mortar Hod.
 Price per dozen.....\$18.00
 No. 162 Brick Hod.
 Price per dozen.....\$14.00

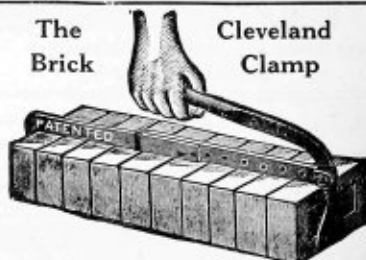
Underwriter Brackets

For Fire Axes, Hose Pipe, Crowbars, Etc.



Furnished in the sheardized malleable iron
 Price per set, either style.....\$0.70
 Per dozen sets.....7.00

The Brick Cleveland Clamp



This brick clamp does away with the necessity of handling bricks by hand, and is both convenient and practical where bricks are used in any quantity. Substantially made for hard usage and adjustable for a large variation in loading.
 Price per dozen.....\$40.00

Bullock Warranted Anvils

Wrought Base, Solid Crucible Tool Steel Face



General Blacksmiths
Pattern

Our Bullock Anvil is strictly an American product, and because of this is sold on its merits alone and not upon tradition. While the principal features of manufacture are essentially the same as the Peter Wright, it varies in one important particular, i. e., the face is made in one piece, whereas the old English method was to weld the face on in sections about six inches in length, a fair sized anvil requiring several sections to complete the face.

With the single exception of the face, the Bullock anvil is made in exactly the same manner as the famous old Mousehole and Peter Wright, but with newer and better equipment. The process of manufacturing the Bullock anvil is as follows: The base or bottom part is formed by piling up scrap iron, carefully selected, of course, and welding into a solid mass. While still hot it is placed in a die and blocked to shape, the power used being steam. The whole of the upper part including the horn and tail, is also forged from selected scrap. Next the tool steel face is welded on, the hardy and pritchel holes punched, the tail or heel squared and the horn finished to shape. The two pieces, base and upper part are then welded together at the waist. The anvil is then thrown on a finishing block and finished so far as forging goes, with hand tools.

The Bullock is an anvil with horn and heel in perfect proportion, large base that does not require strapping, tempered edges to prevent chipping, level and true face of correct size, also hardy and pritchel holes and other mechanical details of correct accuracy. In addition to this it has the proper resilience between anvil and hammer and a real musical ring. Its proportions overall are correct, its design is graceful, and above all it is stable on the block. Every-thing considered it is



Farrier's Cliphorn Pattern

The Ideal Anvil for Particular Workmen

Size No.	Nominal Weight, Pounds	Variation in Weight, Pounds	Size of Face, Inches	Purpose	Hardy Hole	Farrier's Cliphorn Price Each	General Blacksmiths' Price Each
160	75	70 to 80	3 1/2 x 12 1/2	Light repair work	1 1/2		\$12.50
161	100	95 to 105	3 1/2 x 13 1/2	Farmers' size	1 1/2		15.75
162	125	120 to 130	3 3/4 x 15	General blacksmith's and horse-shoers', contractors' sizes for ordinary work	1 1/2	\$16.00	19.50
163	150	145 to 160	4 x 16		1 1/2	25.50	24.00
164	200	195 to 210	4 1/4 x 17 1/2		1 1/2	33.50	31.50
165	250	240 to 260	4 3/4 x 19		1 1/2		39.00
166	300	290 to 310	5 x 20		1 1/2		46.50
167	350	340 to 360	5 1/2 x 22	Machine and heavy forge work	1 1/2		54.00
168	400	390 to 415	5 1/2 x 24		1 1/2		62.25
169	500	475 to 525	6 x 26		1 1/2		78.75

Vulcan Anvils

Cast Iron Base—Tool Steel Face

These anvils are cheaper than our Bullock warranted anvils, but for occasional use will give satisfactory service.

The body or base is made of Lake Superior charcoal iron of superior mixture—no scrap used.

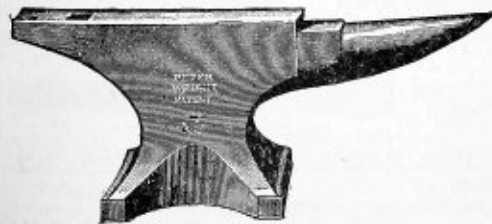
The face is one solid piece of tool steel thoroughly welded to body by special process.

Face is ground tempered and polished.

Horn is covered with and its extremity made entirely of tough untempered steel.



Number	Approximate Weight, Pounds	Size of Face, Inches	Hardy Hole	Pritchel Hole	Purpose	Price Each
3	30	2 3/4 x 7 1/2	1 1/2	3/8	Very light repair work	\$ 4.50
4	40	3 x 7 1/2	1 1/2	3/8		5.25
5	50	3 x 8 1/2	1 1/2	3/8		6.00
6	60	3 1/4 x 10 1/2	1 1/2	3/8		6.50
8	80	3 1/4 x 11 1/2	1 1/2	3/8		8.00
10	100	3 1/2 x 12 1/2	1 1/2	3/8	Farmers and contractors use, light blacksmithing, etc.	10.00
12	120	3 3/4 x 13	1 1/2	3/8		12.00
15	150	4 x 14	1 1/2	3/8		15.00



Peter Wright Anvils

Imported, English

Wrought Iron With Steel Face

Sizes 85 to 500 pounds, base price	Market
Sizes 71 to 84 pounds, add to base price, per pound	\$0.01
Sizes 61 to 70 pounds, add to base price, per pound	.01 1/2
Sizes 51 to 60 pounds, add to base price, per pound	.02
Sizes 50 pounds and lighter add to base price, per pound	.03
Farrier's pattern, 147 to 160 pounds, add per pound	.01

Blacksmiths' Anvil Tools

Highest grade, forged from well designed dies. Uniform in size and weight. Properly heat-treated and tempered for the purpose intended. All scale is removed—the tools are sand blasted and finished in black paint—baked on.



B. S. Top Swages. (Average Length 5 to 6½ inches)

For shaping, sizing and smoothing round forgings.												
Size, inches	1½-2	2-2½	2½-3	3-3½	3½-4	4-4½	4½-5	5-5½	5½-6	6-6½	6½-7	7-7½
Weight each, pounds	1½	2½	3½	4½	5½	6½	7½	8½	9½	10½	11½	12½
Price each	\$0.90	\$0.90	\$1.00	\$1.15	\$1.15	\$1.25	\$1.45	\$1.55	\$1.75	\$2.00	\$2.35	\$2.50

B. S. Bottom Swages. (Average Length 4 to 5½ inches)

For shaping, sizing and smoothing round forgings.												
Size, inches	1½-2	2-2½	2½-3	3-3½	3½-4	4-4½	4½-5	5-5½	5½-6	6-6½	6½-7	7-7½
Weight each, pounds	1½	2½	3½	4½	5½	6½	7½	8½	9½	10½	11½	12½
Price each	\$0.90	\$1.00	\$1.00	\$1.15	\$1.15	\$1.25	\$1.45	\$1.55	\$1.75	\$2.00	\$2.35	\$2.50



B. S. Hardies. (Polished Bits.)

For cutting off forgings.

We must know size of shank wanted, otherwise we send 1-inch shank, which is standard.

Size of shank, inches	1	1½	2	2½	3	3½	4	4½	5	5½	6	6½
Width of bit, inches	1½	2½	3½	4½	5½	6½	7½	8½	9½	10½	11½	12½
Length over all, inches	1½	2½	3½	4½	5½	6½	7½	8½	9½	10½	11½	12½
Weight each, pounds	1½	2½	3½	4½	5½	6½	7½	8½	9½	10½	11½	12½
Price each	\$0.45	\$0.50	\$0.55	\$0.60	\$0.60	\$0.60	\$0.60	\$0.60	\$0.60	\$0.60	\$0.60	\$0.60

B. S. Top Fullers

For necking, grooving and drawing down forgings.

Size, inches	1½-2	2-2½	2½-3	3-3½	3½-4	4-4½	4½-5	5-5½	5½-6	6-6½	6½-7	7-7½
Weight each, pounds	1½	2½	3½	4½	5½	6½	7½	8½	9½	10½	11½	12½
Price each	\$0.90	\$0.90	\$1.00	\$1.15	\$1.15	\$1.25	\$1.45	\$1.55	\$1.75	\$2.00	\$2.35	\$2.50

B. S. Bottom Fullers. (Average Length 4 to 5 inches)

For necking, grooving and drawing down forgings.

Size, inches	1½-2	2-2½	2½-3	3-3½	3½-4	4-4½	4½-5	5-5½	5½-6	6-6½	6½-7	7-7½
Weight each, pounds	1½	2½	3½	4½	5½	6½	7½	8½	9½	10½	11½	12½
Price each	\$0.90	\$1.00	\$1.00	\$1.15	\$1.15	\$1.25	\$1.45	\$1.55	\$1.75	\$2.00	\$2.35	\$2.50

We must know size of shank wanted—otherwise we send 1-inch shank.

B. S. Cold Chisels

Width of bit, inches	1	1½	2	2½	3	3½	4	4½	5	5½	6	6½
Length, inches	5½	6½	7½	8½	9½	10½	11½	12½	13½	14½	15½	16½
Weight each, pounds	1½	2½	3½	4½	5½	6½	7½	8½	9½	10½	11½	12½
Price each	\$0.55	\$0.65	\$0.75	\$0.90	\$1.00	\$1.50	\$1.60	\$1.80				

B. S. Hot Chisels

Width of bit, inches	1	1½	2	2½	3	3½	4	4½	5	5½	6	6½
Length, inches	5½	6½	7½	8½	9½	10½	11½	12½	13½	14½	15½	16½
Weight each, pounds	1½	2½	3½	4½	5½	6½	7½	8½	9½	10½	11½	12½
Price each	\$0.55	\$0.65	\$0.75	\$0.90	\$1.00	\$1.50	\$1.60	\$1.80				

B. S. Flatters

For smoothing and finishing flat forgings.

Size of face, inches	2	2½	3	3½	4	4½	5	5½	6	6½	7	7½
Length over all, inches	4½	5	5½	6	6½	7	7½	8	8½	9	9½	10
Weight each, pounds	2½	3½	4½	5½	6½	7½	8½	9½	10½	11½	12½	13½
Price each	\$1.10	\$1.25	\$1.45	\$1.60	\$1.80	\$2.15	\$2.50	\$3.00				

B. S. Set Hammers

For setting down the metal in a forging to form a square corner at point where section changes.

Face, inches square	1	1½	2	2½	3	3½	4	4½	5	5½	6	6½
Length, inches	5	5½	6	6½	7	7½	8	8½	9	9½	10	10½
Weight, pounds	1	1½	2	2½	3	3½	4	4½	5	5½	6	6½
Price each	\$0.75	\$0.80	\$0.90	\$1.00	\$1.15	\$1.45	\$1.60					

B. S. Round Eye Punches. (Length about 8 inches)

Diameter of point, inches	1½	2	2½	3	3½	4	4½	5	5½	6	6½	7
Weight each, pounds	\$0.75	\$0.75	\$0.75	\$0.75	\$0.75	\$0.90	\$1.00	\$1.10	\$1.25			

B. S. Eye Center Punch

Length 6 inches, weight 2 pounds, price each.....\$1.35

B. S. Heading Tools

For holding bolts while forming the head. Lengths range from 12½ to 14½ inches.

Diameter of hole, inches	1½	2	2½	3	3½	4	4½	5	5½	6	6½	7
Weight each about, pounds	2½	3½	4½	5½	6½	7½	8½	9½	10½	11½	12½	13½
Price each	\$1.25	\$1.25	\$1.25	\$1.25	\$1.25	\$1.25	\$1.55	\$1.55	\$1.80	\$1.80		

Toe Knives

Weight 8 lbs. to doz.
Price each.....\$0.90

Buffers

Weight 6½ lbs. to doz.
Price each.....\$0.90

Pritchels

Weight 10 lbs. to doz.
Price each.....\$0.60

Blacksmiths' Tongs, Etc. (Tongs are measured overall)

Drop Forged from Solid Steel—Uniform in Size and Weight—Good Design

Straight Lip Tongs

For Flat Thin Work



Heavy stock in jaws. Can be shaped by blacksmith to suit his individual needs.

Number	11	12	13	14	15	16
Length, inches	16	18	20	22	24	30
Weight, pounds	1½	2	2½	2¾	3	4½
Price pair	\$0.75	\$0.80	\$0.85	\$0.90	\$0.95	\$1.10

Bolt Tongs

For Round Work



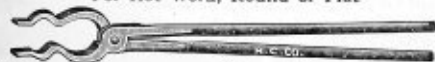
Opening behind jaws gives space for head of bolt.

Number	17	18	19	20	21
Holds rounds	1½	1¾	2	2¼	2½
Length, inches	18	18	20	20	22
Weight, pounds	1½	1¾	2	2¼	2½
Price, pair	\$0.90	\$0.90	\$1.00	\$1.00	\$1.20

Number	22	23	24	25	26
Holds rounds	¾	¾	1	1½	1½
Length, inches	22	24	24	24	24
Weight, pounds	2½	3	3	3¾	3½
Price, pair	\$1.20	\$1.40	\$1.40	\$1.40	\$1.40

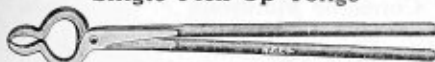
Double Pick-Up Tongs

For Hot Work, Round or Flat



Number	27	28	29	30
Length, inches	18	20	22	24
Weight, pounds	2½	2¾	3	3½
Price, pair	\$1.20	\$1.30	\$1.35	\$1.50

Single Pick-Up Tongs



For hot work. Jaws are larger than double pick-up and will handle heavier work.
No. 31. Length 22 inches, weight 2½ pounds, pair..... \$1.50

Welding Compounds



The Best Flux known for Welding



And MALLEABLE Iron to Cast

PREPARED ESPECIALLY FOR WELDING
FAR SUPERIOR TO COMMON BORAX

We carry in stock a number of brands of welding compounds, four of which are given here. These can be furnished in any quantity desired.

Prices per Pound

Boxes, Pounds	Boraxette	Climax	E-Z	Cherry Heat
25	\$0.14	\$0.14	\$0.14	\$0.22
10	.18	.18	.18	.26
5	.18	.18	.18	.26

Gad Tongs



For General Forging Purposes

Number	32	33	34	35
Length, inches	18	20	22	24
Weight, pounds	2½	2¾	3	3½
Price, pair	\$0.90	\$1.00	\$1.15	\$1.30

Horseshoers' Tongs

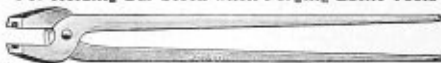
For Holding Horseshoes. Jaws Recessed on Inside



Number	36	37	38
Length, inches	12	14	16
Weight, pounds	1	1½	1½
Price, pair	\$0.75	\$0.80	\$0.85

Lathe Tool Tongs

For Holding Bar Stock when Forging Lathe Tools



Number	39	40	41	42	43
Holds	¾x3½	¾x3½	1x1½	1x1½	1½x3½
Length, inches	16	18	20	22	24
Weight, lbs.	2½	2¾	2¾	3	3½
Price, pair	\$2.25	\$2.40	\$2.55	\$2.80	\$3.00

Blacksmiths' Pincers

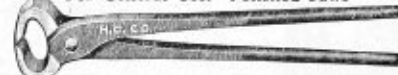
For General Use, Shop and Farm. Polished Jaws



Number	44	45	46
Length, inches	10	12	14
Weight, pounds	1½	1¾	2
Price per pair	\$0.60	\$1.00	\$1.20

Nail Cutting Nippers

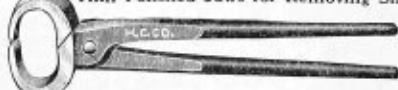
For General Use. Polished Jaws



Number	47	48
Length, inches	12	14
Weight, pounds	1½	2
Price per pair	\$1.50	\$1.60

Farriers' Pincers

Thin Polished Jaws for Removing Shoes



Number	49	50
Length, inches	13	14
Weight, pounds	2½	2¾
Price per pair	\$1.30	\$1.50

Hoof Parers

Full Polished. Counterbored Joint



Flat lip is offset to avoid possibility of binding. Cutting lip is as light as practical.

Number	51	52	Weight, pounds	2½	2½
Length, inches	12	14	Price each	\$2.40	\$2.90

Cast Iron Swage Blocks

Made of Strong Iron, Cast Smoothly and Accurately to Pattern



Shape of Nos. 1, 2 and 3



Shape of Nos. 1 1/2, 2 1/2 and 3 1/2



Shape of Nos. 4 and 4 1/2

Number	0	0 1/2	1	1 1/2	2	2 1/2	2 3/4	3	3 1/2	4	4 1/2	5
Length, inches	19 1/2	15	14	12 1/2	14 1/2	13 1/4	14 1/8	15	16	15	18	24
Width, inches	14	15	10	12 1/2	11 1/8	13 1/4	14 1/8	11 1/8	16	15	18	24
Thickness, inches	4	4	3 3/4	4	3 3/4	4 1/4	4	4 3/8	4 1/2	4	4 3/8	6
Round holes range	1 1/2-2 1/4	1-3 1/2	1-2	1-2 1/4	1-2	1-2 1/4	1 1/2-2 1/4	1-2	1-2 1/4	1-2 1/4	1 1/2-2 1/4	1 1/2-2 1/4
Square holes range	1 1/2-2 1/4	1 1/2-2	1 and 2	1-2 1/4	1 and 2	1-2 1/4	1 1/2-2 1/4	1 and 2	1-2 1/4	1 1/2-2 1/4	1 1/2-2 1/4	1 1/2-2 1/4
Approximate weight, pounds	170	123	106	100	126	135	148	143	198	164	255	675
Price each	\$17.00	\$12.30	\$10.60	\$10.00	\$12.60	\$13.50	\$14.80	\$14.30	\$19.80	\$16.40	\$25.50	\$67.50

Rectangular Holes.—No. 0 has 2 1/2x13; No. 0 1/2 has 1 1/2x2 1/2, 3/4x4, 1 1/4x4, 1 1/2x4 and 3/4x4 1/4; No. 1 1/2 has 1x3 and 1 1/2x3 1/2; No. 2 1/2 has 1 1/2x3 and 1 1/4x3 1/2; No. 2 3/4 same as No. 2 1/2; No. 3 1/2 has 1x3 and 1 1/2x3 1/2; No. 4 has 3/4x3 1/4 and 1 1/2x4; No. 4 1/2 has 1 1/2x3 and 1 1/4x4; No. 5 has 1 1/2x3, 1x4 and 1 1/2x5. **Triangular Holes.**—No. 0 1/2 has 2 1/2x3 1/4. **Hex. Hole.**—No. 0 1/2 has 1 1/2.

The above does not include grooves around the outside.

Leveling Blocks

Made of superior pig iron and accurately **planed** on one side, unless otherwise ordered.

Can supply solid or ribbed pattern. The ribbed blocks are cast hollow and are consequently lighter—weight about 1 pound to 4 cubic inches, ribbed blocks about 1/2 less.

Can be furnished 12 to 80 inches long by 10 to 28 inches wide by 1 1/2 to 5 inches thick.

Price solid pattern, planed one side, per pound \$0.06

Price ribbed pattern, planed one side, per pound06 1/2

Solid pattern can be furnished planed both sides and all edges at extra cost.



Plain Cheney's

Blacksmiths' Cones or Mandrels

Cast round and smooth. Well adapted for forming rings, bands or similar work.

Cheney's Patent has slot, very convenient for holding iron when bending rings. They are strengthened with ties inside the slot.

Height, Inches	Diameter at Base, Inches	Diameter at Top, Inches	Plain			Cheney's		
			No.	Weight	Price	No.	Weight	Price
32	8	1		55	\$ 5.50	11	60	\$ 6.00
40	10	1	1 1/2	90	9.00	11 1/2	100	10.00
48	12	1	2	115	11.50	12	125	12.50
52	14	1	3	140	14.00	13	150	15.00
54	16	2	4	200	20.00	14	220	22.00
50	24	5	5	451	45.00			

Champion Whirlwind Blast Tuyere Iron



Whirlwind Blast

Produces a circular rotary blast and prevents the heat from going to waste up the chimney. Concentrates the blast and heat in tuyere nest, making a hotter fire. Also has revolving pick which keeps slot free of clinkers. Dimensions are: Depth, 5 inches; width, 8 1/4 inches; length, 10 1/2 inches; over all, 12 3/8x14 1/4 inches. Weight 60 pounds.

Price each \$6.00

Champion Tuyere Irons Patent Adjustable Nozzle



Made with large inlet for free access of air. The small necked patterns should not be used except with bellows or positive blow.

Price each \$2.50

Warren's Tuyere Iron



Blast is regulated by revolving a ball, which has three unequal sides. Open bottom valve and all cinders and ashes drop out.

Weight about 31 pounds. Price each \$2.50

Norton's Tuyere Iron



To regulate, turn large rod. Levers and springs can be easily changed for right or left hand use. Draw out small rod to drop ashes.

Weight about 27 pounds. Price each \$2.50

Duck Nest Tuyere Iron



Single Pattern

No.	Style	Weight, Pounds	Price Each
1	Single	11	\$1.00
2	Single	15	1.35
3	Single	18	1.60
4	Double	17	1.60

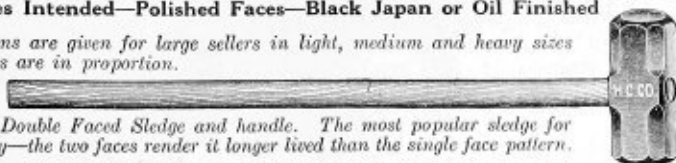
Sledges and Heavy Hammers

Quality Tools—Forged from Well Balanced Designs—Heat Treated and Properly Tempered for Purposes Intended—Polished Faces—Black Japan or Oil Finished

Dimensions are given for large sellers in light, medium and heavy sizes—other sizes are in proportion.

Showing Double Faced Sledge and handle. The most popular sledge for striking only—the two faces render it longer lived than the single face pattern.

Handles always sold separately—see index.



Blacksmiths' Sledges

While known to the trade as Blacksmiths' Sledges, these types are used by contractors, railroads, mining companies, as well as other industries requiring heavy hammers or sledges.

Double Face Blacksmiths' Sledges

Fig. 715



Dimensions	5-pound	8-pound	14-pound
Length.....inches	6½	6¾	7¾
Diameter of face.....inches	2	2¼	2½
Stock Sizes			
Weight each, pounds, 4—6—8—10—12—14—16—18—20—24.			
List Prices			
Weights 5 pounds and over.....	per pound \$0.30		
Weights 3 to 5 pounds.....	per pound .40		
Under 3 pounds.....	per pound .50		

Cross Pein Blacksmiths' Sledges

Fig. 716



Dimensions		6-pound	8-pound	14-pound
Length.....inches		6½	7	8½
Diameter face.....inches		2	2¼	2¾
Pein.....inches		2	2¼	2¾
Stock Sizes				
Pounds, 3—4—5—6—8—10—12—14—16—18—20.				
List Prices				
Weights 5 pounds and over.....				per pound \$0.30
Weights 3 to 5 pounds.....				per pound .40
Under 3 pounds.....				per pound .50

Straight Pein Blacksmiths' Sledges

Fig. 717



Dimensions about same as Cross Pein.	
Stock Sizes	
Pounds 5—6—8—10—12—14—16—20.	
List Prices	
Weights 5 pounds and over.....	per pound \$0.30
Weights 3 to 5 pounds.....	per pound .40

Striking and Drilling Hammers

Standard Long Pattern

Fig. 718



Dimensions			
	4-pound	8-pound	16-pound
Length.....inches	6½	7¾	8½
Diameter face.....inches	1½	1¾	2¾
Stock Sizes			
Pounds 4—6—7—8—10—12—14.			
List Prices			
Weights, 5 pounds and over	per pound \$0.30		
Weights 3 to 5 pounds.....	per pound .40		
Under 3 pounds.....	per pound .50		

Stone Sledges

Fig. 719

A very popular sledge for breaking stone.



Stock.			
Dimensions	6-pound	8-pound	16-pound
Length.....inches	6½	7½	8½
Diameter face.....inches	2	2¾	2¾
Width of bit.....inches	2	2½	2½
Stock Sizes			
Pounds 6—8—10—12—14—16—18—20—24.			
List Price.....	Per pound \$0.30		

Stone Masons' Hammers

Fig. 720

Axe Finish



Dimensions of 6-Pound Size	
Length 7¼ inches; face 2½x1½; bit 2¾ inches.	
Stock Sizes	
5—6—8—10—12—14 pounds.	
List Price	Per pound \$0.50

Spauling Hammers

For Dressing Stone



Single Face Fig. 721		Double Face Fig. 722	
Dimensions, Single Face			
Length.....	inches	8-pound	16-pound
Diameter of face.....	inches	2½x1½	2¾x1½
Width of bit.....	inches	2¾	2¾
Stock Sizes			
5—6—8—10—12—14—16—20 pounds.			
List Price		Per pound \$0.40	

Ship Mauls

Fig. 723

Also Known as Top Mauls



Dimensions	4-pound	5-pound	6-pound
Length.....inches	8½	8½	9
Diameter small face.....inches	1½	1½	1½
Diameter large face.....inches	1½	1½	2¾
List Price.....Per pound \$0.42			

Coal Wedges

Fig. 724



Dimensions	2-pound	2½-pound	3-pound
Length.....inches	8	8½	9½
List Price.....Per pound \$0.20			



Frost Wedges

For Breaking Up Frozen Ground.

Dimensions	18-pound	20-pound	24-pound
Length.....inches	15½	15½	15½
Diameter head.....inches	2½	2½	3
Width of bit.....inches	2½	3	3½
List Price.....Per pound \$0.25			

Blacksmiths' Hand Hammers listed elsewhere, see index.

H. Channon Company Chicago

Horseshoes



Front



Hind

Showing
Medium
Steel

These shoes are made from special soft steel and are smooth and uniform. The punching is clean and the creasing neat and for general wearing qualities they will be found unsurpassed. In 100-lb. kegs.

Light

Front

Size.....	1	2	3	4	5	6	7
Weight, ozs.....	14	17	20	25	29	36	41
Av. No. in keg.....	114	94	80	64	55	44	39
Price per keg.....	\$10.50	10.00	10.00	10.00	10.00	10.00	10.00

Less than keg lots, add 75c to the above prices.

Hind

Size.....	1	2	3	4	5	6	7
Weight, ozs.....	12	15	18	22	27	31	35
Av. No. in keg.....	133	107	89	73	59	52	46
Price per keg.....	\$10.50	10.00	10.00	10.00	10.00	10.00	10.00

Less than keg lots, add 75c to the above prices.

Medium

Front

Size.....	1	2	3	4	5	6	7
Weight, ozs.....	17	20	25	29	35	40	46
Av. No. in keg.....	94	80	64	55	46	40	35
Price per keg.....	\$10.50	10.00	10.00	10.00	10.00	10.00	10.00

Less than keg lots, add 75c to the above prices.

Hind

Size.....	1	2	3	4	5	6	7
Weight, ozs.....	14	17	20	24	29	34	38
Av. No. in keg.....	114	94	80	68	55	47	42
Price per keg.....	\$5.25	\$5.00	\$5.00	\$5.00	\$5.00	\$5.00	\$5.00

Less than keg lots, add 75c to the above prices.

Heavy

Front

Size.....	1	2	3	4	5	6	7
Weight, ozs.....	18½	22	26	30	36	43	49½
Av. No. in keg.....	86	73	62	53	44	37	32
Price per keg.....	\$10.50	10.00	10.00	10.00	10.00	10.00	10.00

Less than keg lots, add 75c to the above prices.

Hind

Size.....	1	2	3	4	5	6	7
Weight, ozs.....	15	18	22	28½	33½	38½	47
Av. No. in keg.....	107	89	73	56	48	42	34
Price per keg.....	\$10.50	10.00	10.00	10.00	10.00	10.00	10.00

Less than keg lots, add 75c to the above prices.

Light Steel

Size.....	1	2	3	4	5	6
Weight, ozs.....	10	12	15	20	23	25
Average No. in keg.....	160	133	107	80	70	33
Price per keg.....	\$11.00	10.50	10.50	10.50	10.50	10.50

Less than keg lots, add \$0.75 to the above prices.

Mule Shoes

Toe Calks



Showing Medium or Country Pattern

Nib is properly placed, pointed and tapered, preventing the possibility of fracturing the shoe or interfering with the crease and nail hole.

Blunt Pattern

No.	Regular Size, Inches	Long Size, Inches	Extra Long Size, Inches	Price per 25-lb. Box
1	1½ x 1½ x ½	1½ x 1½ x ½	2 x 1½ x ½	\$3.00
2	1¾ x 1½ x ½	2 x 1½ x ½	2½ x 1½ x ½	
3	2 x 1½ x ½	2½ x 1½ x ½	3 x 1½ x ½	
4	2½ x 1½ x ½	3 x 1½ x ½	3½ x 1½ x ½	
5	3 x 1½ x ½	3½ x 1½ x ½	4 x 1½ x ½	
6	3½ x 1½ x ½	4 x 1½ x ½	4½ x 1½ x ½	

In quantities of less than 25 lbs., per lb. \$0.16

Medium or Country Pattern

No.	Regular Size, Inches	Long Size, Inches	Extra Long Size, Inches	Price per 25-lb. Box
1	1½ x 1½ x ½	1½ x 1½ x ½	2 x 1½ x ½	\$3.00
2	1¾ x 1½ x ½	2 x 1½ x ½	2½ x 1½ x ½	
3	2 x 1½ x ½	2½ x 1½ x ½	3 x 1½ x ½	
4	2½ x 1½ x ½	3 x 1½ x ½	3½ x 1½ x ½	
5	3 x 1½ x ½	3½ x 1½ x ½	4 x 1½ x ½	
6	3½ x 1½ x ½	4 x 1½ x ½	4½ x 1½ x ½	

In quantities of less than 25 lbs., per lb. \$0.16

Sharp Pattern

No.	Regular Size, Inches	Long Size, Inches	Extra Long Size, Inches	Price per 25-lb. Box
1	1½ x 1½ x ½	2 x 1½ x ½	2½ x 1½ x ½	\$3.50
2	2 x 1½ x ½	2½ x 1½ x ½	3 x 1½ x ½	
3	2½ x 1½ x ½	3 x 1½ x ½	3½ x 1½ x ½	
4	3 x 1½ x ½	3½ x 1½ x ½	4 x 1½ x ½	
5	3½ x 1½ x ½	4 x 1½ x ½	4½ x 1½ x ½	
6	4 x 1½ x ½	4½ x 1½ x ½	5 x 1½ x ½	

In quantities of less than 25 lbs., per lb. \$0.16

Horseshoe Nails

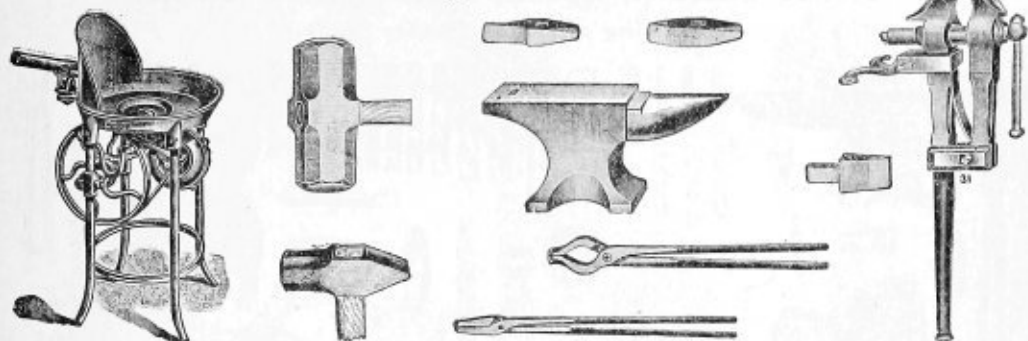
Regular Pattern



Will not buckle in driving and on account of their superior strength may be used in the smaller sizes with perfect safety.

Put up in cartons, 5 pounds each.
Nos. 5 to 10, price per pound. \$0.24

No. 130 Channon Special Blacksmiths' Outfit

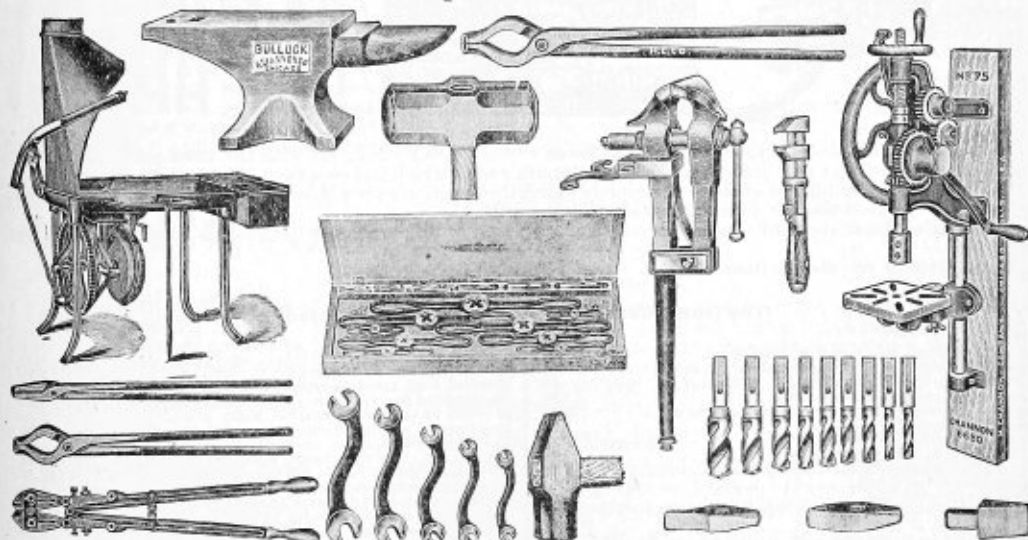


This is a carefully selected outfit consisting of good practical tools from our regular stock and intended for those who have occasional repairs to make. It is designed especially to meet the requirements of those who do not use their tools often enough to make an investment in a higher priced outfit profitable. By preparing these outfits in quantities we are able to offer the set at a specially attractive price.

The outfit consists of all the pieces illustrated:

1 No. 150 Lever Forge with 18x4-inch hearth.	\$7.90	1 Cold Cutter to fit anvil.	\$0.60
1 40-pound Vulcan Anvil, tool steel face.	7.34	1 Hot Cutter to fit anvil.	.72
1 pair 20-inch Straight Lip Tongs.	.75	1 40-pound Blacksmiths' Solid Box Vise.	7.20
1 pair 20-inch Bolt Tongs.	1.00	1 8-pound Blacksmiths' Double Faced Sledge, Handled.	1.20
2-pound First Quality Hand Hammer.	1.00	Special price for Complete Outfit	28.34
1 Hardie to fit anvil.	.60	No. 130.	\$26.00

No. 54 Channon Special Blacksmith's Outfit



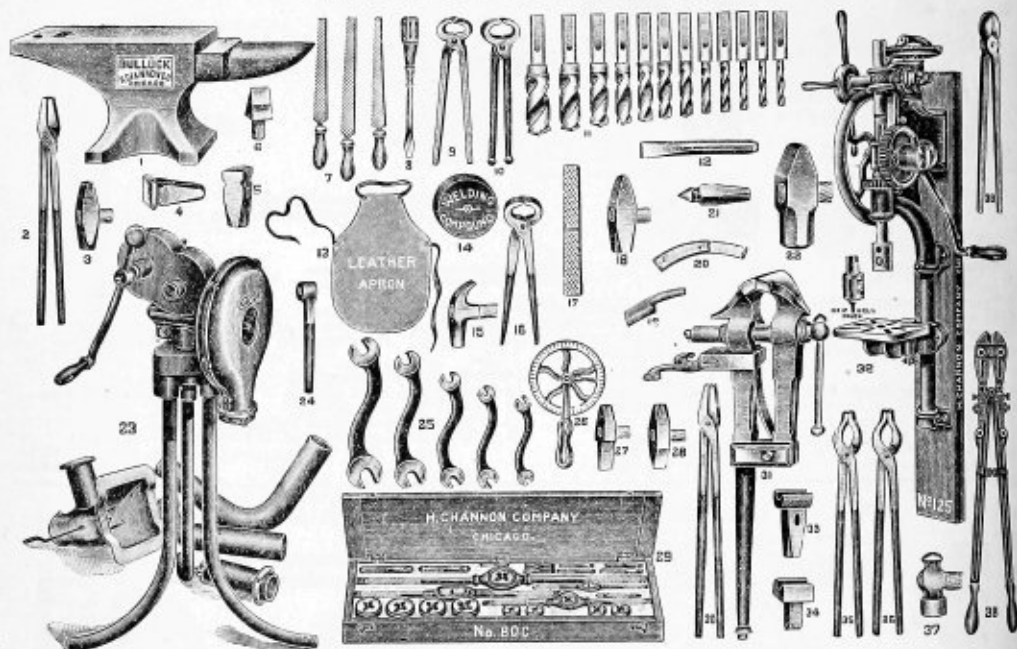
Our No. 54 Special Blacksmiths' Outfit contains an unusually well selected assortment of first quality tools suitable for mechanics having constant use for them and who realize that the best is the cheapest in the long run. The price of the outfit is much lower than when the tools are purchased separately.

The outfit consists of all the pieces illustrated:

1 No. 61 General Purpose Lever Forge, 28x40-inch hearth, 14-inch fan, weight 300 lbs.	\$39.50	1 Hot Cutter for anvil.	\$ 0.60	1 Set of S. & D. Blacksmiths' Twist Drills $\frac{1}{8}$ to $\frac{3}{8}$ by 16ths.	\$ 4.66
1 90-pound Bullock Wrought Anvil, tool steel face.	17.10	1 Cold Cutter for anvil.	.72	1 2-pound Blacksmith Hand Hammer.	1.00
1 80-pound Blacksmiths' Solid Box Vise.	12.30	1 Pair 20-inch Straight Lip Tongs.	.78	1 12-in. Knife Handled Wrench	1.20
1 No. 75 Post Drill (see complete description on another page in this catalog.)	15.00	1 Pair 20-inch Bolt Tongs.	1.00	1 Set of 5 General Purpose "S" Wrenches.	1.14
1 Hardie for anvil.	.60	1 Pair 24-inch Bolt Tongs.	1.20	1 No. 2 New Easy Bolt Clipper	6.20
		1 8-pound Double-faced Blacksmith Sledge, handled.	1.20	Special price Complete Outfit No. 54.	108.00
		1 No. 20A Bull Dog Screw Plate, capacity $\frac{1}{4}$ to $\frac{3}{4}$ inch threads.	15.40		

H. Channon Company Chicago

No. 81 Channon Special Blacksmith's Outfit Consisting of Finest Quality Tools



In the No. 81 Channon outfit we have endeavored to furnish our customers with the most complete and at the same time the most practical collection of blacksmith's tools which has ever been placed on the market.

All tools are of the highest quality—guaranteed—and the selection as a whole has been made with a view to covering the greatest possible variety of uses.

Any part of the above outfit can be had at regular prices, but by purchasing the whole a considerable saving is effected.

Outfit includes one of each item listed.

The Outfit Consists of All the Pieces Illustrated

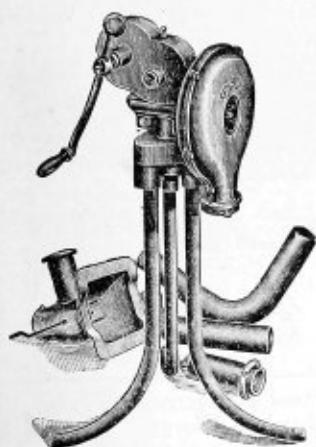
Item No.	
37—2-pound ball pein hammer, handled.....	\$ 0.90
3—9-ounce riveting hammer, handled.....	.64
15—12-ounce Farriers hammer No. 10 V. & B.....	.80
12—3/4-inch steel cold chisel.....	.34
39—Pair 14-inch Farriers tongs, No. 2-0 V. & B.....	1.50
21—Center punch.....	.50
7—8-inch mill file with handle.....	.22
7—10-inch flat file with handle.....	.30
7—12-inch half round file with handle.....	.30
8—6-inch screw driver.....	.36
17—14-inch horse rasp.....	1.20
20—Farriers knife.....	.80
19—Toe knife.....	.80
16—Pair 14-inch Farriers nail cutting nipper No. 22 V. & B.....	2.00
10—Pair 14-inch blacksmith's pincers.....	1.30
9—Pair 14-inch hoof paring pincers No. 214.....	1.80
11—1/4-inch S. & D. drill bit.....	.34
11—1/2-inch S. & D. drill bit.....	.40
11—3/4-inch S. & D. drill bit.....	.46
11—1-inch S. & D. drill bit.....	.54
11—1 1/4-inch S. & D. drill bit.....	.58
11—1 1/2-inch S. & D. drill bit.....	.70
11—1 3/4-inch S. & D. drill bit.....	.84
11—2-inch S. & D. drill bit.....	.96
11—1-inch S. & D. drill bit.....	1.20

Item No.	
11—1 1/4-inch S. & D. drill bit.....	1.46
38—No. 3 Easy bolt clipper.....	6.30
25—No. A-set general purpose wrenches.....	1.14
18—2-pound hand hammer, blacksmith's handled.....	1.00
26—Tire measuring instrument, plain.....	3.00
14—1-pound welding compound.....	.50
13—Blacksmith's apron, cowhide.....	4.00
29—No. 80C Bay State screw plate, set 1/4 to 1-inch.....	31.50
1—Bullock anvil, 150 to 160 pounds, 4x16-inch face.....	29.46
23—12-pound blacksmith's dog with handle.....	2.30
27—1 1/2-inch hot cutter with handle.....	1.16
28—1 1/2-inch cold cutter with handle.....	1.28
35—Pair 20-inch bolt tongs, holding 1/2 to 1 1/2-inch iron.....	1.10
30—Pair 20-inch bolt tongs, holding 1/2 to 1 1/2-inch iron.....	1.10
2—Pair 20-inch straight lip tongs.....	.86
30—Pair 22-inch straight lip tongs.....	.90
6—Hardy to fit anvil.....	.90
24—Heading tool.....	1.40
4—Square flatter.....	1.30
33—Top swage.....	.96
34—Bottom swage.....	1.00
5—Set hammer.....	.76
23—No. 400 Champion blower with 12-inch fan.....	36.00
32—No. 125 Channon post drill.....	25.00
31—80-pound blacksmith box vise with 5 1/2-inch jaws.....	13.30

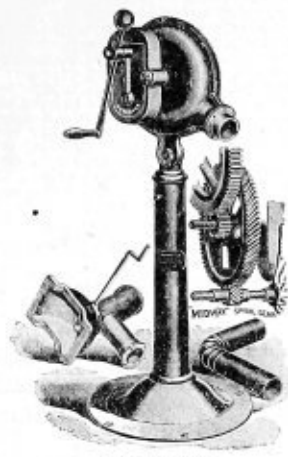
Price if bought separately.....\$187.86

Special price complete, Outfit No. 81.....\$162.00

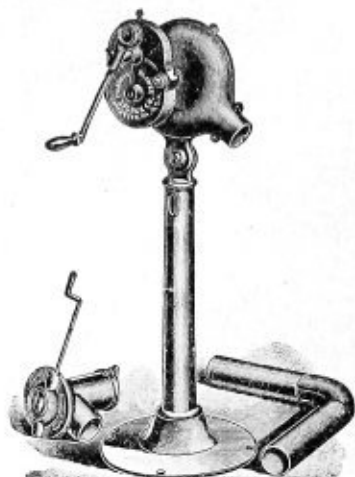
Blacksmiths' Hand Blowers



Champion "400"



Full Diameter Nut Pipe
Champion Midway



Lancaster Geared

Champion "400" Steel Blacksmiths' Blower

The famous Champion 400 blower is one of the best known and most used blowers on the market. Made with adjustable ball bearings and high speed spiral gearing. Will produce a white heat blast equal in every respect to a blast produced by a power blower. The bearings and gears are made from the best tool steel and phosphor bronze, machined and cut from solid metal, and fitted with the precision of a watch, all enclosed in an oil tight, dust proof casing. The blower is very compact; can be taken apart for transportation and again set up in a few moments. With every blower the necessary piping is included and also a Whirlwind blast anti-clinker, heavy nest tuyere iron which produces a circular rotary, whirlwind blast which heats iron at least one-third quicker than tuyere irons constructed differently. The No. 400 blower is made in three sizes. The size with the 12-inch fan is, however, the most popular, as the larger sizes are much harder to turn, the 16-inch size at least 50 per cent harder.

- | | | |
|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| No. 400. | Champion steel blacksmith blower with whirlwind blast, anti-clinker, heavy nest, tuyere iron, fan 12 inches in diameter, complete with piping, blower weight 100 pounds, tuyere iron 60 pounds. | Price . . . \$37.00 |
| No. 420. | With 14-inch fan, weight 170 pounds. | Price . . . 45.00 |
| No. 421. | With 16-inch fan, weight 175 pounds. | Price . . . 48.00 |

Champion Midway Blower

The Champion Midway blower is a substantial, direct driven blower, and though not as finely constructed as the Champion 400, it is durable and practical in every respect. As shown in illustration it has spiral cross gears, which run in oil and are enclosed in a dust proof casing. The gears are all accurately machined, run easily, and crank can be turned in either direction. The head is mounted on a strong base and takes up but little space. Diameter of fan, 12 inches. Weight about 115 pounds. Tuyere iron, 50 pounds.

Price complete with center blast heavy nest ball tuyere iron and piping . . . \$30.00

Lancaster Geared Blower

This blower is well made, direct driven blower, built to meet the demand for a reliable blower at a lower price than the Champion 400 or the Midway blower. It has no belt, ratchet or clutches. Runs easily and the crank can be turned in either direction. The head is adjustable and mounted on a substantial base. Fan is 12 inches in diameter. Weight 125 pounds.

Price complete with tuyere iron and pipe as illustrated . . . \$20.00

Blacksmiths' Forge Blowers

A complete line of blacksmiths' forge blowers, belt driven and direct connected electrically driven, are shown elsewhere in this catalog. See index.





No. 401 Forge with Shield. Also furnished with Half Hood and Closed Hood.

Champion Steel Rivet Forges (400 Series)

Equipped with the Famous Champion 400 Blower

The 400 series of Champion Steel Rivet Forges are equipped with the famous "400" noiseless, high-speed geared blowers. The "400" Blower is equal to a power machine and will produce a white heat blast which cannot be obtained with the regular hand blower. Operates with marvelous ease, produces a strong, regular and positive blast and will create a welding heat on 4-inch bar iron in ten minutes. Handle can be turned in either direction. Fitted with the highest possible grade of adjustable bearings, with cups and cones lathe turned from the solid bar, hardened as hard as glass, ground and polished to the highest finish, making them perfect and durable high-speed adjustable bearings.

This line of forges is especially intended for railroads, bridge and tank builders, structural steel workers, etc., who know it is always economical to buy the best. They are easily taken apart and set up again. Made of steel throughout, strong and light. Made in several sizes and styles as shown in list below. The No. 401 is the most popular forge.

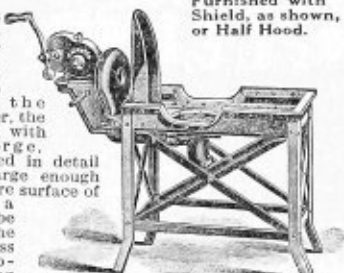
No.	Price, Each	Style of Forge	Diam. of Fan, Inches	Diam. of Blower, Inches	Height of Forge, Inches	Apprx. Wt. Lbs.
401	\$35.00	With Shield	18	9	30	115
402	38.00	With Half Hood	18	9	30	120
403	40.00	With Closed Hood	18	9	30	125
401 1/2	40.00	With Shield	22	9	30	120
402 1/2	43.00	With Half Hood	22	9	30	125
403 1/2	45.00	With Closed Hood	22	9	30	130

Champion Steel Rivet and Toolmakers' Forges

These forges have hearths 24 inches square to which are riveted the angle steel legs. They are equipped with the famous 400 blower, the same as furnished with the No. 401 forge, which is described in detail above, and is large enough to cover the entire surface of the hearth with a hot fire should it be necessary. The blower is noiseless and blast is produced by turning crank in either direction. For many kinds of work a hearth 24 inches square is preferable to one 18 inches in diameter, there being more room for fire, coal and tools. These forges are first quality in every respect and are very popular numbers. Hearth 24x24 inches; height 30 inches; fan 9 inches in diameter.

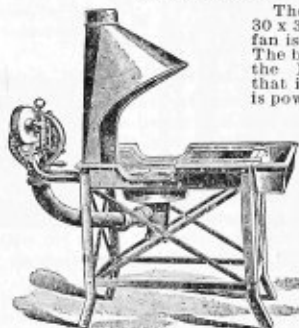
- No. 404. Rivet Forge with Shield as illustrated, weight 170 pounds. Price.....\$45.00
 No. 405. Toolmakers' Forge with Half Hood Complete, weight 180 pounds. Price.....49.00

Furnished with Shield, as shown, or Half Hood.



Champion Steel Boilermakers' and Machinists' Forges

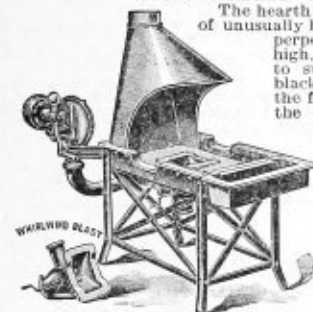
These forges have hearths 30 x 30 inches and the blower fan is 10 inches in diameter. The blower is the same as in the No. 401 forge, except that it is a size larger and is powerful enough for almost any work that can be placed on the hearth. The forges are made of steel throughout with legs riveted to hearth and thoroughly braced, making them firm and rigid. The illustration shows the No. 407 forge which is furnished with half hood. The No. 408 is exactly the same except with shield. Hearth 30x30 inches; height 30 inches; fan 10 inches diameter.



- No. 406. Boilermakers' Forge, with shield, weight 230 pounds. Price.....\$55.00
 No. 407. Machinists' Forge, with half hood, as illustrated; weight 240 pounds. Price.....60.00

Champion Steel Horseshoers' and Blacksmiths' Forge

The hearth in this forge is made of unusually heavy steel plate with perpendicular sides 6 inches high, and can be bricked up to suit the needs of any blacksmith. Provided with the famous 400 blower and the Champion whirlwind blast tuyere iron without extra charge. No. 408 Forge can be furnished with tight and loose pulleys for turning blower with power. Height of forge 30 in.; fan 12 in. diam.



- No. 408. Hearth 30 x 36 inches; half hood as illustrated; weight 300 lbs. Price.....\$65.00
 No. 408 1/4. Same as No. 408 with tight and loose pulleys for power; weight 345 pounds. Price.....76.50
 No. 409. Hearth 30 x 40 inches; half hood as illustrated; weight 310 pounds. Price.....70.00

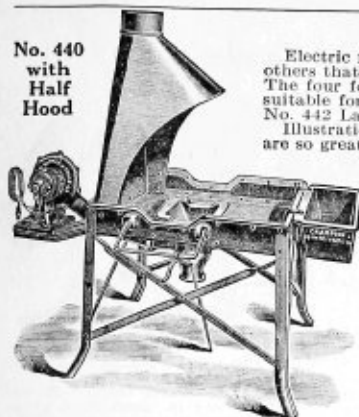
Champion Large Combination Forge

This is an extra heavy cast-iron forge, designed for use in railroad and large blacksmith shops, plow works, etc. The hearth is 6 inches deep and very heavy. It can be built up with fire brick and have every advantage of an all brick or stone forge. Equipped with a 400 blower, whirlwind blast tuyere iron, hood and water tank complete. Height of forge 26 inches.



- No. 430. Forge, hearth 38 x 52 inches; fan 12 inches in diameter; weight 540 pounds. Price.....\$80.00
 No. 431. Forge, hearth 39 x 63 inches; fan 14 inches in diameter; weight 575 pounds. Price.....90.00
 These forges can be furnished without hood and blower if desired. Prices quoted on application.

No. 440
with
Half
Hood



Champion Electric Driven Blacksmith Forges

Electric motors for driving blower fans have become so popular with blacksmiths and others that we now offer a selection of forges completely equipped with electric blowers. The four forge outfits described below offer a wide range of choice, the No. 443 being suitable for those who do not have very heavy work or a great amount of it and the No. 442 Large Blacksmith Forge intended for constant service.

Illustration shows forge equipped with a No. 1 Blower, but the No. 50 and No. 51 are so great an improvement that we are furnishing the different outfits as follows:

Nos. 440, 441 and 443 are provided with a No. 50 Blower, and No. 442 with a No. 51 Blower. These blowers have variable speed controlled by a detached reostat and a big motor using either alternating or direct current. For detailed description refer to page on blowers.

No. 443. Electric driven light forge, built tuyere iron, cast-iron hearth 23x25 inches, tubular legs, height 30 inches, with hood, weight 225 pounds. Price.....\$45.00

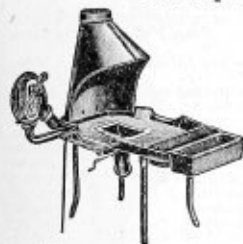
No. 441. Electric driven forge, whirlwind blast, anti-clinker heavy nest tuyere iron, cast-iron hearth 32 x 45 inches, height 30 inches, with hood, weight 360 pounds. Price.....60.00

No. 440. Electric driven forge, same as No. 408 forge except with electric blower, whirlwind blast, anti-clinker heavy nest tuyere iron, hearth 30 x 36 inches, height 30 inches, with hood, weight 300 pounds. Price.....67.00

No. 442. Electric driven large forge, same as No. 430 forge, except with electric blower, whirlwind blast, anti-clinker heavy nest tuyere iron, hearth 38 x 42 x 7 inches deep, height 26 inches, with hood and coal box complete, weight 360 pounds. Price.....80.00

Nos. 440, 441 and 442 Forges furnished with water tank, \$2.75 extra.

Champion "Midway" Spiral Geared Cast Iron Hearth Forges



No. 71 with Half Hood



No. 75 with Shield



No. 72 with Shield



No. 73 with Half Hood

The Champion "Midway" Spiral Geared Cast Iron Hearth Forges are well built, thoroughly reliable in every respect and we recommend them as strong and durable cast-iron forges. The blower is the Champion "Midway" with its cross spiral gearing, enclosed in a dust-proof case. This blower is simple in construction and without small gears or pinions, but does not have adjustable ball bearings as used in the Champion 400 line. It produces a strong blast, however, and crank can be turned in either direction.

The Midway forges, while not as well made as the Champion 400 line, are good, dependable, medium-priced forges and are especially desirable for mechanics who do not have constant use for a forge.

No.	Style Forge	Size of Hearth	Price Each	Size of Fan	Height	Weight
75	Shield	22 inches in diam.	\$30.00	10 inches	33 inches	140 pounds
76	Half hood	22 inches in diam.	33.00	10 inches	33 inches	145 pounds
72	Shield	23 x 35 inches	36.00	10 inches	30 inches	185 pounds
73	Half hood	23 x 35 inches	40.00	10 inches	30 inches	190 pounds
*71	Half hood	32 x 45 inches	50.00	12 inches	30 inches	300 pounds

*No. 71 fitted with water tank, \$5.00 extra.

Champion "Midway" Spiral Geared Rivet Forge



No. 78. Midway Steel Rivet Forge with shield; hearth 18 inches in diameter; height 30 inches; fan 10 inches; weight 135 pounds. Price \$31.00

No. 78. Champion "Midway" Spiral Geared Rivet Forge is intended for those who do not wish to invest their money in the the highest grade forge, No. 401, and do not wish a Midway forge with a cast iron hearth, such as the No. 75. It produces a good blast, by turning crank either way, and is sold guaranteed to be a strictly first class medium price forge.

Champion "Midway" Steel Forges

A substantial and firmly built steel forge, constructed of heavy steel plate, legs riveted to the hearth and strongly braced. The sides of the hearth of the No. 80 are 6 inches wide and cover every requirement for an up-to-date blacksmith fire. The Midway blower with its spiral gearing is used. Equipped with a heavy nest tuyere iron weighing 50 pounds; the same as furnished with the Midway blower when sold separately. A first-class moderate priced forge.

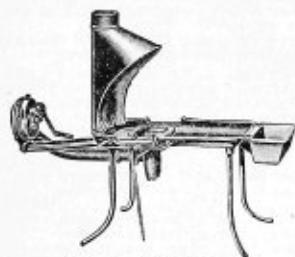


No. 80
with
Half
Hood

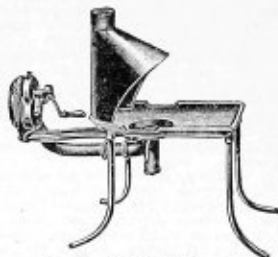
No. 80. Midway Steel Forge; hearth 30 x 36 x 6 inches deep; height 30 in.; fan 12 in.; with half hood and 50-lb. heavy nest tuyere iron; weight 300 lbs. Price.....\$58.00
Extra for water tank 5.00

No. 79. Midway Steel Forge; hearth 24 x 24 in.; height 30 in.; fan 10 in.; with shield; weight 180 lbs. Price.....\$40.00

Champion "Lancaster" Geared Forges



No. 41 with half hood.



No. 43 with half hood.



No. 45 with shield.



No. 48 with shield.

In this catalog we offer for the first time, a line of direct driven forges equipped with the Lancaster Geared Blower. This line is made by the makers of the Champion 400 and Midway Blowers and Forges, and is their third grade. The Lancaster Blower is described in detail on another page. It does not have ball bearings, but is smooth running and crank turns either direction to produce blast.

The No. 41 Blacksmith Forge is a well built, direct-driven forge with cast iron hearth. The Lancaster Geared Blower is attached as shown in illustration. A heavy nest ball tuyere iron weighing 50 pounds is furnished with each forge. A complete, well built blacksmith forge at a very reasonable price.

No. 42 Agricultural Forge is a well made, low priced, direct-driven forge, especially recommended for agricultural use. It is nicely finished and with its large hearth and fan it is very suitable for farm use. The No. 43 is the same as No. 42, except that it is provided with a half hood instead of shield.

Nos 45 and 46 are strong, light, direct-driven, portable forges with cast iron hearths 22 inches in diameter and differ from each other only in that one has a shield, while the other has a half hood.

No. 48 is a new steel rivet forge of the same pattern as the Champion No. 401 and equipped with the Lancaster Geared Blower. It is a very light, convenient and serviceable rivet forge at a moderate price.

No.	Style Forge	Size of Hearth	Size of Fan	Height	Weight	Price each
*41	Half hood	32 x 45 inches	12 inches	30 inches	300 pounds	\$50.00
42	Shield	23 x 35 inches	12 inches	30 inches	165 pounds	36.00
43	Half hood	23 x 35 inches	12 inches	30 inches	170 pounds	40.00
45	Shield	22 inches diam.	10 inches	30 inches	115 pounds	27.00
46	Half hood	22 inches diam.	10 inches	30 inches	120 pounds	30.00
48	Shield	18 inches diam.	10 inches	30 inches	115 pounds	31.00

*No. 41 fitted with water tank, \$5.00 extra.

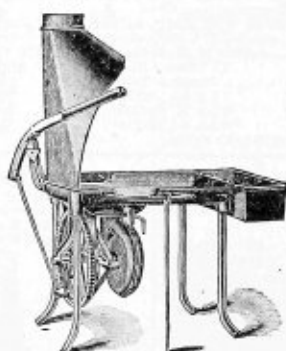
Champion General Purpose Lever Forges



No. 55 with Shield.



No. 59 with Half Hood.



No. 61 with Half Hood and Water Tank.



No. 150 with Shield.

The Champion General Purpose Lever Forges are made with double ratchet, strong and substantial, adapted for all kinds of medium work, and will be found reliable and first class in every respect. The No. 61 is provided with an improved, revolving anti-clinker ball tuyere iron for regulating blast. No. 150 and 151 have single ratchet and are intended mainly for farmers who have only occasional use for a forge, and then only for light repair work.

No.	Style of Forge	Size of Hearth	Height	Size of Fan	Weight	Price Each
55	With shield	18 inches diam.	30 inches	8 inches	75 pounds	\$24.00
56	With half hood	18 inches diam.	30 inches	8 inches	80 pounds	27.00
58	With shield	21 x 27 inches	29 inches	10 inches	150 pounds	36.00
59	With half hood	21 x 27 inches	29 inches	10 inches	160 pounds	40.00
61	With half hood	28 x 40 inches	30 inches	14 inches	300 pounds	50.00
61	With half hood, water tank	28 x 40 inches	30 inches	14 inches	350 pounds	55.00
150	With shield	18 inches diam.	30 inches	8 inches	80 pounds	14.00
151	With half hood	18 inches diam.	30 inches	8 inches	85 pounds	16.00

Buffalo Steel Forges

These forges combine lightness with great strength. Fire Pans are constructed of heavy rolled steel plate, riveted and strongly reinforced with angle steel around the edges. The angle steel legs are cross braced with bar steel, making rigid forges which will stand considerable rough usage. They are equipped with a powerful, easy running Buffalo No. 200 Silent Blower, also hinged and balanced automatic ash gate, which opens by a touch of the foot. A 14-inch blower will produce a 3-inch blast pressure with fan turning 2200 R. P. M., and this speed is not maximum. These forges can be furnished with electric blower and are priced below.



- No. 600** Contractors' Forge, hearth 24x24 inches, 14-inch fan, with shield and heavy duty vulcan tuyere iron. Weight about 210 pounds. Price.....\$45.00
- No. 600E** Same as No. 600 except with electric blower. 48.00
- No. 601** Same as No. 600 except with half hood. Price..... 50.00
- No. 601E** Same as No. 600 except with half hood and electric blower. Weight 185 pounds. Price..... 51.00
- No. 604** Horseshoers' Forge, hearth 30x36 inches, 14-inch fan, with half hood and heavy duty vulcan tuyere iron. Weight 297 pounds. Price..... 65.00
- No. 604E** Same as No. 604 except with electric blower. 60.00
- No. 605** Blacksmiths' Forge, hearth 30x40 inches, 14-inch fan, with half hood and heavy duty vulcan tuyere iron. Weight 312 pounds. Price..... 70.00
- No. 605E** Same as No. 605 except with Electric blower. 63.00
- Any of these forges furnished with water tank, \$5.00 extra.

No. 625 Buffalo Steel Rivet Forge

This forge is simple and strong, able to stand up under hard service. It is provided with a Buffalo 200 Silent

Blower with a 12-inch fan. The fire pan is made of heavy rolled steel plate, strongly riveted. Wind-shield and blower are detachable and can be

packed in the fire pan for transportation. A heavy tuyere plate is furnished, which distributes the blast to insure the best results in heating.

No. 625 Rivet Forge, Hearth, 18 inches in diameter, 12-inch fan. Weight 110 pounds. Price..... \$35.00



Buffalo Standard Blacksmiths' Forges

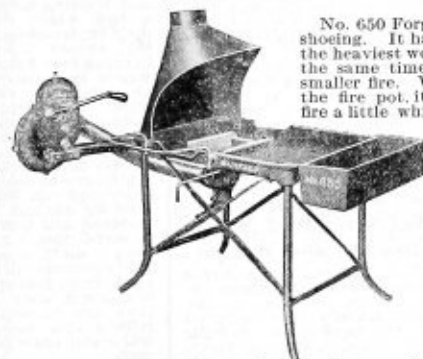
No. 650 Forge is ideal for all around horse-shoeing. It has sufficient capacity for doing the heaviest work in the shortest time, and at the same time affords easy regulation for a smaller fire. When it is desired to clean out the fire pot, it is only necessary to poke the fire a little while turning the valve rod, the

rotating valve quickly crushes and cleans out the clinkers and ashes. The balanced ash gate makes dumping of ashes very convenient. Equipped with a 14-inch Buffalo No. 200 Silent Blower and Vulcan Tuyere iron.

No. 651 is a medium sized forge for indoor work. It is equipped with a 12-inch Buffalo Blower which furnishes a strong blast. The legs are not cross braced as on the No. 650, but an angle iron base attached to each

leg at the corner. The round tuyere iron enables the operator to have either a shallow or deep fire as is required.

- No. 650** Blacksmith Forge, Hearth 28x40 inches, 14-inch fan, with half hood and heavy duty vulcan tuyere iron. Weight 332 pounds. Price.....\$50.00
- No. 650E** Same as No. 650 except with electric blower. Price..... 50.00
- No. 651** Horseshoers' Forge, Hearth 23x30 inches, 12-inch fan, with half hood and round tuyere iron. Weight 205 pounds. Price..... 40.00
- No. 651E** Same as No. 651 except with electric blower. Price..... 45.00
- Any of these forges furnished with water tank, \$4.00 extra.



Cast Iron Wagonmaker's Forges

These forges are intended to meet the requirements for extra large and substantial forges in wagon and blacksmith shops generally where heavy work is handled to a large extent. Made with cast iron hearth and legs. The coal box is cast into the hearth as shown in illustration. The legs are short to provide a low hearth for greater convenience in handling heavy work. The extra large tuyere iron enables the operator to make quick welds on the heaviest work.

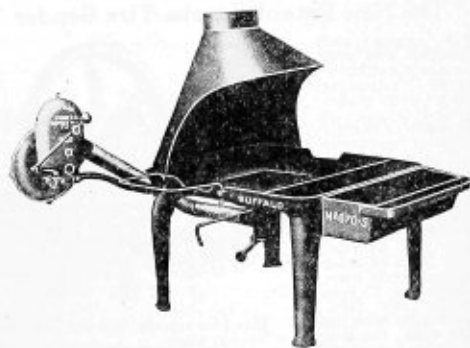
The No. 671 Forge is provided with a cast iron hood, and extra heavy hearth fully 7 inches deep which may be lined with fire brick or clay.

No. 670-S Wagonmakers' Heavy Forge, Hearth 38x42 inches, 14-inch fan, with half hood and extra large "R. R." tuyere iron, size 12x14 inches. Weight 527 pounds. Price.....\$71.00

No. 671 Wagonmakers' Extra Heavy Forge, Hearth 38x42 inches, 14-inch fan, with cast iron half hood and extra large "R. R." tuyere iron, size 12x14 inches. Weight 632 pounds. Price.....\$85.00

Either of these forges can be furnished with water tank for \$5.00 extra.

Prices for either No. 670S or No. 671 Forge equipped with electric blower quoted upon application.



Improved Mole Tire Shrinkers

With or Without Anti-kink Device

Made of first class materials and very strong. Complete with lever. The anti-kink device permits of the tire being upset without being moved. Pressure is applied with the foot.

	No. 1	No. 2	No. 3
Takes tires up to, ins.	2½	3	4
With anti-kinker, price each.		\$12.50	\$15.00
Without anti-kinker price each.	\$ 8.00	12.00	14.50



No. 4 American Tire and Axle Shrinker

A powerful machine made to stand on the floor. It has two jaws 4 by 2 inches wide made of the best tool steel and with hardened machine-cut teeth. It will easily shrink 4 by 1-inch round tire, down to the smallest buggy tire, and axles up to 1½-inch square. Can be handled by one man if required. Weight 345 pounds. Price each..... \$35.00



Western Chief No. 2 Upsetter and Welder

This combines two separate machines in one, by simply removing the top jaws to the side of machine most adapted for work to be done. Is built on the most modern mechanical principles. The leverage is applied to the sliding head so that the lines of force are directly in line with the working stresses, thereby reducing friction on sides to a minimum, making it easy for one man to operate.

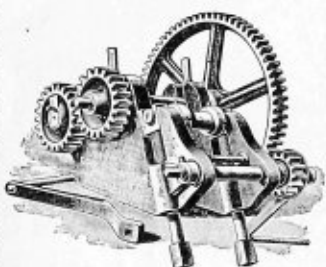
The jaws are of refined tool steel, machine-cut and properly tempered. Size of jaws tire side, 4½ inches wide. Will shrink from the smallest to 5 by 1½-inch round edge tires. Weight 915 lbs. Price each..... \$100.00

The New Patent Eureka Tire Bender

A strong and powerful tool with all latest improvements. Adjusting screws with graduated indicator on each side of Bender showing exact size of tire being bent and giving operator full control over his work.

The end rolls are provided with collars to prevent tires from twisting so both ends meet when bent. Two cranks are furnished with each bender. Has two speeds, one for light and fast work, the other for heavy work.

No. 1. Bends 4 by 1-inch tire; weighs 190 lbs.	Price each..... \$18.00
No. 2. Bends 6 by 1-inch tire; weighs 300 lbs.	Price each..... \$28.00



Tire Shrinkers and Benders

Improved Stoddard Tire Shrinker

Requires no floor space, as it is bolted to the side of wall or post. Is easily operated by one man and has attachment to prevent light tires from kinking. With each machine we supply a short iron lever which can be lengthened to suit operator.

No. 1. For 2-inch tires or smaller, each.....	\$8.00
No. 2. For 4-inch tires or smaller, each.....	\$14.00

No. 3. A special machine for upsetting 4-inch tires and smaller. Has two sets of loose jaws, which are adjustable for both light and heavy tires, also for upsetting axles up to 1½-inch thick.

Price each..... \$17.50



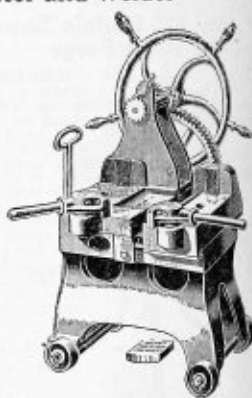
The Champion Star Tire and Axle Upsetter and Welder

The Champion "Star" Tire and Axle Upsetter and Welding machine is a tool which requires little explanation to satisfy anyone interested in doing very heavy city wagon work, as well as all kinds of carriage work. It is sold on a guarantee to do the work claimed for it with a minimum of exertion. It has no unnecessary machinery to get out of order and can be operated by anyone. It is designed and built as a powerful tool. The eccentric shaft, as well as the eccentric strap, is made from best quality hammered steel. The jaws are steelted with refined tool steel and will stand years of hard work.

No. 1. Upsets or welds tires from ¾-inch thick up to 5 by 1¼ inches; upsets or welds axles ¾-inch up to 2¼ inches; upsets with one revolution, 2 inches. Weight 800 lbs. Price each..... \$100.00

No. 2. Upsets or welds tires from ¾-inch thick up to 7 by 1½ inches; upsets or welds axles ¾-inch up to 3¼ inches; upsets with one revolution, 2 inches. Weight 1075 lbs. Price each..... \$125.00

No. 3. Upsets or welds tires from ¾-inch thick up to 8 by 1½ inches; upsets or welds axles ¾-inch up to 3½ inches; upsets with one revolution, 2 inches. Weight 1125 lbs. Price each..... \$145.00



Vulcan Tire Benders

No. 1. With turned rollers and bearings; will bend tires up to 3¼ inches to a circle 30 inches diameter or larger.



Prices Including Crank

No.	Capacity	Price Each
1	3 ¼ inches or smaller.....	\$6.00
2	3 ½ inches or smaller.....	7.00
2 ½	6 inches or smaller.....	8.50



No. 2 and 2 ½

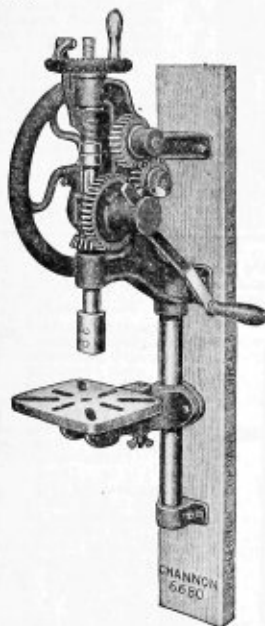
Nos. 2 and 2½ Tire Benders. Have steel gear and pinion; turned steel rollers and bearings; will bend to a circle 30 inches or larger.

Channon Blacksmith Post Drills

High Grade Ball Bearings

THESE two drills are made in large quantities by automatic machinery and are consequently sold at attractive prices. Will give satisfaction for all ordinary work within their capacity. Both are well designed and easy running. Suitable for blacksmith, wagon or machine shops, or for contractors' use in the field. Carefully and accurately made in every respect—with the lathe turned tables, bearings jig-bored from the solid and ground, Ball-bearing between feed screw and spindle for end thrust, saving 20 to 50 per cent in power. Both have automatic self-feed and back gears.

Spindle is fitted with our Gripwell positive drill chuck for $\frac{1}{2}$ -inch straight (flatted) shank drills. This chuck has positive interlock—without a loose or moving part—the drill bit absolutely can not turn in the socket.



No. 75—Capacity up to $1\frac{1}{4}$ inch holes.
Drills to center of 15 inch circle.
Two speeds—back geared.

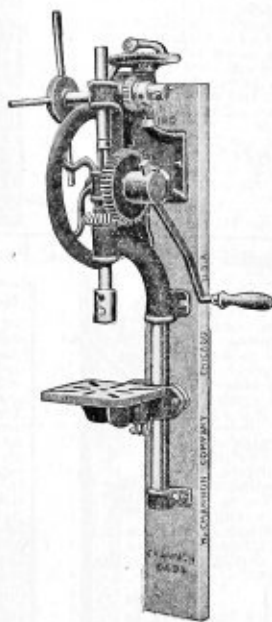
Channon No. 75 Ball-Bearing Post Drill

A good all-around post drill for drilling up to $1\frac{1}{4}$ inches in metal.

Spindle has up and down run of $3\frac{1}{2}$ inches.

Back-geared (with third gear), automatic self-feed, square lathe-turned and slotted table. Two speeds, fast and slow, can be quickly changed from one to the other. Bearings jig-bored. Has long heavy bearing and ball-bearing, to take end thrust. Spindle $1\frac{1}{8}$ -inch diameter. Steel extension crank handle.

No. 75. Weight 125 pounds. Price.....\$16.50
Extra for tight and loose pulleys..... 4.00



No. 125—Capacity up to $1\frac{1}{4}$ inch holes.
Drills to center of $16\frac{1}{2}$ inch circle.
Has Quick Return and Pilot Lever Feed.

Channon No. 125 Ball-Bearing Post Drill

This is a new drill of stocky design with the pilot lever feed and quick return, both quick acting features never found on a drill at this price before.

Also has automatic self-feed, two speeds, end thrust, ball bearings, all bearings ground from the solid (no babbitt), lathe turned and slotted table, spindle, $1\frac{1}{8}$ -inch diameter, up and down run is $5\frac{1}{2}$ inches. This drill is simply and substantially built throughout.

No. 125. Weight 140 pounds. Price.....\$27.50
Extra for tight and loose pulleys..... 4.00

Blacksmiths who want good, durable tools should give us a trial. We sell only the best.

Champion Blacksmiths' Post Drills

Black Diamond Self Feed Post Drill

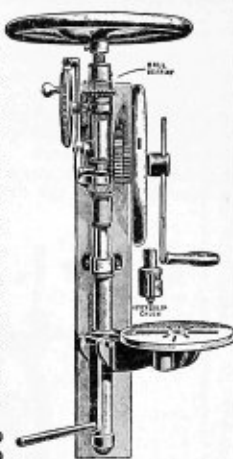
The Champion Ball-Bearing Black Diamond Self-Feed Post Drill is built on scientific principles. The gearing is designed for easy and quick running, being compounded for increasing power. There are two fly wheels as shown in the illustration, each making two revolutions to each turn of the crank. It has two speeds, crank turning same direction for both. Spindle has end thrust ball-bearings, which are ground from solid metal.

Drills to center of 18-inch circle and holes up to 1½ inches. It is equipped with automatic self-feed and a lathe-turned, slotted table. Spindle is 1¼ inches in diameter and has an up and down run of 4 inches. A wheel holder is furnished for drilling tires.

All parts are standard and interchangeable. Spindle is bored for ½-inch straight shank drills. Weight about 255 pounds.

Price each \$24.00

With Pulleys for Power 28.00



No. 96 Quick Return Blacksmiths' Post Drill

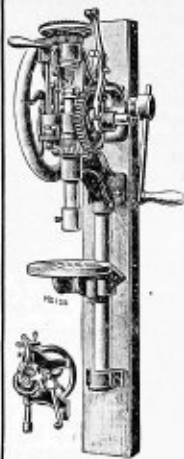
A time saving machine at a reasonable price. Quick return lever is thrown into place while drill continues in motion, where it remains until bit is raised out of work, when it automatically stops, requiring no attention from operator, and is again ready to start next hole.

Back-gearred with an improved third gear principle. Crank has forward motion on 1st and 2nd speed, 3rd gear being a part of handle hub and in use only when on 2nd speed.

Drills to center of 15½-inch circle. Drills holes from ¼ to 1¼ inches. Regularly bored for ½ inch. Straight shank drills. All gears are protected with double journal bearings. All bearings ground from the solid. Weight 135 pounds.

Price each \$12.50

With Pulleys for Power 15.50



No. 98 Self Feed Blacksmiths' Post Drill

This is a first class back-gearred post drill. Spindle has end thrust ball bearings, which save 20 to 50 per cent of power. Bearings are made from highest grade lathe-turned tool steel. Drills holes to 1 inch to center of 14-inch circle. Full automatic self-feed. Diameter of spindle 1 inch, bored for ½-inch straight shank drills. Up and down run 3 inches. Round lathe-turned, slotted table. Weight 95 pounds.

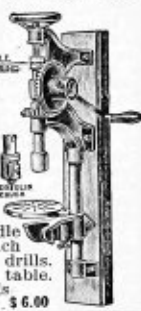
Price each \$ 8.00

With Pulleys for Power 11.00



No. 92 Hand Feed Post Drill

This machine will drill to the center of a 12-inch circle and will drill a hole up to ¾ inches. The shaft is made of 1½-inch steel and has an up and down run of 3 inches. It is made of the best material, bearings ground out of solid metal; spindle fitted for ½-inch straight shank drills. Slotted swing table. Weight 55 pounds. Price each \$ 6.00



No. 93 Back Geared Post Drill Two Speeds

A strictly first class up-to-date machine, with every gear supplied with bushing on each side. Two speeds and lathe-turned, slotted, square table. Drills to center of 15-inch circle. Drills holes up to 1¼ inches. Diameter of spindle 1½ inches. Up and down run 3 in. Spindle bored to take ½-inch straight shank drills. Provided with full back gears and automatic self feed. Weight 125 pounds.

Price each \$10.00

With Pulley for Power 13.00



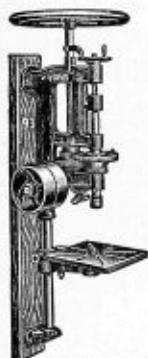
The Black Diamond Drill, also Nos. 92, 93, 96 and 98 will be bored to take ¼ or ½ inch Straight Shank Drills, to order

Buffalo Ball Bearing Post Drills

No. 961B—The gears on this drill are all machine cut and mesh perfectly. Bearings are all bored from the solid metal. Ball bearings are placed at end thrusts of all swiftly revolving parts. No loose joints, with consequent lost motion and noise. Two speeds, operated by shifting the collar. Two feeds, automatic and lever with instant, automatic return of drill spindle. A half turn of wheel changes feed from automatic to lever.

No. 941B—On this drill, the fly wheel speed is independent of the spindle, giving full momentum when most needed, on slow, heavy work. Table is attached to an adjustable rack, giving quick and easy adjustment of table or wheel-holder to any point of run. Gears are machine cut. Shafts and spindles are steel, run in journal bearings, bored and reamed in the solid metal of the frame. Two speeds and two feeds, same as on No. 961B drill described above. Fitted with Suregrip Chuck and ball bearings at end of feed screw, relieving 90 per cent of friction at this point.

No. 931B—A drill of large capacity and medium price, distinguished by large and heavy fly-wheel on top. Frame is neat, strong and well ribbed. Slotted table is easily adjusted to any point of run. Provided with machine cut bevel and spur gears, accurately fitted, giving smooth operation without lost motion. Two speeds, change obtained by sliding gears on spindle, up or down, to engage with upper or lower gear on fly wheel shaft. Ball bearings at end thrust of feed screw.



No. 931B Drill with Pulleys for Power

No.	Capacity, inches		Up and Down Run, inches	Run of Table, inches	Size of Pulley, inches	Height Over All, inches	Shipping Wt., lbs.	Price Each	
	Holes Up to	Drills to Center of						Hand	Hand and Power
961B	1½	18	4½	18	8	62	250	\$30.00	\$34.00
941B	1½	21	4½	21	8x3	62	270	40.00	44.00
931B	1½	22	6½	21	8x3	66	385	36.00	40.00



No. 961B Drill with Hand Crank

Buffalo Drill Spindles are bored for ½-inch straight shank bits, but ¾ or 1-inch also furnished.

Champion Automatic Self Feed and Compound Lever Feed Drills

No. 200½ Post Drill

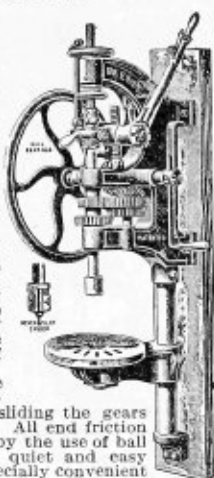
This is a powerful, medium priced blacksmith drill. Special attention is called to the Double Compound Lever-Feed with which this drill is equipped, which produces fully 80 per cent more pressure at the point of drill than any other power or hand drill not provided with this feature. This Double Compound Lever-Feed is entirely independent of the Automatic Self-Feed. The feeds are interchangeable and can be changed from one to the other instantly.

With either feed, the drill spindle has instantaneous return of the drill bit out of the hole drilled and again instantaneous return on to the material being drilled for the next hole. The drill spindle and bit are positively always raised up or down while using either feed by the use of the quick acting lever.

It has two speeds; the change from slow to fast or heavy to light work is accomplished by sliding the gears which requires but an instant. All end friction is taken from the drill spindle by the use of ball bearings, making the drill very quiet and easy running. The lever makes it especially convenient for wood boring. Drills to center of an 18-inch circle. Spindle 1¼-inch in diameter. Up and down run 5½ inches. Spindle bored like Never-Slip Chuck for ½-inch straight shank bits. Drills holes up to 1½ inches.

No. 200½. Champion Post Drill for hand only. Weight 240 pounds. Price.....\$30.00

No. 200½. Champion Post Drill with 11 x 2½-inch tight and loose pulleys for power and hand combined. Price.....34.00



No. 203 Post Drill

This is an excellent drill for blacksmith shops, garages, carriage and wagon shops for use with hand or power, or combined. It has all the advantages of the No. 200½ described in the opposite column, and in addition has an upright flywheel. Table is raised and lowered by rack and pinion. The upright flywheel shaft runs on frictionless end thrust ball bearings. End thrust bearings are also provided on spindle.

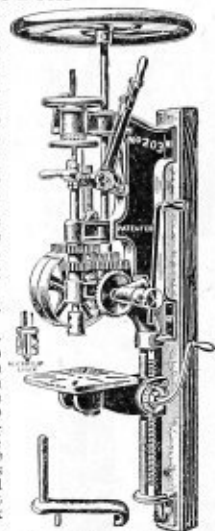
It has double back cut gears with two speeds. In its entire construction and design this drill is a powerful machine for all kinds of shops where a strictly high grade machine is wanted. The lever makes it especially convenient for wood boring.

Spindle is 1¼ inches in diameter and is bored like Never-Slip Chuck to take ½ or 41/64-inch straight shank bits or for ½-inch bits if so ordered. Up and down run 5½ inches. Drills holes up to 1½ inches and to center of 21-inch circle. Pulleys are 11 x 2½ inches and are designed to revolve at 80 R. P. M. A wheel hanger is furnished for drilling painted wheels, and the table, when not being used can be turned back out of the way.

No. 203. Champion Post Drill for hand only. Weight 400 pounds. Price.....\$50.00

No. 203-T. Champion Post Drill with 11 x 2½-inch tight and loose pulleys for hand and power combined. Price.....54.00

No. 203-C. Champion Post Drill with cone pulleys and cone countershaft for hand and power combined. Weight 450 pounds. Price.....65.00



No. 200 Post Drill

This drill is made with Automatic Self-Feed and Double Compound Link and Rack Lever-Feed which are independent of each other and can be changed from one to the other in an instant. It has two speeds with three gears in order to give the second speed same turning direction of the crank as first speed. All end friction on the drill spindle is eliminated by ball bearings, making it a very light running drill.

Drills to center of 16-inch circle and holes up to 1¼ inches. Spindle is 1¼-inch in diameter with up and down run of 4 inches and bored for ½-inch straight shank drills or ½ or 41/64-inch bits is so ordered.

No. 200. Champion Post Drill for hand only, weight 180 pounds. Price.....\$25.00

No. 200. Champion Post Drill with 6 x 2-inch tight and loose pulley for hand and power combined. Price.....28.00



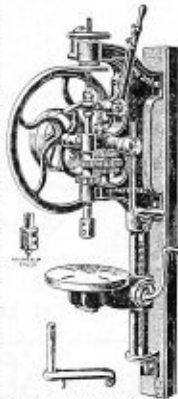
No. 201 Post Drill

The No. 201 Champion Post Drill will drill a 1-inch hole in cast iron with ease, owing to the new patented high pressure lever feed. It has two speeds which can be instantly changed by sliding the cut gears. Table is raised and lowered by rack and can be turned back out of the way.

Drills to center of 21-inch circle and holes up to 1½ inches. Spindle is 1¼-inch in diameter, up and down run 5½ inches, and bored for ½-inch straight shank bits or ½ or 41/64-inch bits if so ordered.

No. 201. Champion Post Drill for hand only, weight 375 pounds. Price.....\$40.00

No. 201. Champion Post Drill with 11 x 2½-inch tight and loose pulleys for hand and power combined. Price.....44.00



No. 203½ Upright Drill

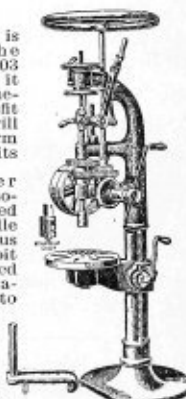
This drill is precisely the same as No. 203 except that it gives the mechanic the benefit of having a drill that stands firm and solid on its own base.

With either lever feed or automatic self feed the drill spindle has instantaneous return of drill bit out of hole drilled and instantaneous return on to material being drilled, for the next hole, enabling operator to increase production. Same specifications as the No. 203.

No. 203½. Champion Upright Drill for hand only. Weight 600 pounds. Price.....\$70.00

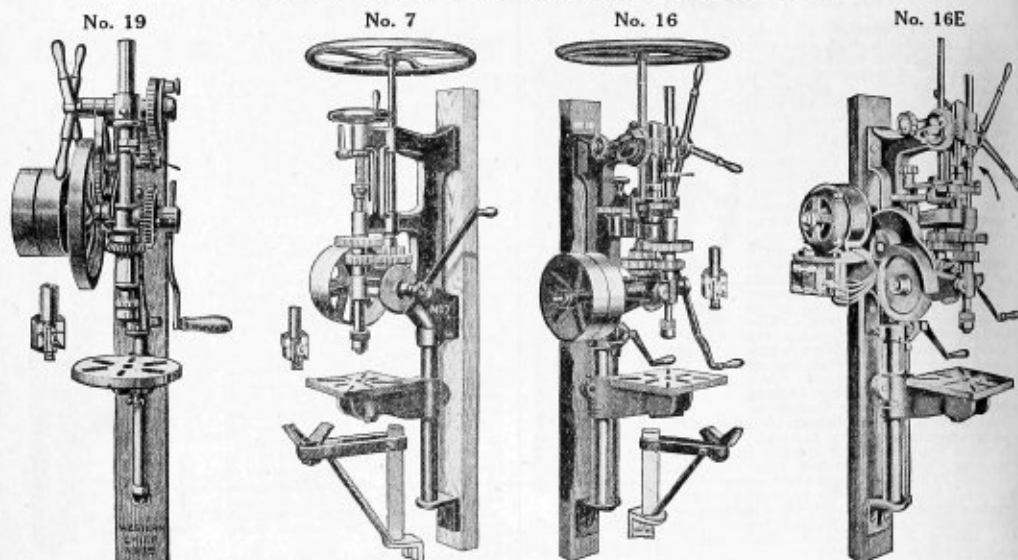
No. 203½-T with 11 x 2½-inch tight and loose pulleys for hand and power combined. Price.....75.00

No. 203½-C with cone pulleys and countershaft for hand and power combined. Price.....85.00



When ordering be sure to state whether spindle should be bored for ½ or ¾ inch drill bits.

Western Chief Blacksmiths' Post Drills



No. 19

A low-priced combined Hand and Self-Feed Drill, adapted to ordinary shop use. Hand and self-feed operated independently. A good drill for wood boring. Size of pulleys, 8x2 inches. Should be run at about 190 revolutions per minute.

No. 7

This drill is a hand and power drill with cut gears. Has automatic self-feed, and fast and slow speed, which can be changed instantly. Size of tight and loose pulleys for power, 10 $\frac{3}{4}$ x2 $\frac{1}{2}$ inches. Drills should be operated at about 175 revolutions per minute.

No. 16

This drill is a ball-bearing drill with power attachment, hand-lever feed and horizontal, gear-driven positive self-feed. Each feed works independently of the other. Has cut gears and rack for raising and lowering table. Size of tight and loose pulleys, 10 $\frac{3}{4}$ x2 $\frac{1}{2}$ inches. Drills should be run at 175 revolutions per minute.

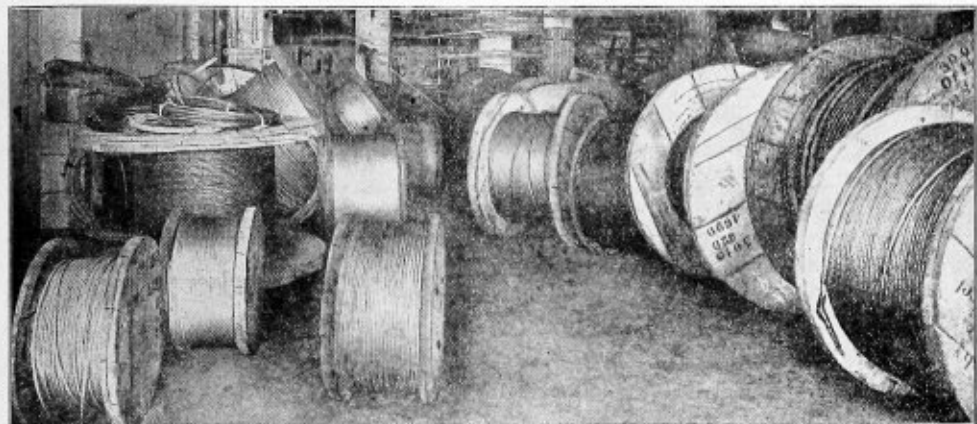
No. 16E

This drill has all the time and labor-saving features of the No. 16 Drill, and in addition is equipped with electric motor drive, which costs less than 25 cents per day to operate. No belts are necessary, the motor being directly connected with spur cut gears.

No.	Price for Hand Power Only	Price With T. & L. Pulleys	Price With Electric Motor	Drilling Circle, Inches	Drills Holes Size, Inches	Up and Down Run of Table, Inches	Up and Down Run of Spindle, Inches	Bored for S. S. Drills, Inches	Wheel Holder Attachment	Weight, Pounds	
										Hand	Power
19	\$18.00	\$20.00	.....	16 $\frac{1}{2}$	0 to 1 $\frac{1}{4}$	11	5 $\frac{1}{2}$	$\frac{1}{2}$ or $\frac{1}{4}$	.....	130	140
7	33.50	37.50	.....	21	0 to 1 $\frac{1}{2}$	16 $\frac{1}{2}$	5	$\frac{1}{2}$ or $\frac{1}{4}$	\$2.00	275	295
16	42.50	46.50	.....	24	0 to 1 $\frac{1}{2}$	15 $\frac{1}{2}$	6 $\frac{1}{2}$	$\frac{1}{2}$ or $\frac{1}{4}$	2.00	340	360
16E	.....	.....	\$150.00	24	0 to 1 $\frac{1}{2}$	15 $\frac{1}{2}$	6 $\frac{1}{2}$	$\frac{1}{2}$ or $\frac{1}{4}$	2.00	...	400

In these machines chuck is not separate but is attached to spindle.
In ordering, always state whether spindle is wanted bored for $\frac{1}{2}$ or $\frac{1}{4}$ straight shank drills.
We always furnish spindles bored for $\frac{1}{2}$ -inch straight shank drills unless otherwise ordered.

WIRE ROPE SECTION



A Section of Our Wire Rope Stock

Wire Rope—Grades and Constructions and Suggestions

Wire rope or wire cable, as some call it, is offered in different grades, different constructions and in sizes from 1-16 diameter (sash cord) up to 3 inches in diameter—sizes up to 2½ inch diameter, dredge cables being usually carried in our Chicago stock.

When doubtful as to the material to be used, the conditions under which the rope is to operate should always be given, in order that the proper construction and grade may be furnished. When possible, a rough sketch showing size and position of drums, sheaves and maximum load in pounds upon the rope, should be sent with the inquiry or order.

In designing a wire rope system of any sort, it is always advisable to use drums, sheaves and pulleys of the largest diameter practicable. Avoid high velocities and sharp bending, particularly reverse bending, all of which tend toward rapid deterioration of wire rope. Wherever possible, avoid overwinding on drums.

The larger the drum or sheaves, the longer the rope will last. Use grooved drum if possible.

The working loads for hoisting and haulage ropes should not exceed one-fifth the ultimate or breaking stress of the rope. The working load for standing or guy rope, however, may be somewhat exceeded. Where human life is at stake, the working load should be one-seventh or one-tenth of the strength of the rope.

To get more tonnage, increase the load, but not the speed, because wear of the rope increases with the speed.

The grooves of the drums, sheaves or pulleys should be perfectly smooth and uniform and of such shape that the rope cannot wedge. All sheaves or pulleys should be absolutely in line with the rope, so that it will not chafe on the sides of the groove.

Pulleys used for transmitting power should be lined with wood, leather or rubber. This will materially increase the life of wire rope, particularly where high speeds are necessary.

Do not subject wire rope to jerks or sudden stresses.

Galvanized ropes are not intended for general hoisting or running purposes. Bending over drums and sheaves will wear off the zinc and rust rapidly follows. Galvanized ropes have about ten per cent less strength than ungalvanized ropes.

To lubricate and protect wire rope from the weather, cover it with "Cabeline" dressing.

Unlike hemp or manila rope, wire rope should not be coiled or uncoiled, but must be wound or unwound as from a reel. It should be seized with soft iron wire on each side of the portion at which the cut is to be made to prevent the ends from untwisting.

Sizes of rope smaller than those published take same list price as smallest size listed.

Intermediate sizes of rope take list of next larger size.

Lay of Wire Rope



Regular Lay, Right Hand Rope
Always sent unless otherwise specified

Wires in the strands laid to the left, strands laid to the right.



Regular Lay, Left Hand Rope
Made to order only

Wires in the strands laid to the right, strands laid to the left.

Standard rope is made regular lay, right hand lay, unless otherwise specified. Lang lay rope, also left lay rope, take the same list prices and discounts as regular lay, right hand rope.



Coils or short pieces as ordinarily shipped.

Wire Rope or Cable

Wire rope or wire cable, is offered in 6 different grades, 11 different constructions and in sizes from $\frac{1}{16}$ inch diameter (sash cord) up to 3 inches in diameter—sizes up to $\frac{1}{2}$ inch diameter, dredge cables, being carried in our Chicago stock.

When doubtful as to the material to be used, the conditions under which the rope is to operate should always be given, in order that the proper construction and grade may be furnished. When possible, a rough sketch showing size and position of sheaves and maximum load in pounds upon the rope, should be sent with the inquiry or order.



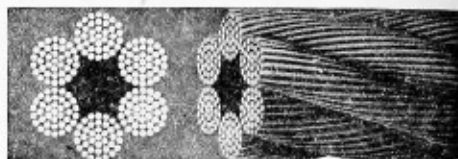
Standard Wooden Reel. Reels contain 5 to 10,000 feet of rope, depending upon the size of rope.

Standard Construction Wire Hoisting Rope (6x19)

6 strands—19 wires to each strand—one hemp center

This construction is by far the most popular for ordinary work. It is pliable and will pass over reasonably large drums or sheaves. The crucible and extra strong crucible grades are used for ordinary hoisting, such as on derricks, small dredges, etc.

Where the loads are heavy and the service severe, the Standard Plow and Bullock extra quality Plow Steels meet the most exacting requirements. The iron rope is but little used except for transmission of power over small sheaves.



"Bullock" Extra Quality Plow Steel Hoisting Rope (6x19 Construction)

Made from drawn wires having a tensile strength of 225,000 to 280,000 lbs. per square inch of sectional area.

Bullock rope is the strongest and toughest wire rope obtainable—it is the best and cheapest that can be used where great strength and hard service is required. For dredges, steam shovels, stump pullers, well drills, railroad wrecking cars and ballast unloaders, heavy derricks—for rapid coal hoisting or wherever a rope is subjected to the severest pulling stresses or wear, Bullock rope will give the best of satisfaction. In this grade of rope the highest tensile strength possible is obtained without sacrificing the toughness, pliability and elasticity.

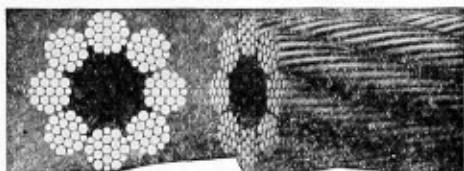
Diameter.....inches	$\frac{3}{4}$	$\frac{7}{8}$	1	1 $\frac{1}{8}$	1 $\frac{1}{2}$	1 $\frac{3}{4}$	2	2 $\frac{1}{2}$	3	3 $\frac{1}{2}$	4	5	6	7	8	9	10	11	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60	62	64	66	68	70	72	74	76	78	80	82	84	86	88	90	92	94	96	98	100	102	104	106	108	110	112	114	116	118	120	122	124	126	128	130	132	134	136	138	140	142	144	146	148	150	152	154	156	158	160	162	164	166	168	170	172	174	176	178	180	182	184	186	188	190	192	194	196	198	200	202	204	206	208	210	212	214	216	218	220	222	224	226	228	230	232	234	236	238	240	242	244	246	248	250	252	254	256	258	260	262	264	266	268	270	272	274	276	278	280	282	284	286	288	290	292	294	296	298	300	302	304	306	308	310	312	314	316	318	320	322	324	326	328	330	332	334	336	338	340	342	344	346	348	350	352	354	356	358	360	362	364	366	368	370	372	374	376	378	380	382	384	386	388	390	392	394	396	398	400	402	404	406	408	410	412	414	416	418	420	422	424	426	428	430	432	434	436	438	440	442	444	446	448	450	452	454	456	458	460	462	464	466	468	470	472	474	476	478	480	482	484	486	488	490	492	494	496	498	500	502	504	506	508	510	512	514	516	518	520	522	524	526	528	530	532	534	536	538	540	542	544	546	548	550	552	554	556	558	560	562	564	566	568	570	572	574	576	578	580	582	584	586	588	590	592	594	596	598	600	602	604	606	608	610	612	614	616	618	620	622	624	626	628	630	632	634	636	638	640	642	644	646	648	650	652	654	656	658	660	662	664	666	668	670	672	674	676	678	680	682	684	686	688	690	692	694	696	698	700	702	704	706	708	710	712	714	716	718	720	722	724	726	728	730	732	734	736	738	740	742	744	746	748	750	752	754	756	758	760	762	764	766	768	770	772	774	776	778	780	782	784	786	788	790	792	794	796	798	800	802	804	806	808	810	812	814	816	818	820	822	824	826	828	830	832	834	836	838	840	842	844	846	848	850	852	854	856	858	860	862	864	866	868	870	872	874	876	878	880	882	884	886	888	890	892	894	896	898	900	902	904	906	908	910	912	914	916	918	920	922	924	926	928	930	932	934	936	938	940	942	944	946	948	950	952	954	956	958	960	962	964	966	968	970	972	974	976	978	980	982	984	986	988	990	992	994	996	998	1000	1002	1004	1006	1008	1010	1012	1014	1016	1018	1020	1022	1024	1026	1028	1030	1032	1034	1036	1038	1040	1042	1044	1046	1048	1050	1052	1054	1056	1058	1060	1062	1064	1066	1068	1070	1072	1074	1076	1078	1080	1082	1084	1086	1088	1090	1092	1094	1096	1098	1100	1102	1104	1106	1108	1110	1112	1114	1116	1118	1120	1122	1124	1126	1128	1130	1132	1134	1136	1138	1140	1142	1144	1146	1148	1150	1152	1154	1156	1158	1160	1162	1164	1166	1168	1170	1172	1174	1176	1178	1180	1182	1184	1186	1188	1190	1192	1194	1196	1198	1200	1202	1204	1206	1208	1210	1212	1214	1216	1218	1220	1222	1224	1226	1228	1230	1232	1234	1236	1238	1240	1242	1244	1246	1248	1250	1252	1254	1256	1258	1260	1262	1264	1266	1268	1270	1272	1274	1276	1278	1280	1282	1284	1286	1288	1290	1292	1294	1296	1298	1300	1302	1304	1306	1308	1310	1312	1314	1316	1318	1320	1322	1324	1326	1328	1330	1332	1334	1336	1338	1340	1342	1344	1346	1348	1350	1352	1354	1356	1358	1360	1362	1364	1366	1368	1370	1372	1374	1376	1378	1380	1382	1384	1386	1388	1390	1392	1394	1396	1398	1400	1402	1404	1406	1408	1410	1412	1414	1416	1418	1420	1422	1424	1426	1428	1430	1432	1434	1436	1438	1440	1442	1444	1446	1448	1450	1452	1454	1456	1458	1460	1462	1464	1466	1468	1470	1472	1474	1476	1478	1480	1482	1484	1486	1488	1490	1492	1494	1496	1498	1500	1502	1504	1506	1508	1510	1512	1514	1516	1518	1520	1522	1524	1526	1528	1530	1532	1534	1536	1538	1540	1542	1544	1546	1548	1550	1552	1554	1556	1558	1560	1562	1564	1566	1568	1570	1572	1574	1576	1578	1580	1582	1584	1586	1588	1590	1592	1594	1596	1598	1600	1602	1604	1606	1608	1610	1612	1614	1616	1618	1620	1622	1624	1626	1628	1630	1632	1634	1636	1638	1640	1642	1644	1646	1648	1650	1652	1654	1656	1658	1660	1662	1664	1666	1668	1670	1672	1674	1676	1678	1680	1682	1684	1686	1688	1690	1692	1694	1696	1698	1700	1702	1704	1706	1708	1710	1712	1714	1716	1718	1720	1722	1724	1726	1728	1730	1732	1734	1736	1738	1740	1742	1744	1746	1748	1750	1752	1754	1756	1758	1760	1762	1764	1766	1768	1770	1772	1774	1776	1778	1780	1782	1784	1786	1788	1790	1792	1794	1796	1798	1800	1802	1804	1806	1808	1810	1812	1814	1816	1818	1820	1822	1824	1826	1828	1830	1832	1834	1836	1838	1840	1842	1844	1846	1848	1850	1852	1854	1856	1858	1860	1862	1864	1866	1868	1870	1872	1874	1876	1878	1880	1882	1884	1886	1888	1890	1892	1894	1896	1898	1900	1902	1904	1906	1908	1910	1912	1914	1916	1918	1920	1922	1924	1926	1928	1930	1932	1934	1936	1938	1940	1942	1944	1946	1948	1950	1952	1954	1956	1958	1960	1962	1964	1966	1968	1970	1972	1974	1976	1978	1980	1982	1984	1986	1988	1990	1992	1994	1996	1998	2000	2002	2004	2006	2008	2010	2012	2014	2016	2018	2020	2022	2024	2026	2028	2030	2032	2034	2036	2038	2040	2042	2044	2046	2048	2050	2052	2054	2056	2058	2060	2062	2064	2066	2068	2070	2072	2074	2076	2078	2080	2082	2084	2086	2088	2090	2092	2094	2096	2098	2100	2102	2104	2106	2108	2110	2112	2114	2116	2118	2120	2122	2124	2126	2128	2130	2132	2134	2136	2138	2140	2142	2144	2146	2148	2150	2152	2154	2156	2158	2160	2162	2164	2166	2168	2170	2172	2174	2176	2178	2180	2182	2184	2186	2188	2190	2192	2194	2196	2198	2200	2202	2204	2206	2208	2210	2212	2214	2216	2218	2220	2222	2224	2226	2228	2230	2232	2234	2236	2238	2240	2242	2244	2246	2248	2250	2252	2254	2256	2258	2260	2262	2264	2266	2268	2270	2272	2274	2276	2278	2280	2282	2284	2286	2288	2290	2292	2294	2296	2298	2300	2302	2304	2306	2308	2310	2312	2314	2316	2318	2320	2322	2324	2326	2328	2330	2332	2334	2336	2338	2340	2342	2344	2346	2348	2350	2352	2354	2356	2358	2360	2362	2364	2366	2368	2370	2372	2374	2376	2378	2380	2382	2384	2386	2388	2390	2392	2394	2396	2398	2400	2402	2404	2406	2408	2410	2412	2414	2416	2418	2420	2422	2424	2426	2428	2430	2432	2434	2436	2438	2440	2442	2444	2446	2448	2450	2452	2454	2456	2458	2460	2462	2464	2466	2468	2470	2472	2474	2476	2478	2480	2482	2484	2486	2488	2490	2492	2494	2496	2498	2500	2502	2504	2506	2508	2510	2512	2514	2516	2518	2520	2522	2524	2526	2528	2530	2532	2534	2536	2538	2540	2542	2544	2546	2548	2550	2552	2554	2556	2558	2560	2562	2564	2566	2568	2570	2572	2574	2576	2578	2580	2582	2584	2586	2588	2590	2592	2594	2596	2598	2600	2602	2604	2606	2608	2610	2612	2614	2616	2618	2620	2622	2624	2626	2628	2630	2632	2634	2636	2638	2640	2642	2644	2646	2648	2650	2652	2654	2656	2658	2660	2662	2664	2666	2668	2670	2672	2674	2676	2678	2680	2682	2684	2686	2688	2690	2692	2694	2696	2698	2700	2702	2704	2706	2708	2710	2712	2714	2716	2718	2720	2722	2724	2726	2728	2730	2732	2734	2736	2738	2740	2742	2744	2746	2748	2750	2752	2754	2756	2758	2760	2762	2764	2766	2768	2770	2772	2774	2776	2778	2780	2782	2784	2786	2788	2790	2792	2794	2796	2798	2800	2802	2804	2806	2808	2810	2812	2814	2816	2818	2820	2822	2824	2826	2828	2830	2832	2834	2836	2838	2840</
---------------------	---------------	---------------	---	-----------------	-----------------	-----------------	---	-----------------	---	-----------------	---	---	---	---	---	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	--------

"Extra Flexible" Construction Wire Hoisting Rope, (8x19)

8 strands—19 wires to each strand—one hemp center

This rope has two more strands and smaller wires than the standard 6 strand rope. The large hemp center reduces the strength somewhat, but under certain conditions where great flexibility is required and the load is light, this construction, owing to its ability to withstand severe bending, retains its strength longer than the standard six strand rope.

Used on derricks, coal handling machinery, pile drivers, steam shovels and for tubing and casing lines in oil districts. For description of the several grades see 6x19 Construction.

**"Bullock" Extra Quality Plow Steel Hoisting Rope (8x19 Construction)**

Diameter in inches	3/4	1 1/4	1 3/4	2	2 1/4	2 3/4	3	3 1/4
Approximate Strength, tons	5.6	9.5	13	18	23	28	36	46
Proper Working Load, tons	1.10	1.9	2.6	3.6	4.6	5.6	7.2	9.1
Approximate weight, per 100 feet, pounds	20	35	56	80	106	142	180	220
List price per foot	\$0.16 1/2	\$0.19	\$0.25	\$0.34	\$0.43	\$0.55	\$0.68	\$0.82

"Standard Plow" Steel Hoisting Rope (8x19 Construction)

Diameter, in inches	3/4	1 1/4	1 3/4	2	2 1/4	2 3/4	3	3 1/4
Approximate strength, tons	5.12	8.7	14	20	26	33	43	52
Proper Working load, tons	1.02	1.74	2.8	4	5.2	6.7	8.6	10.4
Approximate weight, per 100 feet, pounds	20	35	56	80	106	112	180	200
List price per foot	\$0.14	\$0.16	\$0.21	\$0.29	\$0.33	\$0.48	\$0.60	\$0.72

"Extra Strong Crucible" Steel Hoisting Rope (8x19 Construction)

Diameter, in inches	3/4	1 1/4	1 3/4	2	2 1/4	2 3/4	3	3 1/4
Approximate strength, tons	4.66	8	12.4	17.6	23	29.7	38	47
Proper Working Load, tons	.93	1.6	2.5	3.5	4.6	5.9	7.6	9.4
Approximate weight, per 100 feet, pounds	20	35	58	89	108	142	180	220
List price, per foot	\$0.12 1/4	\$0.14	\$0.18 1/2	\$0.25	\$0.32	\$0.41	\$0.51	\$0.62

"Crucible" Steel Wire Hoisting Rope (8x19 Construction)

Diameter, in inches	3/4	1 1/4	1 3/4	2	2 1/4	2 3/4	3	3 1/4
Approximate strength, tons	4.2	7.3	10.9	15.3	20	26	34	42
Proper working load, tons	.84	1.46	2.18	3.06	4	5.2	6.8	8.4
Approximate weight, per 100 feet, pounds	20	35	56	89	108	142	180	220
List price, per foot	\$0.10 1/2	\$0.12	\$0.16	\$0.21	\$0.27	\$0.34	\$0.42	\$0.51

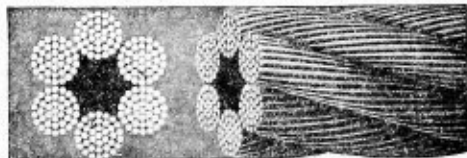
"Special Flexible" Construction Wire Hoisting Rope, (6x37)

6 strands—37 wires to each strand—one hemp center

Designed for crane, dredge and other uses where strength and extreme flexibility are essential.

The wires are of a necessity finer than those of 6x19 or 8x19 constructions and this rope consequently must not be subjected to as much abrasive wear.

This rope is used largely on overhead traveling cranes. For description of the several grades see 6x19 Construction.

**"Bullock" Extra Quality Plow Steel Hoisting Rope, (6x37 Construction)**

Diameter	in inches		1 1/2	2	2 1/2	3	3 1/2	4	4 1/2	5	5 1/2	6	6 1/2	7	7 1/2	8	8 1/2	9	9 1/2	10	10 1/2	11	11 1/2	12	12 1/2	13	13 1/2	14	14 1/2	15	15 1/2	16	16 1/2	17	17 1/2	18	18 1/2	19	19 1/2	20	20 1/2	21	21 1/2	22	22 1/2	23	23 1/2	24	24 1/2	25	25 1/2	26	26 1/2	27	27 1/2	28	28 1/2	29	29 1/2	30	30 1/2	31	31 1/2	32	32 1/2	33	33 1/2	34	34 1/2	35	35 1/2	36	36 1/2	37	37 1/2	38	38 1/2	39	39 1/2	40	40 1/2	41	41 1/2	42	42 1/2	43	43 1/2	44	44 1/2	45	45 1/2	46	46 1/2	47	47 1/2	48	48 1/2	49	49 1/2	50	50 1/2	51	51 1/2	52	52 1/2	53	53 1/2	54	54 1/2	55	55 1/2	56	56 1/2	57	57 1/2	58	58 1/2	59	59 1/2	60	60 1/2	61	61 1/2	62	62 1/2	63	63 1/2	64	64 1/2	65	65 1/2	66	66 1/2	67	67 1/2	68	68 1/2	69	69 1/2	70	70 1/2	71	71 1/2	72	72 1/2	73	73 1/2	74	74 1/2	75	75 1/2	76	76 1/2	77	77 1/2	78	78 1/2	79	79 1/2	80	80 1/2	81	81 1/2	82	82 1/2	83	83 1/2	84	84 1/2	85	85 1/2	86	86 1/2	87	87 1/2	88	88 1/2	89	89 1/2	90	90 1/2	91	91 1/2	92	92 1/2	93	93 1/2	94	94 1/2	95	95 1/2	96	96 1/2	97	97 1/2	98	98 1/2	99	99 1/2	100	100 1/2	101	101 1/2	102	102 1/2	103	103 1/2	104	104 1/2	105	105 1/2	106	106 1/2	107	107 1/2	108	108 1/2	109	109 1/2	110	110 1/2	111	111 1/2	112	112 1/2	113	113 1/2	114	114 1/2	115	115 1/2	116	116 1/2	117	117 1/2	118	118 1/2	119	119 1/2	120	120 1/2	121	121 1/2	122	122 1/2	123	123 1/2	124	124 1/2	125	125 1/2	126	126 1/2	127	127 1/2	128	128 1/2	129	129 1/2	130	130 1/2	131	131 1/2	132	132 1/2	133	133 1/2	134	134 1/2	135	135 1/2	136	136 1/2	137	137 1/2	138	138 1/2	139	139 1/2	140	140 1/2	141	141 1/2	142	142 1/2	143	143 1/2	144	144 1/2	145	145 1/2	146	146 1/2	147	147 1/2	148	148 1/2	149	149 1/2	150	150 1/2	151	151 1/2	152	152 1/2	153	153 1/2	154	154 1/2	155	155 1/2	156	156 1/2	157	157 1/2	158	158 1/2	159	159 1/2	160	160 1/2	161	161 1/2	162	162 1/2	163	163 1/2	164	164 1/2	165	165 1/2	166	166 1/2	167	167 1/2	168	168 1/2	169	169 1/2	170	170 1/2	171	171 1/2	172	172 1/2	173	173 1/2	174	174 1/2	175	175 1/2	176	176 1/2	177	177 1/2	178	178 1/2	179	179 1/2	180	180 1/2	181	181 1/2	182	182 1/2	183	183 1/2	184	184 1/2	185	185 1/2	186	186 1/2	187	187 1/2	188	188 1/2	189	189 1/2	190	190 1/2	191	191 1/2	192	192 1/2	193	193 1/2	194	194 1/2	195	195 1/2	196	196 1/2	197	197 1/2	198	198 1/2	199	199 1/2	200	200 1/2	201	201 1/2	202	202 1/2	203	203 1/2	204	204 1/2	205	205 1/2	206	206 1/2	207	207 1/2	208	208 1/2	209	209 1/2	210	210 1/2	211	211 1/2	212	212 1/2	213	213 1/2	214	214 1/2	215	215 1/2	216	216 1/2	217	217 1/2	218	218 1/2	219	219 1/2	220	220 1/2	221	221 1/2	222	222 1/2	223	223 1/2	224	224 1/2	225	225 1/2	226	226 1/2	227	227 1/2	228	228 1/2	229	229 1/2	230	230 1/2	231	231 1/2	232	232 1/2	233	233 1/2	234	234 1/2	235	235 1/2	236	236 1/2	237	237 1/2	238	238 1/2	239	239 1/2	240	240 1/2	241	241 1/2	242	242 1/2	243	243 1/2	244	244 1/2	245	245 1/2	246	246 1/2	247	247 1/2	248	248 1/2	249	249 1/2	250	250 1/2	251	251 1/2	252	252 1/2	253	253 1/2	254	254 1/2	255	255 1/2	256	256 1/2	257	257 1/2	258	258 1/2	259	259 1/2	260	260 1/2	261	261 1/2	262	262 1/2	263	263 1/2	264	264 1/2	265	265 1/2	266	266 1/2	267	267 1/2	268	268 1/2	269	269 1/2	270	270 1/2	271	271 1/2	272	272 1/2	273	273 1/2	274	274 1/2	275	275 1/2	276	276 1/2	277	277 1/2	278	278 1/2	279	279 1/2	280	280 1/2	281	281 1/2	282	282 1/2	283	283 1/2	284	284 1/2	285	285 1/2	286	286 1/2	287	287 1/2	288	288 1/2	289	289 1/2	290	290 1/2	291	291 1/2	292	292 1/2	293	293 1/2	294	294 1/2	295	295 1/2	296	296 1/2	297	297 1/2	298	298 1/2	299	299 1/2	300	300 1/2	301	301 1/2	302	302 1/2	303	303 1/2	304	304 1/2	305	305 1/2	306	306 1/2	307	307 1/2	308	308 1/2	309	309 1/2	310	310 1/2	311	311 1/2	312	312 1/2	313	313 1/2	314	314 1/2	315	315 1/2	316	316 1/2	317	317 1/2	318	318 1/2	319	319 1/2	320	320 1/2	321	321 1/2	322	322 1/2	323	323 1/2	324	324 1/2	325	325 1/2	326	326 1/2	327	327 1/2	328	328 1/2	329	329 1/2	330	330 1/2	331	331 1/2	332	332 1/2	333	333 1/2	334	334 1/2	335	335 1/2	336	336 1/2	337	337 1/2	338	338 1/2	339	339 1/2	340	340 1/2	341	341 1/2	342	342 1/2	343	343 1/2	344	344 1/2	345	345 1/2	346	346 1/2	347	347 1/2	348	348 1/2	349	349 1/2	350	350 1/2	351	351 1/2	352	352 1/2	353	353 1/2	354	354 1/2	355	355 1/2	356	356 1/2	357	357 1/2	358	358 1/2	359	359 1/2	360	360 1/2	361	361 1/2	362	362 1/2	363	363 1/2	364	364 1/2	365	365 1/2	366	366 1/2	367	367 1/2	368	368 1/2	369	369 1/2	370	370 1/2	371	371 1/2	372	372 1/2	373	373 1/2	374	374 1/2	375	375 1/2	376	376 1/2	377	377 1/2	378	378 1/2	379	379 1/2	380	380 1/2	381	381 1/2	382	382 1/2	383	383 1/2	384	384 1/2	385	385 1/2	386	386 1/2	387	387 1/2	388	388 1/2	389	389 1/2	390	390 1/2	391	391 1/2	392	392 1/2	393	393 1/2	394	394 1/2	395	395 1/2	396	396 1/2	397	397 1/2	398	398 1/2	399	399 1/2	400	400 1/2	401	401 1/2	402	402 1/2	403	403 1/2	404	404 1/2	405	405 1/2	406	406 1/2	407	407 1/2	408	408 1/2	409	409 1/2	410	410 1/2	411	411 1/2	412	412 1/2	413	413 1/2	414	414 1/2	415	415 1/2	416	416 1/2	417	417 1/2	418	418 1/2	419	419 1/2	420	420 1/2	421	421 1/2	422	422 1/2	423	423 1/2	424	424 1/2	425	425 1/2	426	426 1/2	427	427 1/2	428	428 1/2	429	429 1/2	430	430 1/2	431	431 1/2	432	432 1/2	433	433 1/2	434	434 1/2	435	435 1/2	436	436 1/2	437	437 1/2	438	438 1/2	439	439 1/2	440	440 1/2	441	441 1/2	442	442 1/2	443	443 1/2	444	444 1/2	445	445 1/2	446	446 1/2	447	447 1/2	448	448 1/2	449	449 1/2	450	450 1/2	451	451 1/2	452	452 1/2	453	453 1/2	454	454 1/2	455	455 1/2	456	456 1/2	457	457 1/2	458	458 1/2	459	459 1/2	460	460 1/2	461	461 1/2	462	462 1/2	463	463 1/2	464	464 1/2	465	465 1/2	466	466 1/2	467	467 1/2	468	468 1/2	469	469 1/2	470	470 1/2	471	471 1/2	472	472 1/2	473	473 1/2	474	474 1/2	475	475 1/2	476	476 1/2	477	477 1/2	478	478 1/2	479	479 1/2	480	480 1/2	481	481 1/2	482	482 1/2	483	483 1/2	484	484 1/2	485	485 1/2	486	486 1/2	487	487 1/2	488	488 1/2	489	489 1/2	490	490 1/2	491	491 1/2	492	492 1/2	493	493 1/2	494	494 1/2	495	495 1/2	496	496 1/2	497	497 1/2	498	498 1/2	499	499 1/2	500	500 1/2	501	501 1/2	502	502 1/2	503	503 1/2	504	504 1/2	505	505 1/2	506	506 1/2	507	507 1/2	508	508 1/2	509	509 1/2	510	510 1/2	511	511 1/2	512	512 1/2	513	513 1/2	514	514 1/2	515	515 1/2	516	516 1/2	517	517 1/2	518	518 1/2	519	519 1/2	520	520 1/2	521	521 1/2	522	522 1/2	523	523 1/2	524	524 1/2	525	525 1/2	526	526 1/2	527	527 1/2	528	528 1/2	529	529 1/2	530	530 1/2	531	531 1/2	532	532 1/2	533	533 1/2	534	534 1/2	535	535 1/2	536	536 1/2	537	537 1/2	538	538 1/2	539	539 1/2	540	540 1/2	541	541 1/2	542	542 1/2	543	543 1/2	544	544 1/2	545	545 1/2	546	546 1/2	547	547 1/2	548	548 1/2	549	549 1/2	550	550 1/2	551	551 1/2	552	552 1/2	553	553 1/2	554	554 1/2	555	555 1/2	556	556 1/2	557	557 1/2	558	558 1/2	559	559 1/2	560	560 1/2	561	561 1/2	562	562 1/2	563	563 1/2	564	564 1/2	565	565 1/2	566	566 1/2	567	567 1/2	568	568 1/2	569	569 1/2	570	570 1/2	571	571 1/2	572	572 1/2	573	573 1/2	574	574 1/2	575	575 1/2	576	576 1/2	577	577 1/2	578	578 1/2	579	579 1/2	580	580 1/2	581	581 1/2	582	582 1/2	583	583 1/2	584	584 1/2	585	585 1/2	586	586 1/2	587	587 1/2	588	588 1/2	589	589 1/2	590	590 1/2	591	591 1/2	592	592 1/2	593	593 1/2	594	594 1/2	595	595 1/2	596	596 1/2	597	597 1/2	598	598 1/2	599	599 1/2	600	600 1/2	601	601 1/2	602	602 1/2	603	603 1/2	604	604 1/2	605	605 1/2	606	606 1/2	607	607 1/2	608	608 1/2	609	609 1/2	610	610 1/2	611	611 1/2	612	612 1/2	613	613 1/2	614	614 1/2	615	615 1/2	616	616 1/2	617	617 1/2	618	618 1/2	619	619 1/2	620	620 1/2	621	621 1/2	622	622 1/2	623	623 1/2	624	624 1/2	625	625 1/2	626	626 1/2	627	627 1/2	628	628 1/2	629	629 1/2	630
----------------	-----------	--	-------	---	-------	---	-------	---	-------	---	-------	---	-------	---	-------	---	-------	---	-------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----

"Reliance" Elevator Hoisting Cable (Genuine Imported Swedes Iron)



6 Strands of 19
Wires Each One
Hemp Center

For Elevator Hoisting and Counterweight Cables

We guarantee that our Reliance rope is made of wires drawn from the finest Swedish Charcoal Iron Rods. These wires are uniform in strength, tough, pliable and elastic. The quality of wire used in our Reliance cables and the construction of them is the result of many years' experience.

The finished rope is the finest that can be made for elevator purposes, as the wire will wear without hardening and will not crack and stick out as do the wires in many ropes that have been in service but a short time. As the safety of human life is dependent upon the use of cables in elevators, the greatest care should be used in their selection. Factor of safety should be one-seventh to one-tenth of the breaking strength of the rope.

Where ropes are used in pairs, we can supply left laid rope; otherwise we furnish right hand rope.

Where the sheaves are small this rope is sometimes used for transmission or power.

Diameter, inches	1 1/4	1 1/2	1 3/4	2	2 1/4	2 3/4	3	3 1/2	4
Approximate strength, pounds	2,200	3,000	4,800	7,800	12,000	17,000	23,600	29,000	
Working load at 1-5 of strength, pounds	440	600	960	1,560	2,400	3,400	4,720	5,800	
Diameter drums or sheaves advised, inches	18	24	27	36	48	54	66	72	
Approximate weight, per 100 feet, pounds	10	15	22	39	62	89	120	158	
List price, per foot	\$0.09	\$0.09 1/2	\$0.09 1/2	\$0.11	\$0.14	\$0.19	\$0.24	\$0.31	

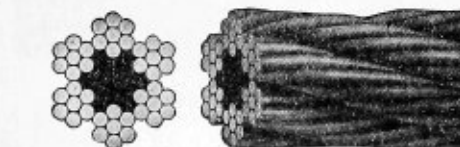
Reliance Swedes Iron Tiller or Elevator Rope (6x6x7)

6 strands of 42 wires each—252 wires in all—7 hemp cores.

The 3/4, 1 1/2 and 1 3/4-inch sizes are used for starting and stopping elevators and called "elevator shipper rope."

This is an exceedingly flexible rope, capable of bending over very small sheaves. Being composed of very fine wires, however, it will not stand much abrasive wear and loads should be light.

Diameter, inches	1 1/4	1 1/2	1 3/4	2	2 1/4	2 3/4	3	3 1/2	4
Approximate strength, Reliance Iron, pounds	1,300	1,900	3,000	5,800	7,000	11,000	15,500	22,000	
Approximate strength, Ex. Strong Crucible, pounds	2,500	3,600	4,800	9,000	13,500	18,000	26,000	35,000	
Diameter of drums or sheaves advised, inches	6	7 1/2	9	12	15	18	21	24	
Approximate weight, per 100 feet, pounds	7	11	16	28	43	62	84	110	
List price, per foot	\$0.07 1/2	\$0.08	\$0.09	\$0.11 1/2	\$0.17	\$0.22	\$0.27	\$0.33	



Transmission Haulage or Standing Rope

6 strands—7 wires to each strand—one hemp core

The coarse wires in this construction resist abrasion and corrosion to the greatest possible extent. It makes a very stiff rope, however, and when used for transmission of power, the sheaves must be very large. Haulage rope is used for mine haulage, conveyors or inclined planes. Standing or Guy ropes usually furnished galvanized.

Diameter, inches	1 1/4	1 1/2	1 3/4	2	2 1/4	2 3/4	3	3 1/2	4
Working load, American Iron, tons	44	74	1.2	1.7	2.4	3	3.8	4.6	6.4
Working load, Crucible Steel, tons	92	1.5	2.6	3.7	4.8	6.2	7.4	9.2	10.6
Working load, Ex. Strong Crucible, tons	1.05	1.8	2.9	4.2	5.6	7	8.6	10.8	14.6
Working load, Standard Plow Steel, tons	1.2	2	3.2	4.6	6.2	7.6	9.4	12	16.4
Working load, Bullock Ex. Quality Plow Steel, tons	1.3	2.2	3.5	5	6.6	8.4	10	13	18
Approximate weight, per 100 feet, pounds	22	39	62	89	120	158	200	245	355
Price, per 100 feet, Domestic Iron	\$0.04 1/2	\$0.06 1/2	\$0.10	\$0.14	\$0.18 1/2	\$0.24	\$0.30	\$0.36	\$0.51
Price, per 100 feet, Crucible Steel	08 1/2	.08	.12	.17	.22 1/2	.29	.36	.43	.60
Price, per 100 feet, Ex. Strong Crucible Steel	.06	.09 1/2	.14 1/2	.20	.27	.35	.44	.53	.75
Price, per 100 feet, Standard Plow Steel	.06 1/2	.11 1/2	.17 1/2	.24 1/2	.32	.41	.51	.62	.90
Price, per 100 feet, Bullock Ex. Qual. Plow Steel	.08 1/2	.13 1/2	.20 1/2	.28 1/2	.37	.48	.58	.72	1.05

Galvanized Standing or Guy Rope (6x7)

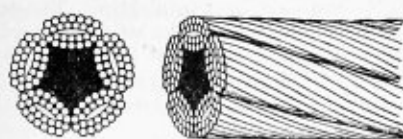
Same construction as shown in illustration above. Extra galvanized by special process, the galvanizing does not chip or flake. Used for guys for derricks, smoke stacks, etc., also for ships' standing rigging.

Furnished in two grades—American Iron grade and Crucible Steel grade.

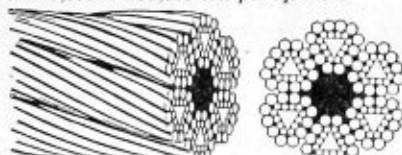
Diameter, inches	1 1/4	1 1/2	1 3/4	2	2 1/4	2 3/4	3	3 1/2	4
Approx. strength, Domestic Iron, tons	1.42	1.95	3.39	5.7	7.8	11.1	14.1	18	23
Approx. strength, Crucible Steel, tons	3.2	4.2	7	11.7	16.8	22	28	34	42
Approx. weight, per 100 feet, pounds	15	22	39	62	89	120	158	200	245
List price per foot, Galv. Domestic Iron	\$0.03 1/2	\$0.04 1/2	\$0.06	\$0.08	\$0.09	\$0.13	\$0.15	\$0.19 1/2	\$0.25
List price per foot, Galv. Crucible Steel	.04 3/4	.06	.08 1/2	.13	.18 1/2	.24 1/2	.31 1/2	.39 1/2	.47

"Bullock" Special Construction Wire Rope

Made from drawn wires having a tensile strength of 220,000 to 280,000 lbs. per sq. inch.



Type A. 5 strands—28 wires to strand—1 hemp core



Type B. 6 strands—25 wires to strand—1 hemp core

Bullock Flattened Strand (Lang's Lay) Wire Rope

These peculiar forms of construction produce a combination of flexibility with increased wearing surfaces which makes them particularly efficient in certain service. Type A—this rope in sizes smaller than 1½ inch is used for general hoisting. Type B is used in all sizes for hoisting, dredging, haulage systems, logging, etc.

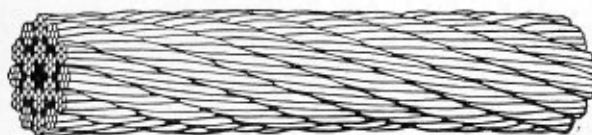
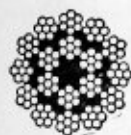
Type A—5 x 28 Construction

Diameter	inches	1½	1¾	2	2¼	2½	3	3½	4	4½	5
Price	per foot	\$0.20¾	\$0.25	\$0.28	\$0.37½	\$0.49	\$0.60	\$0.71	\$0.89	\$1.12	\$1.37
Working load, in tons of 2000 lbs.		2.42	2.9	3.8	5.26	7	9	11.2	13.8	16.8	19.6
Approx. weight per foot	lbs.	.39	.50	.62	.89	1.20	1.58	2.00	2.45	3.00	3.55

Type B—6 x 25 Construction

Diameter	inches	1½	1¾	2	2¼	2½	3	3½	4	4½	5
Price	per foot	\$0.20¾	\$0.25	\$0.28	\$0.37½	\$0.49	\$0.60	\$0.71	\$0.89	\$1.12	\$1.37
Working load, in tons of 2000 lbs.		2.7	3.2	4.2	5.8	7.8	10	12.4	15.2	18.4	21.6
Approx. weight per foot	lbs.	.45	.58	.72	1.00	1.38	1.80	2.30	2.80	3.45	4.00

Bullock Non-Spinning Plow Steel Hoisting Rope



18 strands—7 wires each—1 hemp core

Especially adapted for single line derricks, mine shaft sinking, grab bucket dredging, etc.

Holds the load still without spinning or untwisting. Should not be loaded as heavily as ordinary hoisting rope if best results are to be obtained.

Should be fastened with socket connections.

Diameter	inches	1½	2	2½	3	3½	4	4½	5	5½	6
Price	per foot	\$0.17	\$0.22½	\$0.31	\$0.39	\$0.50	\$0.62	\$0.75	\$0.90	\$1.10	\$1.37
Approx. Breaking stress	tons	10.7	17.3	27	35	39	52.2	62.5	75.5	90.7	110
Working load in tons of 2000 lbs.		2.1	3.4	5.4	7	7.8	10.4	12.5	15.1	18.1	21.6
Approx. weight per foot	lbs.	.42	.70	1.02	1.44	1.73	2.34	2.80	3.60	4.32	5.25



Showing 6 x 37 construction, special flexible

Bullock "Steel Clad" Dredge Rope

Ropes of this construction may be used for unusually severe conditions of service where the additional wearing surface due to the flat steel strips, spirally served, materially increases the durability of the rope thus employed. Recommended particularly for dredging and similar difficult conditions.

6 Strand—19 Wire Construction

Diameter over serving	inches	1½	2	2½	3	3½	4	4½	5	5½	6
Diameter of bare rope	inches	1½	2	2½	3	3½	4	4½	5	5½	6
Price	per foot	\$0.32	\$0.38	\$0.48	\$0.56	\$0.68	\$0.81	\$0.96	\$1.12	\$1.33	\$1.54
Approx. breaking stress	tons	12.1	19	26.3	35	45	56	69	84	98	110
Working load in tons of 2000 lbs.		2.4	3.8	5.3	7	9	11	14	17	20	22
Approx. weight per foot	lbs.	.70	1.00	1.30	1.72	2.12	2.80	3.30	3.95	4.62	5.25

6 Strand—37 Wire Construction

Price	per foot	\$0.63	\$0.77	\$0.94	\$1.07	\$1.27	\$1.48	\$1.69	\$2.19
Approx. breaking stress	tons	29	37	46	58	71	84	95	125
Working load in tons of 2000 lbs.		5.8	7.4	9.2	11	14	17	19	25



Endless Wire Rope Transmission Belts

We splice endless wire rope belts properly and promptly. The splice, as we make it, is the same diameter as the rest of the cable—a very important feature—the rope is laid back for at least 10 feet on each side of center of the splice which takes 20 to 30 feet of extra rope.

The charges below are for labor making the splice only and does not include the 20 to 30 feet of extra cable.

Prices for Splicing Endless Wire Ropes

Diameter of rope, inches.....	$\frac{1}{4}$ to $\frac{3}{8}$	$\frac{3}{8}$ to $\frac{1}{2}$	$\frac{1}{2}$ to $\frac{3}{4}$	$\frac{3}{4}$ to $1\frac{1}{8}$	$1\frac{1}{8}$ to $1\frac{1}{4}$
Price for splicing, net.....	\$2.50	\$3.00	\$3.50	\$4.00	\$4.50

Exact length of endless rope must be given or the exact distance between centers of sheaves and the diameter of both sheaves—measured with a steel tape.

“Bullock” Locomotive Wire Switch Rope

Made of Bullock finest quality Plow Steel Cable, spliced in the best possible manner—our ropes do not pull out in the splice—the weakest point.

Will out-pull and out-wear others.



Shows two Links and Thimble one end, Hook and Link in other—can be supplied with thimble and link in one end and thimble and hook in other—as desired.

Length in Feet	Diameter in Inches								
	$\frac{3}{4}$	$\frac{7}{8}$	1	$1\frac{1}{8}$	$1\frac{1}{4}$	$1\frac{3}{8}$	$1\frac{1}{2}$	$1\frac{5}{8}$	$1\frac{3}{4}$
25.....	\$10.25	\$14.50	\$16.75	\$21.50	\$24.50	\$30.75	\$37.75	\$45.00	\$52.50
30.....	11.20	15.70	18.30	23.40	26.80	33.55	41.05	48.85	57.00
40.....	13.10	18.10	21.40	27.20	31.40	39.15	47.65	56.55	66.00
50.....	15.00	20.50	24.50	31.00	36.00	44.75	54.25	64.25	75.00
Diameter of rope..... inches	$\frac{3}{4}$	$\frac{7}{8}$	1	$1\frac{1}{8}$	$1\frac{1}{4}$	$1\frac{3}{8}$	$1\frac{1}{2}$	$1\frac{5}{8}$	$1\frac{3}{4}$
Breaking strength of rope..... tons	25	35	45	56	69	84	98	110	133

Ballast Unloader Cables

Used with Locomotive or Lidgerwood Unloaders for pulling ballast plops over dirt trains—they are subjected to excessive stresses and great abrasive wear and the best obtainable rope is none too good—we have furnished our Bullock Unloader Ropes to railroads for many years. The sizes are usually 1 to 2 inches in diameter with hook on one end as shown on Bullock Switch Ropes. Prices upon request.

Wire Rope Slings

Wire rope slings are fast coming into use for handling heavy loads with traveling cranes, jib cranes, etc.

These slings are considerably lighter than chains, can be obtained more quickly and the cost is less—furthermore in wire rope slings, the wear can usually be seen when the strands become frayed, loose or cut—defects in a chain are harder to find.

Slings can be made any style desired with single eye or swivel hooks or plain links spliced in, or with hook with socket babbitted in with loop each end, or endless as shown.

Prices quoted upon request.



Fig. F86
Single Eye Hooks



Fig. F87
Socket and Hook

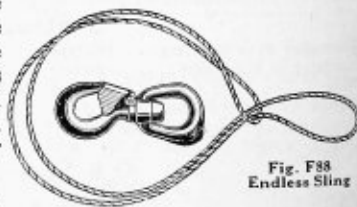


Fig. F88
Endless Sling

Extra Galvanized

Flexible Wire Sash Cord



6 strands—7 wires
to each strand—one
cotton core

Galvanized by special process—the galvanizing does not crack or chip off. The construction makes a very flexible cable—used largely for window weights, bell-cords, automobile brakes, whistle cords, for electric open car curtain fixtures, also steam car curtains and Pullman bunks.

Diameter	inches	$\frac{1}{16}$	$\frac{1}{8}$	$\frac{3}{16}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{3}{4}$
Approximate strength	lbs.	140	320	550	1400	1800	2200	
Approximate weight per 100 feet	lbs.	6	1.4	2.5	5.6	7.7	10.1	
List price	per 100 feet	\$1.75	\$2.00	\$2.25	\$3.00	\$3.50	\$4.00	

Copper and Phosphor Bronze Wire Cord

Diameter	inches	$\frac{1}{16}$	$\frac{1}{8}$	$\frac{3}{16}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{3}{4}$
Copper list per 100 feet		\$3.00	\$3.50	\$4.50	\$6.00	\$7.50	\$9.00	
Phosphor-bronze list per 100 feet				6.00	8.00		12.00	\$15.00
								\$22.00

The Phosphor-bronze cord has 6 strands, 19 wires, to each strand and hemp core.

Galvanized Steel Wire Guy Strand

Extra Galvanized



Seven steel wires
twisted into a single
strand

This strand is used chiefly for guying poles and smokestacks, for supporting trolley wires and for operating railroad signals. This rope is very stiff, as it has but seven solid wires. For larger guy rope, see 6x7 construction galvanized.

Diameter	inches	$\frac{3}{16}$	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{7}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{3}{4}$
Gauge of Wire Used	Ga.	16	14	12	11	9	8	6	5	3
Approximate strength	lbs.	1400	2300	3800	5000	6500	8500	11000	14000	18000
Approximate weight per 100 feet	lbs.	75	125	210	300	415	510	650	800	1200
List price	per 100 feet	\$1.25	\$1.75	\$2.50	\$3.50	\$4.50	\$5.50	\$7.00	\$8.50	\$14.00

$\frac{1}{4}$, $\frac{3}{8}$ and $\frac{1}{2}$ diameter not usually carried in Chicago stock.

Arc Light or Mast Arm Rope—Galvanized

The $\frac{1}{4}$ and $\frac{3}{8}$ sizes are 9 strands of four wires construction, balance 9x7 wires, one hemp core.

Diameter	inches	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$
Approximate strength	lbs.	1125	1530	2200	3400	4700
Approximate weight per 100 feet	lbs.	7.7	10.7	16.3	24.5	34
List price	per 100 feet	\$2.75	\$3.50	\$5.00	\$6.00	\$7.00

"Cabeline"

A Lubricant and Protector for Wire Ropes
Particularly Adapted for Elevated Cables



Wire rope is often put into service and used severely without care or protection of any kind, and cases are not infrequent where ropes suddenly break while the outside wires show no sign of wear. To get full service from wire ropes each wire, each strand and the whole rope must be kept in perfect condition as the condition of the outside wires does not show how much the inner ones are worn.

Cabeline takes care of both internal and external lubrication. Rust destroys more quickly than hard work.

Cabeline is free from mineral acids—so destructive to iron and steel, and which is much in evidence in the common oils and greases often used to protect wire ropes.



Cabeline is applied while heated and in a liquid state, and so finds its way between the wires and penetrates to the heart of the rope—it then solidifies, forming an adhering coating around each wire and around the whole rope—preventing internal friction—rusting—also outside chafing against the pulleys over which it runs.

Prices

In 5 and 10-lb. tin cans, per lb.	\$0.40
In 25, 40 and 75-lb. wooden kits, per lb.	.35
In half and full barrels, per lb.	.25



"Gripwell" Wire Rope Clips

Japanned—Malleable Iron Saddles

A well designed wire rope clamp of great holding power, with malleable iron saddle or block grooved for sizes of rope listed. The sides are extended high enough to contain two ropes, keeping them in alignment and supporting "U" bolt which is of open-hearth steel

The clips are attached as shown below—two clips are recommended up to $\frac{5}{8}$ —three up to 1 inch and four for larger ropes.

Size and diam. of rope, inches...	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{7}{16}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1	$1\frac{1}{8}$	$1\frac{1}{4}$	$1\frac{1}{2}$
Width of saddle, inches...	$\frac{5}{16}$	$\frac{7}{16}$	$\frac{7}{8}$	1	$1\frac{1}{8}$	$1\frac{1}{4}$	$1\frac{1}{2}$	2	2	$2\frac{1}{4}$	$2\frac{3}{8}$	$2\frac{3}{4}$
Diam. of "U" bolt, inches...	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{7}{16}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{7}{8}$
Weight per 100, pounds...	18	19	30	35	45	70	100	163	213	287	350	500
List price, each	\$0.30	\$0.30	\$0.30	\$0.35	\$0.35	\$0.40	\$0.55	\$0.60	\$0.65	\$0.75	\$0.85	\$1.15

"Bullock" Wire Rope Clips

Drop Forged Steel Saddles

A wire rope clip is a safety device—upon its strength and gripping qualities depends the safety of your workmen and machinery. The Bullock clip is the best obtainable.

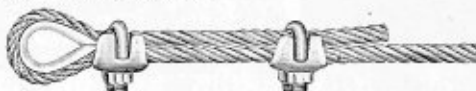
These clips have wider saddles giving greater bearing on the rope besides having the sides extended to contain two ropes as shown below.

Diam. of rope, inches...	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{7}{16}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1	$1\frac{1}{8}$	$1\frac{1}{4}$	$1\frac{3}{8}$	$1\frac{1}{2}$
Width of saddle, inches...	$1\frac{3}{8}$	$1\frac{1}{2}$	2	$2\frac{1}{8}$	$2\frac{3}{8}$	$2\frac{1}{2}$	$3\frac{1}{8}$	$3\frac{3}{8}$	$3\frac{3}{8}$	$3\frac{3}{4}$	$3\frac{3}{4}$	$3\frac{3}{8}$	$3\frac{3}{8}$
Diam. of "U" bolt, inches...	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{7}{8}$	$\frac{7}{8}$	1	1	1
Weight per 100, pounds...	25	34	82	95	165	256	316	325	472	475	662		
List price each	\$0.35	.40	.45	.65	.65	.75	.85	.95	1.10	1.25	1.50		

Larger clips up to $2\frac{1}{2}$ special prices upon request.



Method of Fastening
Clips and W. R. Thimbles



Standard Wire Rope Thimbles

Hot Galvanized—Heavy Pattern



Section of Steel

Made from heavy specially rolled steel of section shown at left—and extra galvanized by hot dip process.

Also used for Manila rope.



Size of rope, inches...	$\frac{3}{16}$	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1	$1\frac{1}{8}$	$1\frac{1}{4}$	$1\frac{3}{8}$	$1\frac{1}{2}$
Length, inches...	$1\frac{3}{8}$	$1\frac{3}{4}$	$2\frac{1}{8}$	$2\frac{1}{4}$	3	$3\frac{1}{4}$	$3\frac{3}{4}$	$4\frac{1}{2}$	$4\frac{3}{4}$	$5\frac{3}{8}$	$5\frac{3}{4}$	6	$6\frac{1}{2}$
Diameter of pin will take, inches...	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1	$1\frac{1}{4}$	$1\frac{3}{8}$	$1\frac{1}{2}$	$1\frac{3}{4}$	2	$2\frac{1}{4}$	$2\frac{1}{2}$	$2\frac{3}{4}$
Weight per 100, pounds...	$2\frac{1}{2}$	$3\frac{1}{4}$	5	7	$14\frac{1}{2}$	$23\frac{1}{2}$	42	48	60	88	114	160	200
Price (100 lots) per 100:	\$5.00	\$5.00	\$6.00	\$7.00	\$9.00	\$11.00	\$13.00	\$14.00	\$18.00	\$28.00	\$33.00	\$42.00	\$50.00
Price (doz. lots) doz...	.75	.75	.90	1.05	1.35	1.65	1.95	2.00	2.75	4.00	4.50	6.00	7.50
Price each	.08	.08	.10	.12	.15	.17	.20	.22	.27	.40	.45	.60	.75

Larger thimbles and special thimbles quoted upon request.

Round Open Manila Rope Thimbles



Size of rope } inches...	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	$1\frac{3}{4}$	2
Width of score }									
Outside diameter, inches...	1	$1\frac{1}{4}$	$1\frac{1}{2}$	$1\frac{3}{4}$	2	$2\frac{1}{2}$	3	$3\frac{1}{4}$	4
Weight per 100, pounds...	3	6	9	16	23	43	63	112	160
Plain, price per dozen	\$0.26	\$0.30	\$0.34	\$0.40	\$0.55	\$0.95	\$1.40	\$2.75	\$4.00

Channon Manila Rope



Ajax 4 Strand Rope

Only one strand combed out to show length and strength of fibre.

AJAX

The strength and color of the fibre, the two most important qualities, are determined largely by the manner in which it is cleaned. Good quality fibre is from 8 to 17 feet in length, of glossy white color, very light and strong and of clean, even texture—it is its admirable qualities in the *higher grades* that has given Manila hemp an undisputed rank as the "premier cordage fibre of the world."

By far the greatest usefulness of Manila rope is for hoisting—and wherever loads are handled you will find men about—hoisting, directing or placing the load. They must rely upon the strength of the rope—should the rope part—one or more might be seriously injured—further—the damage to the piece dropped is usually much greater than the price of the rope.

Manila hemp (*Abaca*) is the premier cordage fibre of the world—it is grown successfully in but one small section of the globe—the Philippine Islands.

It is a structural fibre obtained from the leaf sheath of the plant *Musa Textilis*—a tree-like herb that grows 16 to 33 feet in height.

About 14 varieties of the plant are under cultivation in the leading provinces from which are obtained as many as 30 to 40 different grades or "Marks" of hemp.

We handle nothing but good quality, dependable rope—not a pound of "off-grade" rope can be found in our immense stock, we do not sell any of the grades known to the trade as 2nd, 3rd, 4th, (or hardware grade), they are unsuitable for hoisting or hauling.

Besides being made of good hemp it is necessary that great care be exercised during the process of manufacture. All twisting strains must be carefully balanced, every fibre, yarn and strand should pull equally and together—a well made rope has no tight strands—the tension, lay and size are uniform and perfect.

We have been selling good rope for over forty years.

We Handle Two Grades Only

Channon No. 1 Manila Rope

For ordinary service.

Our Channon No. 1 grade is guaranteed to be a strictly pure, unadulterated, first quality product carefully made from clean, good, genuine Manila hemp fibre with just enough lubricating oil to lay it up properly. There are no cheaper fibres mixed with it, nor any other adulterants to add weight—as a result, this rope is light, strong and uniform throughout. With the exception of our Ajax brand, there is no better rope made.

We do not handle any of the cheaper grades known as 2nd, 3rd, 4th or "Hardware" grades; they are unsuitable for hoisting or hauling.

Ajax Manila Rope

For Transmission of Power and other hard service.

Ajax is the strongest and finest of all ropes made of Manila Hemp—***nothing better can be obtained anywhere at any price.***

Ajax is made from a specially selected, highest quality, long fibre Manila hemp which has had all the knots, tow and other weak parts carefully "combed" out of it before it is spun into yarns. Ajax rope is higher in price than common rope but is well worth the difference and will prove the most economical in the end.

Channon No. 1 Standard Manila Rope

Three Strand
Regular
Construction



Four Strand
Tallow Laid
with Core

For Ordinary Hoisting and Hauling

Carefully made from a superior quality of clean, pure manila hemp—with just enough oil to lay it up properly. There are no cheaper fibres mixed with it—nor any other adulterants to add weight—as a result this rope is light and uniformly strong throughout. Suitable for all ordinary service of hoisting, hauling, etc. There is only one grade of rope better than our No. 1 Grade, and that is our Ajax brand described below.

Three Strand Regular Construction

Put up in standard length coils of 1200 feet and half coils of 600 feet—from which we can supply any length desired. (Cut pieces take 1 cent per pound advance.)

Diameter, in inches	3/8	1/2	5/8	3/4	7/8	1	1 1/8	1 1/4	1 1/2	1 3/4	2
Approx. Breaking Strength, pounds	1,100	1,300	2,400	4,000	4,700	6,500	8,000	10,000	12,500	17,500	25,000
Nominal Working Load, pounds	275	325	580	1,000	1,200	1,600	2,000	2,500	3,000	4,000	6,000
Approx. Weight per 100 feet, pounds	2 1/2	4	8	14	17	23	28	36	42	60	90
Extras over base, per pound	\$0.01	\$0.01	\$0.00								

(Base price 1/2¢ and all larger sizes)

Four Strand Tallow Laid with Core

Diameter, in inches	1/2	5/8	3/4	7/8	1	1 1/8	1 1/4	1 1/2	1 3/4	2
Approx. Weight per 100 feet, pounds	9	13	18	27	33	42	50	70	100	125
Extras over Base, per pound	\$0.01	\$0.01								

All 4 strand rope takes 1 cent per lb. advance over base price

Ajax Long Fibre Manila Rope

Three Strand
For Hoisting
and Hauling



Four Strand
for Transmission
of Power

For Transmission of Power, Car Pulling, Pile Driving and Other Hard Service

Trade Mark—A tarred brown yarn—running through the strands

Our Ajax rope is the finest of all ropes made from Manila hemp—nothing better can be had at any price. Not only is it the best investment where strength, safety and durability are considered, but it is a much easier rope to handle—it is smoother—smaller sized yarns are used to make up the strands and the fibre, which is carefully selected for strength and length, goes through several more operations before it is spun into the "yarns."

Diameter in inches	1/2	5/8	3/4	7/8	1	1 1/8	1 1/4	1 1/2	1 3/4	2
Approx. Breaking Strength, pounds	3,000	5,000	5,500	8,000	10,000	13,500	16,000	20,000	22,000	32,000
Nominal Working Load, pounds	750	1,200	1,400	2,000	2,500	3,400	4,000	5,000	5,500	9,000
Approx. Weight per 100 feet, pounds	9	15	18	27	33	42	50	65	70	100
Extra over Base, per pound	\$0.01	\$0.01								

Four strand invariably furnished for transmission, 3 strand for hoisting and hauling—both furnished at same price.

"Champion" Hawser Laid Manila Well Drilling Rope

Nine Strand Rope
Left Laid—Hard
Twist



Trade Mark
A Purple Red Yarn
Running Through
the Strands

For Blast Hole Drilling, Water and Oil Well Drilling, also Caisson Work, Car Pulling and Elevator Governor Ropes

This rope is well known to drillers—we have sold it under this brand for 25 years. Our distinguishing mark is purple red yarn in each of the strands—rope with this mark will drill more "feet of hole" than any other rope made. Well drilling is about the hardest service we know of and it is highly important that the rope be well made and contain the finest Manila hemp—our Champion brand may be relied upon in every way. Construction is what is known as "nine strand" left laid and hard twist, consisting of three 3-strand right hand laid ropes laid up to the left. We carry Champion drilling rope in 1,200 foot standard coils from which any length may be cut at prices below.

Diameter, in inches	3/8	1/2	5/8	3/4	7/8	1	1 1/8	1 1/4	1 1/2	1 3/4	2
Approx. Weight per 100 feet, pounds	16	20	30	37	49	60	68	78	95	120	140
Extra over Base, per pound	\$0.01										

1/2¢ and larger, base price

Larger diameter and lengths longer than 1200 feet come under oil well classification and are shipped from mill at market prices.



AJAX

Manila Rope

Each Coil of Ajax is carefully burlapped all over to protect it from chafing, and to keep it clean.

A numbered tag is attached to each coil with the request to send us the number at once if the rope is not received in perfect condition—the number gives us a record of each coil with date of manufacture.

Approximate Weight and Strength of New Ajax Manila Rope

Diameter.....inches	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1	$1\frac{1}{8}$	$1\frac{1}{4}$	$1\frac{3}{8}$	$1\frac{1}{2}$
Approx. wt. per 100 ft. ....lbs.	9	15	18	27	33	42	50	65	70
Approx. breaking strength.lbs.	3,000	5,000	5,500	8,000	10,000	13,500	16,000	20,000	22,000
Diameter.....inches	$1\frac{3}{4}$	2	$2\frac{1}{4}$	$2\frac{1}{2}$	$2\frac{3}{4}$	3	$3\frac{1}{2}$	4	.....
Approx. wt. per 100 ft. ....lbs.	100	125	170	200	240	300	400	500	.....
Approx. breaking strength.lbs.	32,000	37,000	50,000	55,000	65,000	75,000	90,000	130,000	.....

Safe working load of new rope about one quarter of above table.

Horse-Power Transmitted by Manila Ropes

Work Strain=200 d² Pounds

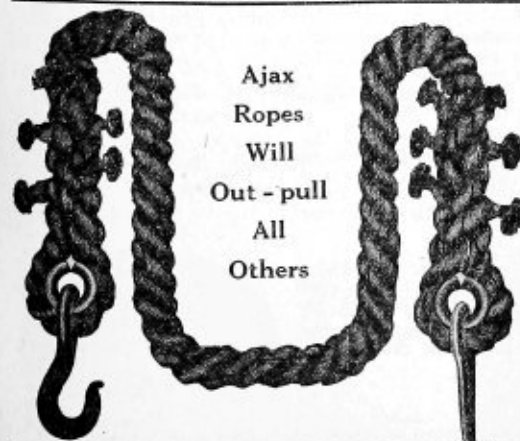
d=Diameter of Rope in Inches

Diam. of Rope, Inches	Speed of the Rope in Feet per Minute											
	1000	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000
$\frac{5}{8}$	1.24	2.70	3.30	3.83	4.30	4.74	5.01	5.20	5.29	5.08	4.74	4.12
$\frac{3}{4}$	2.25	3.84	4.71	5.46	6.23	6.83	7.24	7.47	7.60	7.32	6.83	5.93
1	3.57	6.84	8.38	9.80	11.09	12.15	12.89	13.29	13.53	13.10	12.13	10.54
$1\frac{1}{4}$	5.59	10.68	13.10	15.39	17.33	18.98	20.15	20.76	21.14	20.36	19.00	16.47
$1\frac{1}{2}$	8.02	19.39	18.86	21.87	24.94	27.33	29.00	29.89	30.43	29.32	27.34	23.72
$1\frac{3}{4}$	10.85	20.93	25.66	29.74	34.03	37.17	39.45	40.65	41.39	39.77	37.21	32.26
2	14.20	27.36	33.54	38.88	44.35	48.59	51.57	53.15	54.11	52.12	48.63	42.18

The table shows the effect of centrifugal force in diminishing the power transmitted under an assumed working tension, and would indicate that with tensions of 200 d² pounds the speed should not exceed 5500 feet per minute.

Splicing Transmission Ropes

We have at all times an efficient corps of expert rope splicers which we send out to any part of the country to install and splice our Ajax transmission ropes.



Ajax
Ropes
Will
Out - pull
All
Others

Ajax Manila

Switch and Wrecking Ropes

The hooks, links and thimbles are hand forged in our own shops; are of special design and extra heavily proportioned.

All of our ropes are spliced in the very best possible manner, by men of long experience in this class of work.

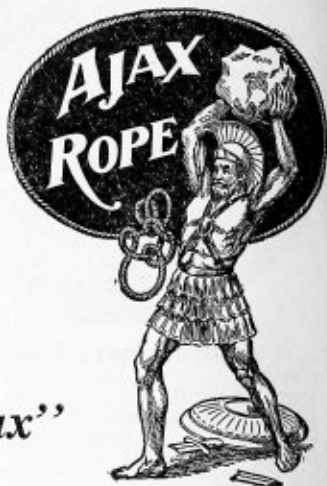
Usual Lengths	Diameter of Ropes, Inches	Price of Ajax Ropes
30 to 50 ft.	$2\frac{1}{2}$ inch	\$.....
30 to 50 ft.	3 inch	.....
30 to 50 ft.	$3\frac{1}{2}$ inch	.....
30 to 50 ft.	4 inch	.....
30 to 50 ft.	5 inch	.....

We make Switch Ropes any length or diameter.

The Specification

to completely cover the finest and stongest Manila hemp rope obtainable.

May be summed up in just one word—"Ajax"



Trade Mark
A tarred brown
yarn in the strands

The first modern grain elevator in England, that of the Manchester Ship Canal Company was Ajax equipped throughout. After six years the general superintendent wrote under date of June 9th, 1904:—

"The Ajax ropes used in our Elevator have given complete satisfaction so far; in fact, the long main drive and most of the other principal drive ropes, installed originally SIX YEARS AGO are still working well."

Besides transmitting power, Ajax ropes are used to a large extent for:

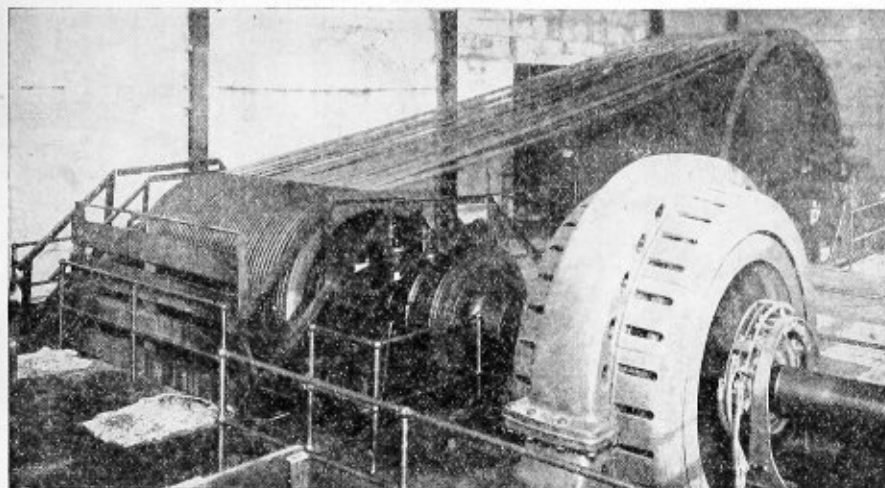
- Extra heavy hoisting and hauling.
- Hammer lines for pile drivers.
- Railroad wrecking and switch ropes.
- Towing and other particularly hard work.

The hemp used in Ajax is exceptionally strong, tough and uniform in quality. When placed alongside the common grades of Manila hemp rope, the difference is obvious even to the novice—it has a peculiar bright appearance—it looks "alive" and it is.

Our policy, steadily pursued since the inception of Ajax, 25 years ago, has been to make it the very best rope that the best material and the most skillful workmanship can produce—Ajax is the rope with a character—it has a reputation to sustain.

We have only one other grade of Manilla rope which is called *Channon No. 1 quality*, this grade is recommended for all ordinary work of hauling and hoisting and we guarantee it to contain not only strictly pure and unadulterated Manila hemp but to be first quality in every respect.

The most economical rope to use for transmission of power and other hard service.



2,000 H. P. Drive—44, 2 inch diam. Ajax Transmission Ropes—English System. Drive Sheave is 7 ft. 5½ in., Driven is 23 ft. in diameter and weighs 230,000 lbs.

Ajax Rope Drive in Large Steel Mill

The rope drive machinery, shown above, in the new Shear Plate Mill of The Inland Steel Co. at Indiana Harbor, Ind., was furnished by the Mesta Machine Co. of Pittsburgh; the Ajax transmission ropes were furnished and installed by the H. Channon Company.

This new mill will enable the steel company to add a full line of car and tank plates to its already extensive output.

To provide the additional steel necessary for this new mill four new 60-ton open-hearth furnaces have been constructed, making a total of 12, with a maximum capacity of 700,000 tons a year. The new 90-inch three high mill has a capacity of 450 tons in 24 hours and can roll plates from 8 gauge to ¾ inch in widths up to 80 inches, and lengths up to 40 feet.

Power for operating the mill is furnished by a 2,000 H. P. Westinghouse, Constant Speed 245 R. P. M., motor, 25 cycle, 3 phase 2,200 volts; current is taken from a low-pressure turbo-generator station.

The motor is connected up through a rope drive consisting of 44 2-inch diameter Ajax ropes. The rope sheaves are 40 feet apart, center to center, the driver is 7 feet 4½ inches, the driven sheave is 23 feet diameter, weighing 230,000 pounds. At 80 R. P. M. the rim velocity is 5,780 feet per minute and the energy equivalent to 20,400,000 foot pounds.

We also furnished and installed the rope drives when this plant was first opened, 12 years ago. Ropes are dressed with our well known Magnolia Rope Dressing.

Ajax is absolutely the finest of all ropes made from Manila hemp—nothing better can be obtained anywhere—at any price.

It is the most economical rope for transmitting power.



MANILA



ROPE

STRENGTH

SAFETY

ECONOMY

Manila Rope Slings, Etc.

For Handling Machinery, Etc., by Overhead Cranes or Derricks.



Fig. F371
Thimble and
Hook



Fig. F372
Round Thimble
Spliced In.



Fig. F373
Loop Spliced In.



Fig. F374 Endless Sling with Short Splice

We make slings of both No. 1 and Ajax Manila Rope of any length or diameter. Slings are usually measured, doubled, and stretched out. Illustration shows an endless Manila rope sling with a short splice—we also make them with "Long Splice," which takes 20 to 30 feet of rope for the splice which is then the same diameter as the rest of the rope. Prices upon request.

We splice any kind of fitting into Manila ropes—properly and promptly. We have at all times an efficient corps of expert rope splicers which we send out to any part of the country to install and splice Ajax Transmission Ropes.

"Magnolia" Rope Dressing

For Manila Hemp Ropes



It is the only dressing made that penetrates to the center of a transmission rope, thoroughly lubricating the fibre there, besides protecting the outside of the rope. Money spent in caring for and protecting your transmission rope is money saved.

In 5 and 10-pound tin cans, per pound \$0.40
In 25, 40 and 75-pound wooden kits, per pound35
In half and full barrels, per pound25

Transmission ropes are at all times subject to many conditions which tend to hard wear and short life; internal wear, caused by the chafing of the fibres, and external wear caused by contact with the pulleys, soon takes the life and strength out of a rope. Rapidly moving ropes are in an ever-changing circulation of air, which, together with the continual bending open of the strands, causes rapid evaporation of any lubricant with which the rope may have been originally treated. Manila fibre, which is naturally tough and strong, is, when dry, rough and harsh, but, when treated with a perfect lubricant, becomes smooth and silky.

The following quotation from a professor of mechanical engineering who has made careful, actual tests may be of interest. He says: "A manila rope with the fibre properly lubricated, will, under the same conditions, outlast from two to four similar dry ropes."



Hooks for Manila Rope

Large Eye—Forged Steel—Japanned

These hooks have eyes large enough for a Manila hemp rope to pass through.



Size	inches	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1	$1\frac{1}{8}$	$1\frac{1}{4}$	$1\frac{1}{2}$	$1\frac{3}{4}$	2
Length of hook	inches	3	3 $\frac{3}{8}$	4 $\frac{3}{8}$	6	6 $\frac{1}{4}$	7	7 $\frac{1}{2}$	8 $\frac{3}{8}$	10	12	13 $\frac{1}{2}$
Diameter of eye	inches	$\frac{3}{4}$	1	1 $\frac{1}{4}$	1 $\frac{1}{2}$	1 $\frac{3}{4}$	1 $\frac{7}{8}$	2	2 $\frac{1}{4}$	2 $\frac{1}{2}$	2 $\frac{3}{4}$	3 $\frac{1}{4}$
Inside diameter of hook	inches	$\frac{3}{8}$	$\frac{5}{8}$	1	1 $\frac{1}{4}$	1 $\frac{1}{2}$	1 $\frac{3}{4}$	1 $\frac{7}{8}$	1 $\frac{1}{2}$	1 $\frac{3}{4}$	2	2 $\frac{3}{4}$
Approximate strength	pounds	1200	2600	3800	5700	9000	9700	13600	16000	25000	32000	38000
Approximate weight per 100 in.	pounds	18	40	72	133	193	280	355	460	865	1250	1850
Price	each	\$0.14	\$0.17	\$0.21	\$0.29	\$0.37	\$0.56	\$0.67	\$0.82	\$1.55	\$2.50	\$3.65

Hooks for Wire Rope

Small Eye—Forged Steel—Japanned

Same style as above but shorter in length and with smaller eye to pass wire rope. They also weigh somewhat less for the same strength.



Size	inches	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1	$1\frac{1}{8}$	$1\frac{1}{4}$	$1\frac{1}{2}$	$1\frac{3}{4}$	2
Length of hook	inches	2 $\frac{3}{4}$	3 $\frac{3}{8}$	4	4 $\frac{1}{2}$	5 $\frac{1}{8}$	6 $\frac{1}{4}$	7	7 $\frac{1}{4}$	8 $\frac{3}{8}$	10 $\frac{1}{2}$	12
Diameter of eye	inches	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	1	1 $\frac{1}{8}$	1 $\frac{1}{4}$	1 $\frac{1}{2}$	1 $\frac{3}{8}$	1 $\frac{1}{2}$	2	2 $\frac{3}{4}$
Inside diameter of hook	inches	$\frac{3}{8}$	$\frac{5}{8}$	1	1 $\frac{1}{4}$	1 $\frac{1}{2}$	1 $\frac{3}{4}$	1 $\frac{7}{8}$	1 $\frac{1}{2}$	1 $\frac{3}{4}$	2	2 $\frac{3}{4}$
Approximate strength	pounds	1200	2600	3800	5700	9000	9700	13600	16000	25000	32000	38000
Approximate weight per 100 in.	pounds	15	37	67	109	150	250	325	430	687	1300	1840
Price	each	\$0.18	\$0.20	\$0.25	\$0.35	\$0.38	\$0.42	\$0.58	\$0.80	\$1.25	\$2.35	\$3.30

Match or Sister Hooks

Forged Steel—Galvanized

Size	inches	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1
Length	inches	2 $\frac{3}{4}$	3 $\frac{3}{8}$	4 $\frac{3}{8}$	4 $\frac{1}{2}$	5 $\frac{1}{8}$	6 $\frac{1}{4}$
Diameter of eye	inches	$\frac{3}{4}$	1	1 $\frac{1}{4}$	1 $\frac{1}{2}$	1 $\frac{3}{4}$	2
Inside diameter of hook	inches	$\frac{3}{8}$	$\frac{5}{8}$	1	1 $\frac{1}{4}$	1 $\frac{1}{2}$	1 $\frac{3}{4}$
Approximate strength	pounds	1400	2000	3800	7100	8000	11000
Approximate weight per 100 in.	pounds	15	24	49	105	158	223
Price	each	\$0.25	\$0.25	\$0.28	\$0.35	\$0.44	\$0.75



Fig. F-317

Maxila or Wire Rope Thimbles

Size, inches	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1
Inside diam. of hook, in.	$\frac{3}{8}$	1	1 $\frac{1}{4}$	1 $\frac{1}{2}$	1 $\frac{3}{4}$	1 $\frac{7}{8}$
Approx. strength, pounds	3200	5300	7300	11000	15000	17000
Approx. wt. each, pounds	$\frac{1}{2}$	1	1 $\frac{1}{2}$	3	4 $\frac{1}{2}$	5 $\frac{1}{2}$
Price each	\$0.33	\$0.40	\$0.70	\$0.85	\$1.15	\$1.45

Fig. F-306

Swivel Hooks

Drop Forged—Japanned

Size, inches	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1
Inside diam. of hook, in.	$\frac{3}{8}$	1	1 $\frac{1}{4}$	1 $\frac{1}{2}$	1 $\frac{3}{4}$	1 $\frac{7}{8}$
Approx. strength, pounds	3200	5300	7300	11000	15000	17000
Approx. wt. each, pounds	$\frac{1}{2}$	1	1 $\frac{1}{2}$	3	4 $\frac{1}{2}$	5 $\frac{1}{2}$
Price each	\$0.33	\$0.40	\$0.70	\$0.85	\$1.15	\$1.45

Wire Rope Sockets with Double Swivel Hooks Fig. 421

Diam. wire rope	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$
Size of hook	1	1 $\frac{1}{8}$	1 $\frac{1}{4}$	1 $\frac{3}{8}$	1 $\frac{1}{2}$	2	2 $\frac{1}{4}$
Price each	\$5.00	\$7.20	\$9.00	\$9.50	\$11.40	\$18.00	\$25.00



Fig. F-421



Fig. 416 Open Style

Wire Rope Sockets

Drop Forged—Weldless



Fig. 417 Closed Style

Diameter Rope, Inches	Price Each	Length, Inches	Opening Between Jaws	Diameter of Pin, Inches	Weight Each, Pounds	Diameter Rope, Inches	Price Each	Extreme Length, Inches	Length of Basket	Largest O.S. Diam., Basket	Weight Each, Pounds
$\frac{1}{4}$	\$ 0.85	3 $\frac{3}{8}$	$\frac{1}{8}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{4}$	\$ 0.60	3 $\frac{3}{8}$	1 $\frac{5}{8}$	1 $\frac{5}{8}$	$\frac{1}{2}$
$\frac{3}{8}$	.90	3 $\frac{3}{8}$	$\frac{1}{8}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{3}{8}$	.65	3 $\frac{3}{8}$	1 $\frac{5}{8}$	1 $\frac{5}{8}$	$\frac{1}{2}$
$\frac{1}{2}$	1.20	5	$\frac{1}{8}$	$\frac{5}{8}$	1 $\frac{1}{4}$	$\frac{1}{2}$	.75	5 $\frac{1}{4}$	2 $\frac{1}{8}$	1 $\frac{5}{8}$	1
$\frac{5}{8}$	1.60	5 $\frac{1}{2}$	$\frac{1}{8}$	$\frac{3}{4}$	1 $\frac{3}{8}$	$\frac{5}{8}$	1.00	6	2 $\frac{5}{8}$	1 $\frac{7}{8}$	1 $\frac{1}{2}$
$\frac{3}{4}$	2.10	6 $\frac{1}{2}$	$\frac{1}{8}$	1	3 $\frac{3}{8}$	$\frac{3}{4}$	1.35	6 $\frac{1}{2}$	3	2 $\frac{1}{4}$	2 $\frac{5}{8}$
$\frac{7}{8}$	2.70	7 $\frac{1}{4}$	$\frac{1}{8}$	$\frac{1}{2}$	5 $\frac{1}{4}$	$\frac{7}{8}$	1.80	8	3 $\frac{1}{2}$	2 $\frac{5}{8}$	3 $\frac{3}{8}$
1	3.40	8 $\frac{1}{2}$	$\frac{1}{8}$	$\frac{1}{2}$	8 $\frac{1}{4}$	1	2.50	9	4	3	6
$1\frac{1}{8}$	4.50	10	$\frac{1}{8}$	$\frac{1}{2}$	12 $\frac{1}{2}$	$1\frac{1}{8}$	3.50	10 $\frac{3}{8}$	4 $\frac{1}{2}$	3 $\frac{1}{2}$	8 $\frac{5}{8}$
$1\frac{1}{4}$	5.00	10	$\frac{1}{8}$	$\frac{1}{2}$	13 $\frac{1}{2}$	$1\frac{1}{4}$	4.00	10 $\frac{3}{8}$	4 $\frac{1}{2}$	3 $\frac{1}{2}$	8 $\frac{5}{8}$
$1\frac{3}{8}$	8.00	11 $\frac{1}{4}$	$\frac{1}{8}$	$\frac{1}{2}$	18 $\frac{1}{2}$	$1\frac{3}{8}$	6.00	11	5	3 $\frac{7}{8}$	12 $\frac{1}{2}$
$1\frac{1}{2}$	8.50	11 $\frac{3}{4}$	$\frac{1}{8}$	$\frac{1}{2}$	18 $\frac{1}{2}$	$1\frac{1}{2}$	6.50	11	5	3 $\frac{7}{8}$	12 $\frac{1}{2}$
$1\frac{5}{8}$	11.50	13 $\frac{1}{2}$	$\frac{1}{8}$	$\frac{1}{2}$	30	$1\frac{5}{8}$	9.00	13	6	4 $\frac{1}{2}$	18 $\frac{1}{4}$

Safe working load about one-fourth of above strengths.

Contractors' Guy Turnbuckles

Forged Steel—Japanned



Fig. 226 with Two Eyes. Right and Left Threads

This is the strongest form of turnbuckle for taking up slack in wire guy ropes, etc. From the strengths and working loads given, the proper size is readily selected, which in every case should be equal to the strength of the guy rope used. Where greater take-up is desired two turnbuckles are sometimes used.

Diameter thread and size.....inches	3/4	1	1 1/4	1 1/2	1 3/4	2	2 1/2	3	4
Length in clear between heads.....inches	6	8 1/2	9 3/4	10	11	12	13	14	15
Length of buckle outside.....inches	7 1/2	10 1/2	11 3/4	12 3/4	14	15 3/4	16 3/4	18	19 1/2
Inside diameter of eye.....inches	3/4	1	1 1/4	1 1/2	1 3/4	2	2 1/4	2 1/2	3
Approximate strength.....pounds	7,800	10,000	20,000	23,500	29,000	38,000	46,000	53,000	65,000
Recommended working load.....pounds	1,500	2,000	4,000	4,700	6,000	7,000	9,000	10,500	13,000
Approximate weight.....each	2	4	6	9	13	17	25	36	40
Price.....each	\$1.30	\$1.75	\$2.60	\$3.60	\$4.75	\$5.50	\$6.75	\$7.75	\$9.50

*Also the amount of take-up. Larger guy take-ups and other styles of turnbuckles see index.

Standard Shackles

Fig. 213

Drop Forged Steel
JapannedRound Pin
"Anchor" Style

Size.....inches	3/4	1	1 1/4	1 1/2	1 3/4	2	2 1/2	3	4
Length inside.....inches	1 1/2	1 3/4	2 1/4	2 3/4	3 1/4	4 1/4	5	5 1/4	7
Width between eyes.....inches	3/4	1	1 1/4	1 1/2	1 3/4	2	2 1/4	2 3/4	3 1/4
Diameter of pin.....inches	3/4	1	1 1/4	1 1/2	1 3/4	2	2 1/4	2 3/4	3 1/4
Approximate strength.....pounds	10,000	18,000	33,000	43,000	55,000	75,000	92,000	103,000	172,000
Approximate weight each.....pounds	0.31	0.7	1.36	2.2	3.4	5	6.8	9 1/2	24
Price.....each	\$0.25	\$0.33	\$0.41	\$0.45	\$0.60	\$0.85	\$1.10	\$1.60	\$2.50

Galvanized Drop Forged Screw Anchor Shackles



Fig. 209

Size.....inches	3/4	1	1 1/4	1 1/2	1 3/4	2	2 1/2	3	4
Length inside.....inches	1 1/2	1 3/4	2 1/4	2 3/4	3 1/4	4 1/4	5	5 1/4	7
Width between eyes.....inches	3/4	1	1 1/4	1 1/2	1 3/4	2	2 1/4	2 3/4	3 1/4
Diameter of pin.....inches	3/4	1	1 1/4	1 1/2	1 3/4	2	2 1/4	2 3/4	3 1/4
Approximate strength.....pounds	8,000	10,000	18,000	33,000	43,000	55,000	75,000	90,000	92,000
Approximate weight each.....pounds	0.18	0.31	0.68	1.36	2.14	3 1/2	5	6 1/2	9
Price.....each	\$0.25	\$0.27	\$0.37	\$0.48	\$0.56	\$0.85	\$1.20	\$1.60	\$2.27

Drop Forged Swivels

Sometimes called chain swivels. Don't confuse these with cast or malleable iron swivels—these are drop forged.

Size.....inches	3/4	1	1 1/4	1 1/2	1 3/4	2	2 1/2	3	4
Length.....inches	2 3/4	3 3/4	4 3/4	5 1/4	6 1/4	7 1/4	8	9	10
Price.....each	\$0.35	\$0.40	\$0.50	\$0.80	\$1.00	\$1.50	\$2.00		

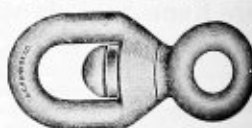


Fig. 401

Boat Snap Hooks

Galvanized Malleable Iron



Fig. 360

Number.....	0	1	2	3	4	5	6
Inside diameter eye.....inches	3/8	5/8	3/4	3/8	1	1 1/4	1 1/2
Ext. length.....inches	2	2 1/4	3 1/4	4	4 3/4	5 3/4	6 3/4
Weight, per dozen.....pounds	1 1/2	1 1/4	1 1/2	3 1/2	4	6	7 1/2
Price.....per dozen	\$1.25	\$1.50	\$1.75	\$2.50	\$2.75	\$3.50	\$4.00

Wire Rope Marline Spikes



Fig. 1347 Tool Steel—Polished

Length, inches.....	6	8	12	14	16	18	20
Price per dozen.....	\$12.20	\$15.00	\$20.00	\$22.50	\$26.25	\$30.00	\$33.75
Price each.....	1.25	1.50	2.00	2.25	2.65	3.00	3.50

"Bullock" Dredge Chain

Finest Quality—Hand Made—Carefully Tested



A chain is only as strong as its weakest link. When you have bought a piece of Bullock chain you have complied with all the necessary safety requirements—as it is the best chain made—it is carefully inspected both before and after making and tested to the proof tests given in table below.

Bullock is the chain to use for sling and derrick chains—where workmen's lives may be endangered—or where expensive machinery may be damaged by falling loads, for dredges and steam shovels it will wear longer and give better results than any other chain made.

Made of a special knobbled dredge iron, re-rolled and double refined, with an average tensile strength of 52,000 pounds to the square inch—it has a very high elastic limit.

The welding of Bullock chain is entrusted only to the most competent workmen.

Size iron	inches	$\frac{1}{2}$	$\frac{3}{4}$	1	1 $\frac{1}{4}$	1 $\frac{1}{2}$	1 $\frac{3}{4}$	2
Standard pitch	inches	1 $\frac{1}{2}$	1 $\frac{3}{4}$	2	2 $\frac{1}{2}$	2 $\frac{3}{4}$	3 $\frac{1}{2}$	4
Outside length	inches	2 $\frac{3}{4}$	3	3 $\frac{1}{2}$	4	4 $\frac{1}{2}$	5 $\frac{1}{2}$	6 $\frac{1}{2}$
Outside width	inches	1 $\frac{1}{4}$	1 $\frac{1}{2}$	1 $\frac{3}{4}$	2	2 $\frac{1}{4}$	2 $\frac{3}{4}$	3 $\frac{1}{4}$
Approximate breaking strength	pounds	17,000	25,000	36,000	48,000	61,000	78,000	95,000
Proof test	pounds	8,500	12,000	18,000	24,500	32,000	40,000	49,000
Average safe working load	pounds	4,000	7,200	10,800	14,700	19,200	24,000	29,500
Average weight per foot	pounds	3	4	5 $\frac{1}{4}$	8	10	13	16
Price	per 100 lbs.							

The pitch is the distance from the center of one link to the center of the next which is equal to the inside length of the link. Larger chain can be furnished up to 2 $\frac{1}{2}$ inch. Prices upon special request.

Standard Coil Chain



"BBB" Quality—Close Link—Tested Crane Chain. Made of extra quality material, welded with special care and dollyed. Certificate of test furnished to proof test shown in table below. Used for quarry, derrick and sling chains.

"BB" Quality Chain. We do not carry this grade in Chicago stock—mill shipment only. Made of good quality iron and closer link than common grade below.

"Common" or "Proof" Chain. This is a good commercial chain for general use.

Chain Table

Size, Inches	"BBB" QUALITY						"BB" QUALITY						"COMMON" OR "PROOF"					
	Approx. Breaking Strength	Proof Test	Outside Length in Inches	Outside Width in Inches	Approx. Links per Foot	Weight per 100 Feet	Approx. Breaking Strength	Outside Length, Inches	Outside Width, Inches	Approx. Links per Foot	Weight per 100 Feet	Approx. Breaking Strength	Outside Length, Inches	Outside Width Inches	Approx. Links per Foot	Weight per 100 Feet		
$\frac{1}{4}$	2,400	1,200	1 $\frac{1}{2}$	$\frac{3}{4}$	15	52	2,200	1 $\frac{1}{4}$	$\frac{3}{4}$	14 $\frac{1}{2}$	50	2,000	1 $\frac{1}{2}$	$\frac{3}{4}$	13 $\frac{1}{2}$	46	46	
$\frac{3}{8}$	4,500	1,750	1 $\frac{3}{4}$	$\frac{3}{4}$	14	83	3,800	1 $\frac{3}{4}$	$\frac{3}{4}$	13 $\frac{1}{2}$	80	3,300	1 $\frac{1}{2}$	$\frac{3}{4}$	12 $\frac{1}{2}$	75	75	
$\frac{1}{2}$	7,000	3,400	1 $\frac{1}{2}$	$\frac{3}{4}$	12 $\frac{1}{2}$	118	5,600	1 $\frac{1}{2}$	$\frac{3}{4}$	12	115	5,200	1 $\frac{1}{2}$	$\frac{3}{4}$	11	110	110	
$\frac{5}{8}$	9,000	4,500	1 $\frac{1}{2}$	$\frac{3}{4}$	11 $\frac{1}{2}$	166	8,000	1 $\frac{1}{2}$	$\frac{3}{4}$	11	160	7,200	1 $\frac{1}{2}$	$\frac{3}{4}$	10	155	155	
1	12,500	6,300	2	$\frac{3}{4}$	10	215	11,500	2	$\frac{3}{4}$	9 $\frac{1}{2}$	210	10,600	2	$\frac{3}{4}$	9	200	200	
$1\frac{1}{8}$	16,500	8,000	2 $\frac{1}{4}$	$\frac{3}{4}$	9	268	15,000	2 $\frac{1}{4}$	$\frac{3}{4}$	9	265	13,000	2 $\frac{1}{4}$	$\frac{3}{4}$	8	250	250	
$1\frac{1}{4}$	22,000	10,000	2 $\frac{1}{2}$	$\frac{3}{4}$	8	340	18,500	2 $\frac{1}{2}$	$\frac{3}{4}$	8	335	16,000	2 $\frac{1}{2}$	$\frac{3}{4}$	7 $\frac{1}{2}$	325	325	
$1\frac{3}{8}$	25,000	12,500	3	$\frac{3}{4}$	7	420	23,000	3	$\frac{3}{4}$	7	410	20,000	3	$\frac{3}{4}$	6 $\frac{1}{2}$	400	400	
$1\frac{1}{2}$	35,000	17,750	3 $\frac{1}{4}$	$\frac{3}{4}$	6 $\frac{1}{2}$	610	33,500	3 $\frac{1}{4}$	$\frac{3}{4}$	6 $\frac{1}{2}$	600	28,800	3 $\frac{1}{4}$	$\frac{3}{4}$	6	590	590	
$1\frac{3}{4}$	47,500	24,000	4	$\frac{3}{4}$	5 $\frac{1}{2}$	830	44,000	4	$\frac{3}{4}$	5 $\frac{1}{2}$	820	39,000	4	$\frac{3}{4}$	5	800	800	

Working Loads should be one-fifth to one-third of approximate breaking strengths given.

Hooks and Rings for sling chains should be made of the best refined iron and will appear clumsy and out of proportion to the size of the chain when made of equal strength. For example, a hook for $\frac{3}{4}$ -inch chain should be made of 2 $\frac{1}{4}$ -inch iron and weigh about 20 pounds. Rings, if less than 6-inch diameter, should be made of iron twice the size of the chain and if larger in diameter, size of iron must be increased in proportion.

The life of a chain can be prolonged by frequent annealing and lubrication.

Galvanized Chain can be supplied to special order.



Twist Link Coil Chain

Carried in $\frac{3}{8}$, $\frac{1}{2}$, $\frac{3}{4}$ and $\frac{1}{2}$ -inch sizes only, Common Grade.

For strength and safety, specify Bullock Dredge Chain.

"Bullock" Sling Chains

Finest Dredge Quality—Hand Made—Tested

For crane and derrick work where heavy loads are moved over the heads of the workmen, nothing but the finest quality of dredge chain should be used. Our Bullock chain will insure a higher degree of safety than any other chain made.

We can supply sling chains in any of the other qualities of chain listed on preceding page, but the Bullock grade is recommended and the cost is but slightly greater.

The rings and hooks are made of best refined iron and in proportion to the strength of the chain.

Size of Chain, Inches	Std. Length, Feet	Nom. Cap., Tons	Size of Hook, Inches	Weight Chain Only, per Foot	Approx. Weight		Price Fig. 110 Sling Chain	Price Fig. 220 Twin Chain
					Fig. 110	Fig. 220		
1½	10	2	1½	3	40	75	\$ 9.00	\$18.00
1½	14	6	1½	4	80	160	15.00	30.00
1½	16	10	2¼	6½	140	275	28.50	52.50
1½	18	15	2½	8	200	380	37.50	72.00
1	20	20	2½	10	275	545	52.50	97.50

We aim to carry these popular sizes at all times. Can quickly supply pear shaped links, ring in each end, hook each end and grab hooks instead of standard round slip hooks as shown, in any length or grade desired.

Larger chains any capacity furnished promptly.

Railroad Switch or Wrecking Chains

Fig. 115, Style A, with grab hook on one end and long link on other end.

Furnished to order in ¾, 1 and 1-inch sizes, any length and style of fittings.

No. 120 Log or Binding Chains



Slip Hook

Swivel

Grab Hook

Regularly carried as shown, in common grade and sizes listed below.

Size of chain, inches	¾	1	1½	2	3
Price each, 12 feet long	\$1.50	\$2.20	\$2.60	\$3.20	\$3.75
Price each, 14 feet long	1.80	2.50	2.80	3.50	3.90

Can be furnished promptly in any grade, size or length desired.

Drop Forged Sling Chain Fittings



By using the above drop forgings which we carry in stock, sling chains of any size, length and grade of chain can be made up and shipped the same day.

The different fittings are listed separately on the following page.

Size of chain, inches	¾	1	1½	2	3	4	5	6	8	10
Number of hook	23	24	25	26	27	28	29	30	32	33
Size of Missing Link	¾	1	1½	2	3	4	5	6	8	10
Size of Sling Link	¾	1	1½	2	3	4	5	6	8	10
Approximate weight, pounds	1½	1½	2½	4	5½	8	11	15	27	36
Price per set	\$0.45	\$0.50	\$0.60	\$0.70	\$0.95	\$1.20	\$1.80	\$3.00	\$4.10	\$7.75

Set consists of one Eye Hook, Fig. 120, one Sling Link, Fig. 341, and two Missing Links, Fig. 335.

No. 896 Galv. Malleable Swivels

Number	1	2	3	4	5	6	7
Total length, inches	1½	2	2½	3¼	3½	5	6
Weight per dozen	¾	¾	1½	2¼	3	5½	11½
Price per dozen	\$0.50	\$0.60	\$0.75	\$1.00	\$1.25	\$1.50	\$3.00

We also make Manila and Wire Rope Slings of any size.

Fig. 320 Drop Forged Eye Dirigo Hooks

A Drop Forged flattened Hook of Exceptionally Good Design, Suitable for Chain or Wire Rope



Size No. of Hook	Price Each	Approx. Weight Pounds Each	Approx. Load to Straighten Out, Tons	Inside Diam. of Hook, Inches	Diameter of Eye		Extreme Dimensions	
					Inside, Inches	Outside, Inches	Length, Inches	Width, Inches
23	\$ 0.21	$\frac{3}{4}$	2.3	$1\frac{3}{8}$	$\frac{7}{8}$	$1\frac{3}{4}$	$4\frac{7}{8}$	$3\frac{1}{8}$
24	.25	1	3	$1\frac{1}{2}$	1	2	$5\frac{3}{8}$	$3\frac{1}{2}$
25	.32	$1\frac{1}{2}$	5.7	$1\frac{5}{8}$	$1\frac{1}{8}$	$2\frac{1}{4}$	$6\frac{1}{8}$	$3\frac{3}{8}$
26	.43	2	7	$1\frac{3}{4}$	$1\frac{1}{4}$	$2\frac{1}{2}$	$6\frac{3}{4}$	$4\frac{3}{8}$
27	.60	$3\frac{1}{4}$	8.5	2	$1\frac{3}{8}$	$2\frac{3}{4}$	$7\frac{5}{8}$	$4\frac{7}{8}$
28	.84	$4\frac{1}{2}$	10	$2\frac{1}{4}$	$1\frac{1}{2}$	3	$8\frac{1}{2}$	$5\frac{3}{8}$
29	1.15	6	13	$2\frac{1}{2}$	$1\frac{3}{8}$	$3\frac{1}{4}$	$9\frac{1}{2}$	$6\frac{3}{8}$
30	1.50	$8\frac{1}{4}$	17	$2\frac{3}{4}$	$1\frac{3}{4}$	$3\frac{1}{2}$	$10\frac{1}{4}$	$6\frac{7}{8}$
31	2.00	$10\frac{3}{4}$	19	3	2	4	$11\frac{1}{2}$	$7\frac{1}{2}$
32	2.85	15	26	$3\frac{1}{4}$	$2\frac{3}{8}$	$4\frac{5}{8}$	$12\frac{7}{8}$	$8\frac{1}{4}$
33	4.50	20	32	$3\frac{3}{4}$	$2\frac{3}{4}$	$5\frac{1}{4}$	$14\frac{1}{2}$	$9\frac{1}{4}$
34	8.50	32	35	$4\frac{1}{4}$	$3\frac{1}{8}$	$6\frac{1}{8}$	$16\frac{1}{2}$	$10\frac{7}{8}$
35	15.00	47	48	5	$3\frac{1}{2}$	7	19	13

Log Chain Hooks

No. 1 Round or Slip Hook



Size of chain.....	$\frac{1}{4}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	$1\frac{1}{2}$	$1\frac{3}{4}$	$2\frac{1}{4}$	$2\frac{3}{4}$
Diameter iron in hook.....	$\frac{1}{4}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1	$1\frac{1}{8}$	$1\frac{3}{8}$	$1\frac{1}{2}$
Weight per dozen, pounds.....	4	6	10	15	18	30	48	
Price per dozen.....	\$1.50	\$2.00	\$2.75	\$3.25	\$4.50	\$7.25	\$10.00	

No. 6 Square Grab Hook, Swelled Point

Size of chain.....	$\frac{1}{4}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	$1\frac{1}{2}$	$1\frac{3}{4}$	$2\frac{1}{4}$	$2\frac{3}{4}$
Diameter iron in hook.....	$\frac{1}{4}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1	$1\frac{1}{8}$	$1\frac{3}{8}$	$1\frac{1}{2}$
Weight per dozen, pounds.....	5	7	11	16	21	35	50	
Price per dozen.....	\$1.50	\$2.00	\$2.75	\$3.25	\$4.50	\$7.25	\$10.00	

No. 1 Slip

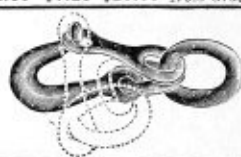
No. 6 Grab

Keystone Safety Shackle Hooks

Drop Forged Steel for Ropes or Chains

To lock and unlock, simply "lower away" giving the ring a quarter turn. Can not become unlocked while in use.

Size 1 -inch for $\frac{3}{8}$ to $\frac{1}{2}$ wire rope, 7 to 9-inch blocks, each.....	\$3.00
Size 1 $\frac{3}{8}$ -inch for $\frac{1}{2}$ to $1\frac{1}{8}$ wire rope, 10 to 12-inch blocks, each.....	5.00
Size 1 $\frac{5}{8}$ -inch for $1\frac{1}{8}$ to $1\frac{3}{8}$ wire rope, 13 to 15-inch blocks, each.....	7.50



The "Missing Link" Chain Repair Links (Fig. 335)

Drop Forged from High Grade Steel—Patented Inter-locking Lugs



This is the strongest chain repair link made and the only one on the market that is stronger than "proof" chain. Notice the inter-locking lugs, a patented feature. Sizes $1\frac{1}{8}$ and larger have reinforced rivet holes and take a different discount.

Size, Inches	Price per Doz.	Weight per Doz., Pounds	Outside Dimensions of Links, Inches	U. S. Gov't Tests, Pounds	Size, Inches	Price per Doz.	Weight per Doz., Pounds	Outside Dimensions of Links, Inches	U. S. Gov't Tests, Pounds
$\frac{3}{4}$	\$1.00	$\frac{3}{4}$	$1\frac{1}{2}$ x 1	5,580	$\frac{3}{4}$	\$3.35	$14\frac{1}{2}$	$3\frac{3}{8}$ x $2\frac{1}{2}$	34,100
$\frac{5}{8}$	1.10	1	$1\frac{3}{4}$ x $1\frac{1}{8}$	8,300	$\frac{5}{8}$	5.00	$20\frac{1}{2}$	5 x $2\frac{3}{8}$	37,100
$\frac{1}{2}$	1.20	2	$2\frac{1}{8}$ x $1\frac{1}{8}$	11,200	1	7.00	29	$5\frac{1}{2}$ x $3\frac{1}{8}$	52,600
$\frac{3}{8}$	1.35	$3\frac{1}{4}$	$2\frac{3}{8}$ x $1\frac{1}{2}$	13,980	$1\frac{1}{8}$	16.00	40	$5\frac{3}{4}$ x $3\frac{1}{2}$	
$\frac{1}{4}$	1.50	$4\frac{1}{2}$	$2\frac{5}{8}$ x $1\frac{3}{4}$	15,900	$1\frac{1}{4}$	21.50	54	$6\frac{1}{8}$ x 4	103,100
$\frac{1}{8}$	1.80	$6\frac{3}{4}$	3 x $1\frac{1}{8}$		$1\frac{3}{8}$	29.40	75	$6\frac{3}{4}$ x $4\frac{1}{4}$	112,800
$\frac{1}{16}$	2.00	9	$3\frac{1}{8}$ x $2\frac{1}{8}$	23,900	$1\frac{1}{2}$	36.00	103	$7\frac{1}{4}$ x $5\frac{1}{4}$	128,000
$\frac{1}{32}$	2.65	11	$3\frac{1}{2}$ x $2\frac{1}{8}$	27,300	$1\frac{3}{4}$	45.00	131	8 x $5\frac{1}{2}$	

Sling Chain Links (Fig. 341)

Size Iron, Inches	Price per Dozen	Length, Inside Inches	Width Inside, Inches	Suitable for Chain, Inches
$\frac{3}{8}$	\$ 2.70	$2\frac{1}{2}$	$1\frac{1}{4}$	$\frac{1}{4}$
$\frac{1}{2}$	3.85	3	$1\frac{1}{2}$	$\frac{3}{8}$
$\frac{5}{8}$	4.95	$3\frac{5}{8}$	$1\frac{3}{4}$	$\frac{1}{2}$
$\frac{3}{4}$	5.85	4	$2\frac{1}{8}$	$\frac{5}{8}$
$\frac{7}{8}$	7.80	$4\frac{1}{2}$	$2\frac{1}{4}$	$\frac{3}{4}$
1	11.70	5	$2\frac{3}{4}$	$\frac{7}{8}$
$1\frac{1}{8}$	18.00	$6\frac{1}{8}$	$3\frac{1}{4}$	1
$1\frac{1}{4}$	25.00	$7\frac{1}{8}$	$3\frac{3}{4}$	$1\frac{1}{8}$
$1\frac{3}{8}$	32.00	$8\frac{1}{4}$	$4\frac{1}{4}$	



Fig. 341

Specify Bullock Dredge Chain for Greatest Safety and Strength.

Keystone Swing Repair Links

Drop Forged Steel—Interlocking Lugs

Two similar halves centrally pivoted on same axis and having on the inner face of each a lug and recess, which when closed together interlock and abutt against each other.



Size, inches.....	1/4	5/8	3/4	7/8	1 1/2	5/8	3/4	7/8	1	1 1/8
Wt. per doz., lbs..	11 1/4	11 1/2	21 1/2	4	5	10 1/2	18	31	44	60
Price per doz....	\$2.00	\$2.25	\$2.50	\$3.25	\$4.00	\$7.50	\$10.00	\$12.50	\$15.00	\$17.50



Fig. 338

"Cold Shut" Repair Links

Plain Links for Making Emergency Chain Repairs

Size of chain..	1/4	5/8	3/4	7/8	1 1/2	5/8	3/4	7/8	1
Wt. per 100 lbs.	6	10	16	25	38	68	130	210	320
Price per 100..	\$2.65	\$3.50	\$4.20	\$5.00	\$7.50	\$11.00	\$21.65	\$35.00	\$53.35

Fig. 340 is a dredge chain cold shut. When the links are closed down and riveted they are the same dimensions as the links of our Bullock dredge chain and work in the sheaves of steam shovels, dredges, etc., without trouble. Sizes 1/4 to 1 1/2-inch.



Fig. 339



Fig. 340 Closed

Trace Repair Links

Fig. 341. Bright and highly polished. Handy for very small chains.



Gauge iron No.	3	2	1	0	3/8
Size, inches.....	3/8	1/2	5/8	3/4	1
Size link.....	10-3	10-2	10-1	5/8x1 1/2	3/4x1 5/8
Price per gross....	\$2.00	\$2.50	\$3.00	\$3.50	\$4.75

Open End Lap Links

Fig. 342. Polished. Inside measurements of links given.



Size of link.....	5/8x1 1/4	3/4x2	7/8x3	1 1/2x2 1/2
Price Per Gross....	\$3.50	\$4.00	\$4.50	\$5.75



CLOSED

Load Binder Hooks

Spread 22 1/2 inches when open and contracts to 17 1/2 inches taking up a slack of 5 1/2 inches.

No. 12 Regular, weight 8 pounds. Price.....\$3.75
No. 13 Ex. heavy, weight 11 pounds. Price... 4.50

No. 373 Can Hooks

Size of Iron Diam.	Japanned per Pair
--------------------	-------------------

3/8	\$0.80
1/2	1.30
5/8	1.50
3/4	3.90
7/8	6.25



No. 375 Bale Hooks

Size of Iron	Japanned per Pair
--------------	-------------------

1 1/2	\$0.90
1 3/4	1.10
2	1.25
2 1/4	2.00



No. 376 Combination Barrel Hooks



Very handy for hoisting barrels either by one or both heads as shown.

Price per set.....\$2.25

Miscellaneous Chain

Triumph Union Lock Link Chain



Size	Weight per 100 Ft. Lbs.	Decimal Size of Wire	Safe Load, Lbs.	Price per 100 Ft. Bright
7	4	.050	60	\$2.50
6	5	.057	80	2.55
5	6	.067	100	2.65
4	7	.072	110	2.75
3	9	.083	150	2.90
2	13	.094	180	3.10
1	15	.105	220	3.50
0	18	.118	300	4.00
2/0	24	.133	330	4.50
3/0	28	.147	380	5.25
4/0	32	.163	440	6.50
5/0	39	.179	650	7.50
6/0	50	.202	800	9.00

Hot Galvanizing, per Lb. \$0.12
 Sherardizing, per Lb.06

Brown Chain



Size	Weight per 100 Ft. Lbs.	Decimal Size of Wire	Safe Load, Lbs.	Price per 100 Ft. Bright
7	3	.050	35	\$2.50
6	4	.057	50	2.55
5	5 1/2	.067	65	2.65
4	5 1/2	.072	75	2.75
3	7 1/2	.083	80	2.90
2	8 3/4	.094	100	3.10
1	11 3/4	.105	120	3.50
0	14	.118	170	4.00
2/0	18	.133	240	4.50
3/0	21	.147	320	5.25
4/0	28	.163	360	6.50
5/0	30	.179	520	7.50
6/0	41	.202	600	9.00

Hot Galvanizing, per Lb. \$0.12
 Sherardizing, per Lb.06

German Machine Chain



Size	American Gauge	Weight per 100 Ft. Lbs.	Safe Load, Lbs.	Price per 100 Ft.
3	10	15	400	\$11.00
2	9	20	600	11.50
1	8	23	1000	12.00
0	7	28	1100	12.50
2/0	6	34	1200	13.00
3/0	5	40	1300	14.00
4/0	7/32	50	1600	15.00
5/0	1/4	65	2200	18.00
6/0	9/32	78	2500	21.00
7/0	5/16	94	3000	24.00

German Coil Chain



Size	Decimal Size	Weight per 100 Ft. Lbs.	Safe Load, Lbs.	Price per 100 Ft.
2	.147	18	700	\$ 7.20
1	.163	22	800	7.80
0	.176	25	900	8.80
2/0	.186	28	950	10.00
3/0	.198	32	1000	11.00
4/0	.212	36	1100	13.00
5/0	.244	50	1200	15.00

Sash Chain



This sash chain is made from the best material and uniform as to width and thickness and shape of link. Used principally for hanging sash, automatic fire doors, and for many mechanical devices. We recommend bronze material to be used in places affected by dampness.

	Length of Link	No.	Price per Ft.	For Sash Weighing not over, Lbs.
Bronze Metal	3/8 in.	A	\$0.13	300
	1/2 in.	1	.10	225
	5/8 in.	2	.08	150
	3/4 in.	0	.06	100
Steel Copper Plated	3/8 in.	A	.11	400
	1/2 in.	1	.08	250
	5/8 in.	2	.06	150
	3/4 in.	0	.04	100
Sherardized or Galvanized	3/8 in.	A	.12	400
	1/2 in.	1	.09	250
	5/8 in.	2	.07	150
	3/4 in.	0	.05	100

Packed on reels of 500 feet.

A. A. Chain



(Cut full size)

Used in connection with chain drills or other heavy service.

No. AA Steel	Tensile Strength	Price per Ft.
	750 lbs.	\$0.13

Plumbers' Chain

Plumbers' link chain is the same style as the regular sash chain except that the link is shorter. Used to a large extent for manufacturing purposes.



Plumbers' Links



Safety Links

Style	Size No.	Price per 100 Ft.		Extra for Nickel Plating per 100 Ft. Net
		Brass	Steel	
Safety links	000	\$3.30		\$0.25
Plumbers' or safety	00	3.60	\$3.00	.25
Plumbers' or safety	0	4.30	3.60	.25
Plumbers' or safety	1	5.20	4.00	.25
Plumbers' or safety	2	6.40	5.00	.35

Price. In boxes of 12 Yds.

Style	Size No.	Brass	Extra for Nickel Plating per Doz. Yds. Net
Safety links	000	\$1.15	\$0.10
Plumbers' or safety	00	1.25	.10
Plumbers' or safety	0	1.50	.10
Plumbers' or safety	1	1.85	.10
Plumbers' or safety	2	2.30	.20

No. 000 is the lightest weight. Others vary proportionately. Plumbers' links, 3/8-inch long. Safety link, 1/2-inch long. Packed on 500-foot reels or 12-yard packages.

H. Channon Company Chicago

Cable Chains Actual Size



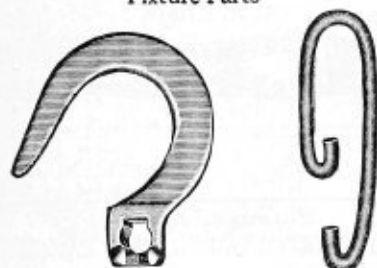
No. 110. No. 10. No. 30. No. 40.

These chains are made by automatic machinery and are therefore uniform.

Furnished in steel only on reels of 250 feet.

No. 110.	For sash of 400 lbs.	Price per foot...	\$0.17
No. 10.	For sash of 250 lbs.	Price per foot...	.14
No. 30.	For sash of 125 lbs.	Price per foot...	.10
No. 40.	For sash of 75 lbs.	Price per foot...	.09

Cable and Sash Chains Fixture Parts

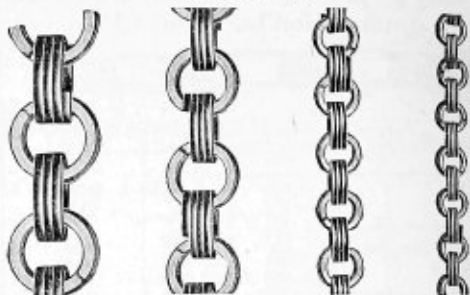


For Cable Chain

For Sash Chain

For cable chains—Hooks, thimbles and irons for Nos. 110, 10, 30, 40. Price per set... \$0.25
For sash chains—Hooks, rings and irons for A, 1, 2-0. Price per set... \$0.14

The Universal Double Jointed Chain Actual Size



1/2-inch 3/8-inch 1/4-inch 1/8-inch
Sold only 100 feet in a box or 500 feet on a reel.

Prices Retained

Size, inches.....	3/8	1/4	5/16	3/8	1/2
Per 100 feet.....	\$3.50	\$4.00	\$5.00	\$6.00	\$9.00

Ornamental, strong and flexible as a piece of twine. Never kinks or snarls, but is always free and pliable, and will bend at all angles. Each joint is soldered into a solid link in the process of retinning.

Brass and Iron Jack Chains



No.	Single Length of Link, Inches	Price per Box of 12 Yards	
		Iron	Brass
8	1 1/16	\$0.95	\$5.25
9	1 3/16	.90	4.25
10	1 1/2	.80	3.50
11	1 5/8	.70	2.80
12	1 7/8	.65	2.30
13	2	.60	1.92
14	2 1/8	.55	1.60
16	2 1/4	.48	1.00
18	2 3/8	.45	.70
20	2 1/2	.40	.55

Hodell Flat Link Chain



The only chain made from flat wire—double at every point. The latest development of flat link chain which possesses many points of superiority over all other patterns of flat chain.

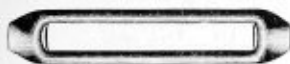
Size No.	List Price per 100 Feet	Gauge of Wire Decimal Fractions of an Inch	Tensile Strength, Pounds	Safe Working Load, Pounds	Approximate Bright Weight per 100 Ft., Lbs.	Approximate Length per Link, Inches
6	\$ 4.60	.047x .022	200	40	2 1/2	3/8
5	5.00	.067x .032	400	80	5	5/8
4	5.40	.085x .040	600	120	8	7/8
3	5.80	.090x .030	475	95	6	5/8
2	6.30	.100x .040	700	140	9	7/8
1	7.00	.100x .040	750	150	8	1 1/8
0	7.50	.100x .050	900	180	10	1
2/0	8.80	.110x .060	1200	240	13	1 1/4
3/0	10.00	.123x .065	1400	280	17	1 5/8
4/0	13.00	.135x .070	1850	370	18	1 1/2
5/0	15.00	.140x .080	1900	380	22	1 3/4

"Weldless" Bridge Turnbuckles For Rods

Drop Forged—Without Welds—Right and Left U. S. S. Threads

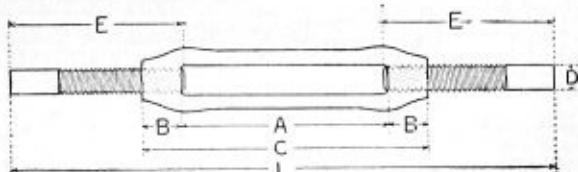


With Stubs Fig. 377



Without Stubs Fig. 378

D—Size and diameter of screw.
A—Length in clear between heads.
B—Length of tapped heads = $1\frac{1}{2}$ D or more



C—Total length of buckle.
E—Length of stub end.
L—Total length of buckle and stub ends, when open.

D Diameter of screw, Inches	Price Each	Weight per 100		A Length Between Heads	B Length of Heads	C Total Buckle Length	E Length Stub End	L Total L. with Stubs
		With Stubs	Without Stubs					
$\frac{1}{2}$	\$0.36	36	20	4	$\frac{1}{2}$	4 $\frac{1}{2}$	6	16
$\frac{3}{8}$	.38	55	33	5	$\frac{3}{8}$	6 $\frac{1}{8}$	6	17
$\frac{1}{4}$	.40	77	33	5	$\frac{1}{4}$	6 $\frac{1}{4}$	8	21
$\frac{3}{16}$	.42	126	64	6	$\frac{3}{16}$	7 $\frac{1}{2}$	8	22
$\frac{1}{2}$	.45	142	64	6	$\frac{1}{2}$	7 $\frac{1}{2}$	8	22
$\frac{5}{8}$	.48	225	115	6	$\frac{5}{8}$	7 $\frac{1}{8}$	8	22
$\frac{3}{4}$	.50	232	115	6	$\frac{3}{4}$	7 $\frac{1}{4}$	8	22
$\frac{7}{8}$	.63	349	163	6	$1\frac{1}{8}$	8 $\frac{1}{4}$	8 $\frac{1}{2}$	23
1	.75	476	206	6	$1\frac{1}{2}$	8 $\frac{3}{8}$	9	24
$1\frac{1}{8}$	.88	662	284	6	$1\frac{1}{2}$	9 $\frac{1}{8}$	9 $\frac{1}{2}$	25
$1\frac{1}{4}$	1.00	870	384	6	$1\frac{1}{4}$	9 $\frac{1}{4}$	9 $\frac{1}{2}$	25
$1\frac{1}{2}$	1.25	1113	469	6	$1\frac{1}{2}$	9 $\frac{3}{8}$	10	26
$1\frac{3}{8}$	1.38	1568	768	6	$2\frac{1}{4}$	10 $\frac{1}{4}$	10 $\frac{1}{2}$	27
$1\frac{1}{2}$	1.50	1717	753	6	$2\frac{1}{4}$	10 $\frac{1}{2}$	10 $\frac{1}{2}$	27
$1\frac{3}{4}$	1.75	2050	930	6	$2\frac{3}{4}$	11 $\frac{1}{4}$	11 $\frac{1}{4}$	28
$1\frac{7}{8}$	2.00	2194	900	6	$2\frac{3}{4}$	11 $\frac{3}{4}$	11	28

$\frac{1}{2}$, $\frac{3}{8}$ and $\frac{1}{4}$ -inch sizes may be had with 9 and 12-inch openings at 25 and 50% advance.

"Brazil" Hexagonal Bridge Turnbuckles

Welded—Wrought Iron—Has good wrench hold—R. and L. U. S. S. Threads

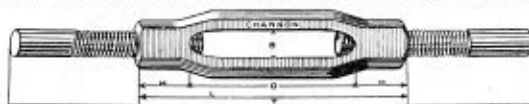


Fig. 380.

B—Size and diameter of screw.
O—Opening between heads—5 $\frac{1}{2}$ inches.
H—Length of tapped heads.

L—Length of buckle without stubs.
T—Total length of buckle and stubs.

The nut or head is of hexagonal form. The buckle has but two weld lines which extend from end to end. Ends are machine finished or chamfered. Has long thread in the heads. Made of charcoal iron. Shape of heads gives good wrench hold.

B Diameter Screw, Inches	Price Each	Weight Each		O Opening Between Heads, Inches	H Length of Heads Inches	L Length Buckle Inches	T Total L. with Stubs Inches
		With Stubs	Without Stubs				
$\frac{3}{8}$	\$0.40	1.15	.65	$5\frac{1}{2}$	$\frac{3}{8}$	7 $\frac{1}{4}$	22
$\frac{1}{2}$	.45	2	1.2	$5\frac{1}{2}$	$\frac{1}{2}$	7 $\frac{1}{2}$	22
$\frac{3}{4}$	.50	3	1.6	$5\frac{1}{2}$	$\frac{3}{4}$	7 $\frac{1}{4}$	22
$\frac{1}{2}$	.63	4	2.2	$5\frac{1}{2}$	$1\frac{1}{8}$	8 $\frac{1}{4}$	23
$\frac{3}{4}$	.75	5.25	2.4	$5\frac{1}{2}$	$1\frac{1}{2}$	8 $\frac{3}{8}$	24
1	.88	7	3.2	$5\frac{1}{2}$	$1\frac{3}{8}$	9	25
$1\frac{1}{8}$	1.00	8.75	3.6	$5\frac{1}{2}$	$1\frac{3}{8}$	9 $\frac{1}{4}$	25
$1\frac{1}{4}$	1.25	11.75	4.8	$5\frac{1}{2}$	$2\frac{1}{8}$	9 $\frac{1}{4}$	26
$1\frac{1}{2}$	1.38	14.12	6	$5\frac{1}{2}$	$2\frac{1}{4}$	10 $\frac{1}{4}$	27
$1\frac{3}{8}$	1.50	17	7.2	$5\frac{1}{2}$	$2\frac{3}{8}$	10 $\frac{1}{2}$	27
$1\frac{1}{2}$	1.75	20	8	$5\frac{1}{2}$	$2\frac{3}{8}$	10 $\frac{1}{2}$	28
$1\frac{3}{4}$	2.00	23 $\frac{1}{4}$	9	$5\frac{1}{2}$	$2\frac{3}{4}$	11 $\frac{1}{4}$	28
$1\frac{7}{8}$	2.25	28	11	$5\frac{1}{2}$	$2\frac{3}{4}$	11 $\frac{3}{8}$	29
$2\frac{1}{8}$	2.65	36	17	$5\frac{1}{2}$	$3\frac{1}{8}$	12	29
$2\frac{1}{4}$	3.10	38	17	$5\frac{1}{2}$	$3\frac{3}{8}$	12 $\frac{1}{4}$	29
$2\frac{1}{2}$	3.50	45	19 $\frac{1}{4}$	$5\frac{1}{2}$	$3\frac{3}{8}$	12 $\frac{3}{8}$	30
$2\frac{3}{4}$	4.00	48	19 $\frac{1}{4}$	$5\frac{1}{2}$	$3\frac{3}{4}$	12 $\frac{3}{4}$	31
$2\frac{7}{8}$	4.50	61	28	$5\frac{1}{2}$	4	13 $\frac{1}{2}$	32
$3\frac{1}{8}$	5.00	62	26	$5\frac{1}{2}$	4 $\frac{1}{4}$	13 $\frac{3}{8}$	32
$3\frac{1}{4}$	5.50	77	35	$5\frac{1}{2}$	4 $\frac{3}{8}$	14 $\frac{1}{4}$	33
$3\frac{3}{8}$	6.00	80	35	$5\frac{1}{2}$	4 $\frac{3}{8}$	14 $\frac{3}{8}$	33
$3\frac{1}{2}$	6.50	83	35	$5\frac{1}{2}$	4 $\frac{3}{4}$	15	34

Special lengths 9, 12, 15, 18 and 24 openings can be had to special order.

Bridge and Roof Rods quoted upon request.

H. Channon Company Chicago

Hook and Eye Turnbuckles

Forged Steel—Right and Left Hand Threads

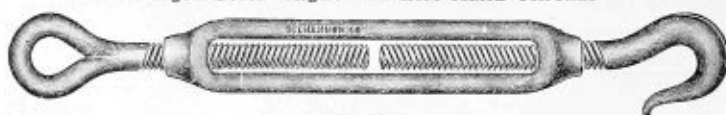


Fig. 225

Size, diameter thread, inches	3/8	1/2	5/8	3/4	1	1 1/8	1 1/4	1 1/2	1 3/4	2
Length between heads, inches	3 1/2	4	4 1/4	4 1/2	6	8 1/2	9 1/4	10	11	12
Length buckle outside, inches	4 1/2	4 3/4	5 1/4	5 1/2	7 1/2	10 1/2	11 3/4	12 3/4	14	15 1/2
Weight each, pounds	3 1/4	3 1/2	3 3/4	4	5 1/2	7 1/2	8 1/2	10 1/2	12 1/2	15
Price plain, each	\$0.70	\$0.75	\$0.80	\$0.85	\$1.30	\$1.75	\$2.60	\$3.60	\$4.75	\$5.80
Price galvanized, each	.80	.85	.90	1.10	1.50	2.20	3.25	4.25	5.50	6.75

Eye and eye contractors buckles listed with wire rope fittings. These turnbuckles are carried black and galvanized. When out of one finish, we usually ship the other.

Malleable Iron Turnbuckles



Fig. 252 With Swiss One End and Wrought Iron Hook

These turnbuckles are not near as strong or as safe as Fig. 225 and are recommended for very light work only.

Outside Diameter of Screw, Inches	Galvanized, Each	Self-colored, Each	Length in the Clear Between Heads, In.	Estimated Weight Each, Pounds
3/8	\$0.55	\$0.48	3	1/4
1/2	.60	.50	3 3/4	5/8
5/8	.65	.55	4 1/2	3/4
3/4	.85	.70	4 3/4	5/8
7/8	1.00	.90	5 1/2	1
1 1/8	1.25	1.00	6	1 1/4
1 1/4	1.75	1.50	8	2 1/2
1 1/2	1.90	1.75	8	3 1/4

Screw Hooks

Wrought Iron



Fig. 392

Size	1/4	5/8	3/8	1/2	5/8	3/4	1
Ext. length, in.	4	4 1/2	4 3/4	5 1/4	5 1/2	6 1/4	7 1/4
Wt., dozen	3 1/2	1	2 1/2	3 3/8	4 1/4	9	14
Plain, dozen	\$0.70	.80	.90	1.20	1.50	2.20	3.70
Galv., dozen	.80	.90	1.00	1.40	1.80	2.60	4.20

Screw Eye Bolts

Drop Forged
Galvanized



Fig. 388

Size shank	1/4	5/8	3/8	1/2	5/8	3/4	1
Lgth under eye	2	2 1/4	2 1/2	2 3/4	3 1/4	4	4 1/2
Dia. eye inside	3/8	5/8	3/4	7/8	1	1 1/4	1 1/2
Weight, dozen	3 1/2	1 1/2	2 1/4	3 1/2	5 1/2	10	17
Price, dozen	\$1.20	1.40	1.60	2.00	2.40	3.20	5.80

Nut Eye Bolts

Fig. 291 Drop Forged—Galvanized

★ Size of Shank, Inches	Galv. Dozen	Length Under Eye, Inches	Inside Diam. of Eye, Inches	Est'd Weight per Doz., Pounds
1/4	\$ 1.40	2	1 1/8	1
5/8	1.60	2 1/4	1 3/8	1 3/4
3/8	1.80	2 1/2	1 5/8	2 3/4
7/8	2.30	2 3/4	2 1/8	4 1/2
1	2.60	3 1/4	2 3/8	6 3/4
1 1/8	3.60	4	3 1/4	12
1 1/4	6.20	4 1/2	3 3/4	20
1 1/2	9.00	5	4 1/4	31
1 3/4	12.00	6	5 1/4	46

Galvanized Ring Bolts

Drop Forged

Fig. 260
Screw Ring BoltsFig. 261
Nut Ring Bolts

Screw Ring Bolts

Size Bolt	Price per Doz.	Length Under Eye	Diam. Ring Inside	Weight Doz., Lbs.
1/4	\$1.60	2	1 3/8	2
5/8	2.40	2 1/4	2	3 1/2
3/8	2.80	2 1/2	2 1/8	5
7/8	3.20	2 3/4	2 3/8	7 1/2
1	3.60	3 1/4	2 3/4	11
1 1/8	5.50	4	3 1/4	19
1 1/4	8.50	4 1/2	3 3/4	31

Nut Ring Bolts

Size Bolt Inches	Price Per Doz.	Length Under Eye	Diam. Ring Inside	Weight Doz., Lbs.
1/4	\$2.00	2	1 3/8	2
5/8	2.60	2 1/4	2	3 1/4
3/8	3.00	2 1/2	2 1/8	5 1/4
7/8	3.50	2 3/4	2 3/8	8
1	3.80	3 1/4	2 3/4	12 1/4
1 1/8	4.70	4	3 1/4	15 1/2
1 1/4	6.00	4 1/2	3 3/4	21
1 1/2	9.50	5	4 1/4	33 1/2

Special Long Guy Take-Ups Listed with Derrick Irons.

Estimated Strength of Blocks for Manila Rope

Regular or Light Pattern, Wood Shell

Size of Block, Inches	Size of Rope Diameter, Inches	Two Single Blocks		Two Double Blocks		Two Triple Blocks	
		Breaking Strain of Hooks in Lbs.	Breaking Strain of New Rope in Lbs.	Breaking Strain of Hooks in Lbs.	Breaking Strain of New Rope in Lbs.	Breaking Strain of Hooks in Lbs.	Breaking Strain of New Rope in Lbs.
4	1 1/2	2,620	3,600	3,810	7,200	5,710	10,800
5	1 3/8	3,810	6,400	5,710	12,800	9,100	18,200
6	1 1/2	5,710	8,100	9,100	16,200	6,810	24,300
7	1 3/4	9,100	12,100	6,810	24,200	9,356	36,300
8	1 7/8	6,810	14,400	9,356	28,800	13,720	43,200
10	1 3/8	13,720	19,600	16,030	39,200	18,722	58,800
12	1 1/2	16,030	22,500	18,722	45,000	20,375	67,500

Heavy or Thick Mortise, Wood Shell

Size of Block, Inches	Size of Rope Diameter, Inches	Two Single Blocks		Two Double Blocks		Two Triple Blocks	
		Breaking Strain of Hooks in Lbs.	Breaking Strain of New Rope in Lbs.	Breaking Strain of Hooks in Lbs.	Breaking Strain of New Rope in Lbs.	Breaking Strain of Hooks in Lbs.	Breaking Strain of New Rope in Lbs.
8	1 1/8	9,356	19,600	13,720	39,200	16,030	58,800
10	1 1/2	16,030	22,500	19,050	45,000	19,050	67,500
12	1 1/2	19,050	32,400	20,375	64,800	28,300	97,200
14	1 3/4	28,300	43,300	35,680	86,600	35,680	129,900
16	2	35,680	48,400	72,100	96,800	72,100	145,200

"Bullock" Wrecking Blocks, with Lashing Shackles

Size of Block, Inches	Size of Rope Diameter, Inches	Two Single Blocks		Two Double Blocks		Two Triple Blocks	
		Breaking Strain of Shackles in Lbs.	Breaking Strain of New Rope in Lbs.	Breaking Strain of Shackles in Lbs.	Breaking Strain of New Rope in Lbs.	Breaking Strain of Shackles in Lbs.	Breaking Strain of New Rope in Lbs.
18	2 1/4	116,300	67,600	132,532	135,200	155,542	202,800
20	2 1/2	132,532	78,400	155,542	156,800	172,400	235,200
22	2	155,542	115,600	172,400	231,200	235,620	346,800
24	3 1/2	172,400	192,000	235,620	384,000	265,955	576,000

One-third the strength of New Rope is considered the proper working load, but on larger rope for extra heavy continuous duty, at least four or five should be figured.

What one man should hoist with a pair of Blocks pulling hand over hand:

With a rope over a stationary sheave, one man will hoist nearly half his weight, averaging 75 lbs., barring friction. Friction reduces this force to about 60 lbs. if the sheave be self-lubricating bronze bushed, and to about 50 lbs. if the sheave be common, or iron, bushed. Each sheave in the lower or movable block multiplies this force by two, so that one man should hoist with a pair of blocks as follows:

Single iron bushed.....	100 lbs.	Single S. L. bronze bushed.....	120 lbs.
Double iron bushed.....	200 lbs.	Double S. L. bronze bushed.....	240 lbs.
Triple iron bushed.....	300 lbs.	Triple S. L. bronze bushed.....	360 lbs.

We would call your attention to the fact that it takes three men to hoist with a pair of single blocks the same load one man will hoist with a pair of triple blocks.

MAXIMUM WORKING LOAD FOR TWO DOUBLE BLOCKS AND NEW MANILA ROPE

Regular or Light Pattern, Wood Shell

Size of blocks.....	5	6	7	8	9	10	12
Load, lbs.....	250	350	600	1,200	2,000	4,000	10,000

Heavy or Thick Mortise, Wood Shell

Size of blocks.....	8	10	12	14	16
Load, lbs.....	2,000	6,000	12,000	24,000	36,000

A set of double and triple blocks will hoist considerably more, and a single and double will hoist correspondingly less. The above estimate load is close to the danger line, and it is well to figure on using somewhat heavier blocks and rope, especially on the larger sizes.



Light Pattern Manila Rope Blocks

Hard Wood Shells, Inside Iron Straps, Round Loose Hooks

These are the lightest wood blocks we have. As the hooks, straps and pins are light, these blocks are recommended for hand hoisting only, and for light loads and occasional use.

For estimated strength of hooks and rope, see preceding page. It will be noted that to secure the full strength of the rope, heavier blocks must be used, see below.

Manila rope increases in size with use, and as the diameter of rope here given is the largest the block will take, it is common practice to order blocks at least one size larger than the rope sizes stated in second column. Ordering next size larger also gives you larger hooks, straps, etc.



Fig. 101
Single with
Becket



Fig. 102
Double, no
Becket



Fig. 103
Triple with
Becket

"Becket," this is the part of the lower end of the block upon which the standing part of the rope is fastened.

Only one block of a pair requires a becket, usually the block with the least number of sheaves.

Beckets are supplied on all singles, one-half of the doubles and one-third of the triples. When more beckets are desired an extra charge will be made.

"Bushings" of blocks.

The Plain Bored, "Common" or "Iron Bushed" sheaves are plain bored for pin. They have no "bushings."

The "Roller Bushed" sheave has a cage roller bushing with 6 rollers—used chiefly for hand over hand hoisting—Painters Falls, etc., carried up to 8 inch only.

Order by Length of Shell, Inches	Diameter of Rope will Take Inches	Price Each with Plain Bored Sheaves			Price Each with Six Roller Bushed Sheaves			Size of Sheaves, Inches			Approximate Weight, Each, Pounds		
		Single	Double	Triple	Single	Double	Triple	Diam.	Width	Diam. Pin	Single	Double	Triple
4	3/4 - 1 1/4	\$0.85	\$1.60	\$2.15	\$1.20	\$2.25	\$3.25	2 1/4	5/8	3/8	1 1/2	2 1/2	3 1/2
5	1 - 1 1/4	.90	1.75	2.25	1.25	2.35	3.50	3	3/4	3/8	2 1/2	4	5 1/2
6	1 1/4 - 1 3/4	1.10	2.00	2.90	1.50	2.85	4.40	3 1/2	1	1/2	4 1/2	6 1/2	10
7	1 3/4 - 2	1.30	2.40	3.50	1.70	3.35	5.00	4 1/4	1 1/4	1/2	5 1/2	8 1/2	12
8	2 - 2 1/4	1.65	2.85	4.25	2.25	4.15	6.00	4 3/4	1 3/8	5/8	8	13	19
10	2 1/4 - 2 3/4	2.75	4.50	6.25				6 1/4	1 3/4	5/8	15	23	28
12	2 3/4 - 3	4.45	7.50	10.65				8	1 3/2	3/4	23	34	45

"Wide Mortise" Manila Rope Blocks

Hard Wood Shells, Inside Iron Straps, Round Loose Hooks

Medium Weight, between "Light Pattern" and "Bullock" Blocks

These blocks are heavier than our light pattern shown above and have wider mortise (thicker wood), are double cross-bolted through the wood shells, and also have heavier hooks and straps.

For estimated strength, see preceding page. Notice that to have blocks of a strength proportioned to the strength of the rope, still heavier blocks must be used. These will be found in our Bullock brand blocks on next page.



Fig. 201
Single



Fig. 202
Double



Fig. 203 Triple

As Manila hemp rope swells with dampness and use, it is well to order one size larger block than the rope sizes listed. Order a 12-inch block for 1 1/4 inch rope, as 1 1/2 inch rope is the largest rope a 12-inch block will take, and 1 1/4 inch rope handles much better through this block.

Beckets, see explanation and ruling same as for Nos. 101 to 103.

Bushings. When ordering be sure to state the "bushing" wanted—whether Plain Bored, also known as Common Iron Bushed, or Self-Lubricating graphite plug bronze bushed. The Self-Lubricating bushing requires no oiling.

Order by Length of Shell, Inches	Diam. of Rope will Take, Inches	Price Each with Plain Bored Sheaves			Price Each with Self- Lubricating Bronze Bushed Sheaves			Size of Sheaves, Inches			Approximate Weight, Each, Pounds		
		Single	Double	Triple	Single	Double	Triple	Diam.	Width	Diam. Pin	Single	Double	Triple
8	1 - 1 1/4	\$ 2.75	\$ 4.50	\$ 6.30	\$ 5.00	\$ 9.00	\$13.00	4 1/4	1 3/8	5/8	12	19	26
10	1 1/4 - 1 3/4	4.00	6.50	8.50	7.25	13.50	19.00	6 1/8	1 1/2	3/4	20	31	43
12	1 3/4 - 2	5.25	8.50	12.50	9.25	17.00	25.00	8	1 3/4	3/4	32	47	65
14	2 - 2 1/4	8.00	13.00	17.00	13.00	23.50	33.00	9 1/2	1 3/4	7/8	51	72	98
16	2 1/4 - 2 3/4	11.50	18.00	25.00	18.00	32.00	48.00	11	2 1/4	1	67	105	148

Order by length of shell—Figure No. and style of sheaves.

"Bullock" Extra Heavy Manila Rope Blocks To Secure Full Strength of Manila Rope These are the Blocks to Use



Fig. 301 Single



Fig. 302 Double



Fig. 303 Triple

Furnished with extra heavy **FLATTENED HOOKS** or shackles.
All Bullock blocks are **Self-Lubricating Graphite Plug Bronze Brushed**.
Extra Heavy Hard Wood Shells, Straps and Pins.

Bullock tackle blocks are the heaviest and strongest blocks made for Manila rope. They are built to stand the hard wear and tear occasioned by severe usage and heavy loads, such as in **bridge erection, railroad wrecking and heavy construction work**, or where it is expected to secure the full strength of good Manila rope.

Bullock blocks are made from highest grade materials throughout. Shells are extra heavy and **double cross bolted**. Sheaves are heavy, with smoothly turned grooves and turned pins. Straps are heavy and hooks large and well proportioned. They are flattened, with eyes punched and worked out. No welds.

Bullock Hook Blocks (Large Flattened Hooks)

Order by Length of Shell, Inches	Diameter of Rope, Inches	Size of Sheaves, Inches			Price Each with Self-Lubricating Graphite Bronze Bushed Sheaves		
		Diameter	Width	Diameter of Pin	Single Fig. 301	Double Fig. 302	Triple Fig. 303
8	1 - 1 1/4	4 3/4	1 1/2	3/4	\$ 6.00	\$ 9.00	\$13.00
10	1 1/4 - 1 1/2	6 1/4	1 1/2	7/8	7.25	13.50	19.00
12	1 1/2 - 1 3/4	8	1 3/4	1	9.25	17.00	25.00
14	1 3/4 - 1 3/4	9 1/4	1 3/4	1 1/4	13.00	23.50	33.00



Fig. 451 Single



Fig. 452 Double



Fig. 453 Triple

Bullock blocks with lashing shackles are recommended for heaviest work. A shackle is just 5 times as strong as a hook made of same size iron. These are also known as "Oil Well" blocks. The straps are also of an entirely different construction, see illustrations. Straps are all straight and bear on the large shackle pin. All large blocks should be constructed in this manner.

Quadruple (4 sheave) blocks are built to special order only. Fig. No. is 454.

Bullock Snatch Blocks to match—see following page.

Bullock Shackle Blocks

Order by Length of Shell, Inches	Diameter of Rope, Inches	Size of Sheaves, Inches			Price Each with Self-Lubricating Graphite Bronze Bushed Sheaves			
		Diameter	Width	Diameter of Pin	Single Fig. 451	Double Fig. 452	Triple Fig. 453	Quadruple Fig. 454
14	1 1/4 - 1 3/4	9 1/4	1 3/4	1 1/4	\$ 13.00	\$ 23.50	\$ 33.00	\$ 45.00
16	1 3/4 - 2	11	2 1/4	1 3/4	18.00	35.00	51.00	69.00
18	2 - 2 1/4	12	2 3/4	1 3/4	23.00	44.00	63.00	90.00
20	2 1/4 - 2 1/2	14	3 1/4	1 3/4	32.00	54.00	77.00	109.00
22	2 1/2 - 3	15	3 3/4	1 3/4	38.00	70.00	100.00	140.00

Special blocks of any size, capacity or number sheaves built promptly to order.

H.Channon Company Chicago

"Chicago" Steel Hook Blocks for Manila Rope

Improved Heavy Pattern, Steel Shells, Round Loose Hooks

These blocks are steadily growing in popularity. There is no wood to split or rot and the shells are flared out and rounded nicely for the rope.

These blocks compare in strength with the wide mortise wood shell blocks Figs. 201 to 203 on preceding page and should not be confused with very light pattern steel blocks offered by the general hardware trade.

Chicago blocks have heavy steel shells and straps and strong hooks and pins.

Finished in black japan.

Bushings—The "plain bored" sheaves, also known as "common iron bushed" are really not "bushed" at all, but consist of plain bored cast iron sheaves rotating on turned steel pins. Our self-lubricating bronze bushed sheaves require no oil or attention and save loss of power by friction.

Beckets same ruling as for Figs. 101 to 103.



Fig. 577



Fig. 578



Fig. 579

Order by Length of Shell, Inches	Diameter of Rope, Inches	Price Each with Plain Bored Sheaves			Price Each with Self-Lubri- cating Bronze Bushed Sheaves			Size of Sheaves, Inches			Approximate Weight, Pounds		
		Single Fig. 577	Double Fig. 578	Triple Fig. 579	Single Fig. 577	Double Fig. 578	Triple Fig. 579	Diam.	Width	Diam. of Pin	Single	Double	Triple
4	3/8-1 1/8	\$ 0.90	\$ 1.75	\$ 2.50	\$ 1.65	\$ 3.25	\$ 4.75	2 1/4	6 1/2	3/4	1 1/2	2	3
5	3/8-1 1/8	1.00	1.90	2.75	1.80	3.50	5.15	3	7 1/2	3/4	2	5	6
6	3/8-1 1/8	1.25	2.25	3.25	2.10	4.00	5.80	3 1/2	1	1 1/2	5	7 1/2	10
7	3/8-1 1/8	1.50	2.70	4.00	2.45	4.60	6.85	4 1/4	1 1/2	1 1/2	7	10	13
8	3/8-1 1/8	1.85	3.20	4.75	2.90	5.30	7.90	4 3/4	1 3/4	1 3/4	10	14	18
10	1 1/8-1 3/4	3.10	5.10	7.00	4.40	7.70	11.00	6 1/4	1 3/2	1 3/2	17	26	35
12	1 1/8-1 3/4	5.00	8.25	11.75	6.45	11.15	16.00	8	1 3/4	1 3/4	26	42	55
14	1 1/8-1 3/4	7.50	11.75	16.50	9.10	15.00	21.30	9 1/2	1 7/8	1 7/8	45	65	95

"Chicago" Steel Shackle Blocks for Manila Rope

Heavy Pattern—Steel Shells—Pivotal Cross Shackles



Fig. 580 Single



Fig. 581 Double



Fig. 582 Triple

Compare with our Figs. 201 to 203, Heavy Pattern Wood Shell blocks. See description with Hook blocks above. Shackles are considered five times stronger than hooks of same dimensions. See ruling for becketts, Figs 101 to 103.

Order by Length of Shell, Inches	Diameter of Rope, Inches	Price Each with Plain Bored Sheaves			Price Each with Self-Lubri- cating Bronze Bushed Sheaves			Size of Sheaves, Inches			Approximate Weight, Pounds		
		Single Fig. 580	Double Fig. 581	Triple Fig. 582	Single Fig. 580	Double Fig. 581	Triple Fig. 582	Diam.	Width	Diam. of Pin	Single	Double	Triple
10	1 1/8-1 3/4	\$ 4.00	\$ 6.50	\$ 8.50	\$ 5.50	\$ 9.50	\$13.00	6 1/4	1 1/2	3/4	29	43	66
12	1 1/8-1 3/4	6.25	10.25	15.00	7.85	13.50	20.00	8	1 3/8	3/4	42	66	89
14	1 1/8-1 3/4	9.00	15.00	20.00	11.00	19.00	26.00	9 1/2	1 3/8	3/4	65	105	138
16	1 3/8-2	13.00	21.00	32.00	15.60	26.00	39.50	11	2 1/8	1	100	159	207
18	2-2 1/4	20.00	35.00	50.00	23.00	41.00	69.00	12	2 3/8	1 1/8	125	212	275
20	2 1/4-2 3/4	28.00	45.00	65.00	32.00	53.00	77.00	13 1/2	2 3/8	1 1/2	160	226	336

Larger Manila Rope Blocks upon request. State weight of load.

Extra Heavy Pattern Steel Manila Rope Blocks

With Lashing Shackles—Self-Lubricating Bronze Bushed



Fig. 710 Double



Fig. 715 Triple



Fig. 720 Snatch Block

Formerly used to a large extent for railroad wrecking and bridge building work for large size manila rope. Wire rope blocks and wire rope are now used instead, except where large winch engines are in use.

Ordered by		Price Each with Self-Lubricating Bronze Bushed Sheaves				Figure 720 Snatch Blocks			
Length of Shell, Inches	Diameter of Rope, Inches	Fig. 709 Single	Fig. 710 Double	Fig. 715 Triple	Fig. 718 Quadruple	Size of Sheave, Inches			Price Each
						Diameter	Width	Diam. Pin.	
16	2	\$20.00	\$34.00	\$ 49.00	\$ 70.00	9	2 5/8	1	\$27.50
18	2 1/4	32.00	54.00	77.00	105.00	10	3	1 1/4	35.00
20	2 1/2	45.00	68.00	92.00	130.00	11	3 1/2	1 3/8	49.50
22	3	65.00	78.00	107.00	148.00	11 3/4	4 1/2	1 3/2	75.50

Producers Steel Snatch Blocks

Regular Oil Well Pattern—Self-Oiling Sheaves—For Manila or Wire Rope



Fig. 623 Double



Fig. 624 Triple

These are not really "snatch" blocks (which have single sheaves and one side with quick opening link) but they are so known to the oil well trade.

Made for both manila or wire rope. Specify which when ordering.

Length of shell, inches	20	22	24	26	28	30
Diameter of sheaves, inches	12	14	15 1/2	16 1/2	18 1/2	20
For Manila rope, diameter, inches	2 1/8	2 3/8	2 1/2	2 1/2	2 1/2	2 1/2
For wire rope, diameter, inches	7/8	1	1	1 1/4	1 1/4	1 1/4
Weight single blocks, each, pounds	115	135	170	195	220	260
Weight double blocks, each, pounds	161	200	260	290	340	400
Weight triple blocks, each, pounds	210	280	350	390	450	570
Price Fig. 622, single blocks, each	\$16.50	\$22.00	\$25.50	\$28.00	\$34.00	\$40.00
Price Fig. 623, double blocks, each	26.00	30.00	37.00	42.00	48.00	60.00
Price Fig. 624, triple blocks, each	35.00	44.00	52.00	58.00	62.00	76.00

Oil Well Hooks

Fig. 625 Double Swivel Flattened



Size Iron	Weight, Pounds	Price Each
1 1/2	10	\$ 2.80
1 3/4	18	3.50
2	25	4.00
2 1/2	45	10.00
3	75	14.00
3 1/2	120	24.00
4	160	31.00
4 1/2	225	43.00
5	275	61.00



Special Extra Heavy Blocks

For Manila Rope

Fig. 626

With forked shackles.

Built promptly to special order, of any size or capacity.

Prices upon request.

Special Blocks of any size built to order.

H. Channon Company Chicago

Snatch Blocks for Manila Rope



Fig. 400
Wood Shell—Locking Link



Fig. 605 Wood Shell "Bullock"
With Bail—10 to 25-inch



Fig. 420
Steel Shell with Link

Order by Length of Shell, Inches	Diameter of Rope, Inches	List Price Each		Size of Sheaves, Inches			Approx. Weight Each, Pounds		
		Iron Bushed	Self-Lubr. Bronze Bushed	Diameter	Width	Size Pin	Fig. 400	Fig. 605	Fig. 420
6	$\frac{7}{8}$	\$ 4.00	\$ 5.25	3	$1\frac{1}{2}$	$\frac{1}{2}$	6		7
7	$\frac{7}{8}$	4.75	6.00	$3\frac{1}{2}$	$1\frac{1}{2}$	$\frac{1}{2}$	9		9
8	1	5.75	7.25	$4\frac{1}{2}$	$1\frac{1}{2}$	$\frac{1}{2}$	12		13
9	$1\frac{1}{8}$	6.75	8.50	5	$1\frac{1}{2}$	$\frac{1}{2}$	17		17
10	$1\frac{1}{8}$	8.50	11.00	$5\frac{3}{4}$	$1\frac{1}{2}$	$\frac{1}{2}$	22	25	25
12	$1\frac{1}{2}$	10.00	13.00	$6\frac{3}{4}$	$2\frac{1}{2}$	$\frac{3}{4}$	31	36	34
14	$1\frac{3}{8}$	13.00	16.50	8	$2\frac{1}{2}$	$\frac{3}{4}$	44	55	48
16	2	17.00	22.00	9	2 $\frac{3}{4}$	1	63	75	70
18	$2\frac{1}{4}$	25.00	31.00	10	3	$1\frac{1}{8}$	89	110	102
20	$2\frac{1}{2}$	38.00	46.00	11	$3\frac{1}{2}$	$1\frac{1}{4}$	128	145	138
22	3	55.00	68.00	$11\frac{3}{4}$	$4\frac{1}{4}$	$1\frac{1}{2}$	170	215	190

Steel Snatch Blocks for Wire Rope



Fig. 722 Drop Link



Fig. 724 Shackle Bail

Fig. 722 has semi-circular guard pressed in shell over sheave to prevent wire rope slipping in between shell and sheave.

Diameter of sheave, inches	6	8	10	12	14	16	18	20	20X
For diameter of wire rope, inches	$\frac{3}{8}$	$\frac{3}{8}$ - $\frac{1}{2}$	$\frac{1}{2}$ - $\frac{5}{8}$	$\frac{5}{8}$ - $\frac{3}{4}$	$\frac{3}{4}$ - $\frac{7}{8}$	$\frac{7}{8}$ -1	1- $\frac{1}{4}$	1 $\frac{1}{4}$ - $1\frac{1}{2}$	
Approximate weight Fig. 722, pounds	9	12	15	21	38	52	87	105	150
Approximate weight Fig. 724, pounds				52	85	135	165	215	240
List price, Iron Bushed, each	\$11.00	\$14.00	\$16.00	\$18.00	\$20.00	\$28.00	\$38.00	\$50.00	\$70.00
List price Self-lub. Bronze Bushed, each	12.00	15.00	18.00	21.00	24.00	33.00	44.00	58.00	78.00



No. 635 Team Snatch Blocks

For wire rope, Self-Lubricating.

A light exceptionally well made steel snatch block. Easily handled by one man. Drop forged head and flattened hook.

Length shell, inches	10	14	16
Size of sheave, inches	6x1	8x1 $\frac{1}{4}$	10x1 $\frac{1}{2}$
Diameter of sheave pin	1	1 $\frac{1}{8}$	1 $\frac{1}{4}$
For wire rope diameter	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$
Weight each, pounds	13	24	42
Price Bronze Bushed	\$7.00	\$9.50	\$13.00



No. 616 Railroad Ballast Snatch Blocks

A special block for ballast cables which are used to pull unloader plows.

Has chilled groove sheave, self-lubricating graphite bronze bushed. Center pin is fastened with hex nut and cotter key. The 16-inch shell has 9-inch sheave and 1 $\frac{1}{2}$ -inch pin. The 20-inch has 12-inch sheave and 1 $\frac{3}{4}$ -inch pin.

16-in. shell, for 1 $\frac{1}{2}$ -in. cable, 85 pounds	\$19.00
20-in. shell, for 2-in. cable, 150 pounds	40.00

Wire Rope Blocks—Regular Pattern

Swivel Hooks—Diamond Shells

As in our Manila rope blocks, we have three weights of blocks for wire rope—regular, heavy and extra heavy.

Our regular pattern blocks are the lightest and we recommend them for ordinary light work only. They compare in a way with other "commercial" blocks on the market listed for the same size of rope, but we furnish flattened type hooks of proper shape, which are considerably stronger than ordinary round hooks. Becketts furnished where desired.

Sheaves are substantial with heavy scores, have smoothly turned grooves and are bored true in a lathe. Turned pins.

Sold by outside diameter of sheave, instead of diameter of shell as in Manila rope blocks.

Sheaves should be large as possible to get the proper service out of the rope. Fig. 725 Single Fig. 730 Double



Order by Diameter Sheaves, Inches	For Wire Rope, Diameter, Inches	Size of Sheaves, Inches			Approximate Weight Each, Pounds			Price Each with Plain Bored Sheaves			Price Each with Self-Lubricating Graphite Bronze Bushed Sheaves		
		Diam.	Width	Diam. Pin	Fig. 725 Single	Fig. 730 Double	Fig. 735 Triple	Single Fig. 725	Double Fig. 730	Triple Fig. 735	Single Fig. 725	Double Fig. 730	Triple Fig. 735
6	3/4-1	6	1	3/4	14	20	27	\$ 6.00	\$11.00	\$14.00	\$ 9.00	\$17.00	\$22.00
8	1-1 1/4	8	1 1/4	1	20	30	42	8.00	13.00	16.00	11.00	19.00	24.00
10	1 1/4-1 3/4	10	1 3/4	1 1/4	35	54	75	10.00	15.00	20.00	13.00	21.00	28.00
12	1 3/4-2	12	1 3/4	1 3/4	50	75	106	12.00	17.00	23.00	15.00	23.00	31.00
14	2-2 1/4	14	2	2	66	102	140	14.00	19.00	26.00	17.00	25.00	34.00

Wire Rope Blocks—Heavy Pattern

With Swivel Hooks or Cross Shackles

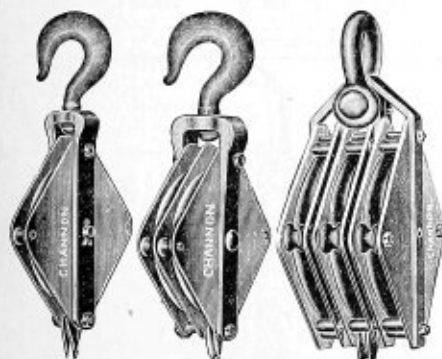


Fig. 740 Single With Hook Fig. 745 Double With Hook Fig. 750 Triple With Cross Shackle

These blocks are stronger than the regular pattern and are supplied with either shackles, or heavy flattened swivel hooks, at the same price.

We recommend the shackles where they can be used, as a shackle is considered to be five times stronger than a hook made from the same size iron.

Sheaves are heavy and well proportioned, with thick scores, turned grooves and lathe bored pin holes.

Recommended with self-lubricating graphite bronze bushed sheaves which require no oil and save loss of power by friction.

Can also be supplied without hooks, at a reduction in price.

	Single	Double	Triple
Fig. Nos. with hooks.....	740	745	746
Fig. Nos. with shackles.....	741	749	750

Order by Diam. of Sheaves, Inches	For Wire Rope, Diameter, Inches	Size of Sheaves, Inches			Approximate Weight Each, Pounds			Price Each with Plain Bored Sheaves			Price Each with Self-Lubricating Graphite Bronze Bushed Sheaves		
		Diam.	Width	Diam. Pin	Single	Double	Triple	Single	Double	Triple	Single	Double	Triple
10	1 1/4-1 3/4	10	1 1/4	1	44	76	106	\$14.00	\$20.00	\$28.00	\$17.00	\$26.00	\$37.00
12	1 3/4-2	12	1 3/4	1 1/4	69	115	160	16.00	23.00	31.00	19.00	29.00	41.00
14	2-2 1/4	14	2	1 3/4	93	153	218	18.00	26.00	36.00	21.00	31.00	45.00
16	2 1/4-2 3/4	16	2 1/4	2	135	240	305	31.00	40.00	46.00	36.00	50.00	72.00
18	2 3/4-3	18	2 3/4	2 1/4	170	322	429	34.50	45.00	60.00	40.00	56.00	78.00

Special Blocks of any size, Capacity or number of sheaves built promptly to order.

Special Extra Heavy Wire Rope Blocks

With Large Outside Straps and Lashing Shackles



Fig. 760 Double



Fig. 765 Triple



Fig. 770 Quadruple

Where it is expected to secure the full strength of many parts of high strength wire rope these are the blocks to use.

We have sold them for years for the heaviest work in bridge and structural steel erection; for railroad wrecking and derrick car work.

The blocks are well designed and properly proportioned throughout. The shackles, pins, side plates, sheaves, etc., are all in proper relation to each other.

In a test by a large railroad company at the University of Madison, one of our 16-inch triple stock blocks failed at 258,000 pounds. Our rating for this block was 25 tons, a factor of safety of five.

Order by Diam. of Sheaves, Inches	For Wire Rope, Diameter, Inches	Size of Sheaves, Inches			Price with Self-Lubricating Graphite Bronze Bushed Sheaves				
		Diameter	Width	Diameter Pin	Single	Double	Triple	Four- Sheave	Five- Sheave
16	$\frac{3}{4}$ - $\frac{7}{8}$	16	11 $\frac{1}{4}$	1 $\frac{1}{2}$	\$ 44.00	\$ 69.00	\$ 90.00	\$110.00	\$140.00
18	$\frac{3}{4}$ - $\frac{7}{8}$ -1	18	11 $\frac{1}{2}$	1 $\frac{1}{2}$	56.00	85.00	110.00	134.00	168.00
20	$\frac{3}{4}$ - $\frac{7}{8}$ -1	20	11 $\frac{3}{4}$	1 $\frac{1}{2}$	76.00	110.00	151.00	187.00	235.00
22	$\frac{3}{4}$ - $\frac{7}{8}$ -1	22	11 $\frac{3}{4}$	1 $\frac{3}{4}$	85.00	122.00	165.00	205.00	256.00
24	1-1 $\frac{1}{8}$	24	2 $\frac{1}{8}$	1 $\frac{3}{4}$	105.00	150.00	200.00	246.00	298.00

Special large blocks 50, 75, 100, 150 tons capacity, upon request.



Special Heavy W. R. Blocks

Fig. 785 with Forked Shackles

Built to order for any capacity and with any number of sheaves. Prices upon request.



Producers' Snatch Blocks

Fig. 786 for Wire Line

Heavy pattern oil well blocks, all steel with center pin drilled for oiling and phosphor bronze bushed sheaves. Built single, double and triple 20 to 32-inch sheaves for 1-inch to 1 $\frac{1}{4}$ -inch cable.

Prices upon request.

Channon New Style Cargo Hoisters

For Manila Rope—Galv. Mall. Iron Shells—Also, Known as "Caisson" Blocks

A very neat, high grade, single block with galvanized, malleable iron shell, swivel hook and sheave with hard wood projecting cheeks. All sheaves are self-lubricating graphite bronze bushed.

Shells have hardwood inserted side plates and taken altogether these blocks are as smooth running and frictionless as it is possible to make.



Showing Special Sheave with Hardwood Projecting Cheeks and Self-Lubricating Bushing.

Order by Length of Shell, In.	Diameter of Rope, Inches	Size of Sheave, Inches			Weight, Pounds	Price Block, Each	Price Sheave, Only
		Diam.	Width	Diam. Pin			
6 1/2	3/4-1 1/8	5	1 1/4	5/8	10 1/2	\$ 5.00	\$2.85
7 1/2	1	5 1/2	1 1/4	5/8	12	6.00	3.00
8 1/2	1 1/8	6 1/2	1 3/8	5/8	17	8.00	3.75
10	1 1/4	7 1/2	1 1/2	5/8	30	10.50	4.25
12 1/2	1 1/2	10	1 3/4	7/8	52	16.00	6.00

Jackson Wire Rope Snatch Block No. 726

An open side snatch block, self-lubricating bronze bushed sheave so fitted that it is impossible for rope to slip between shell and sheave.

Size, in. 8 10 12 14 16
Dia. rope 1/2 5/8 3/4 7/8
Price ea. \$17 \$18 \$21 \$24 \$33



Jackson Skidder Block No. 729

With drop forged swivel eye. A fine husky logging block with steel sheave, bronze bushed with oil reservoir in hub.

Can furnish manganese steel sheaves to special order.

Price 11-inch sheave \$28.00
Price 14-inch sheave 34.00
Price 18-inch sheave 75.00



Gin Blocks

For Manila Rope Swivel Hooks

Fig. 810

Diam. sheave.....	8	10	12
Diam. rope.....	1	1	1
Iron bushed.....	\$3.85	\$4.55	\$5.80
Roller bushed.....	4.70	5.75	7.10



Ice Gin Blocks

For Manila Rope

All self-lubricating bronze bushed with strong sheaves with deep grooves.

Diam. sheave, inches.....	8	10	12
Diam. rope, inches.....	1	1 1/4	1 1/2
Price upper block, each.....	\$5.00	\$6.00	\$7.50
Price lower block, each.....	5.75	6.75	8.25



Fig. 811 Upper Block Swivel Hook

Fig. 812 Lower Block Iron Plate Swivel

Channon Special Coal Hoisting Block

Fig. 500 For Wire Rope

Popular for coal yard use. They have guards riveted to the inside of the shell to prevent rope jumping off sheave and from jamming between sheave and shell.

Strong flattened hooks, self-lubricating, bronze bushed.

Diam. of sheave, inches..... 10 12 14
For wire rope, diam., inches..... 5/8 3/4 7/8
Price each..... \$12.00 \$15.00 \$20.00



Ferry Travelers

As illustration shows the traveler wheels run on the top of the ferry cable.

Diam. Sheave Inches	Price with Plain Bored Sheaves	Price with Self-Lub. Bronze Bushed Sheaves
6	\$ 8.00	\$12.00
8	9.00	13.50
10	12.00	17.00



Fig. 513

In ordering, state diameter of wire rope to be used.

Well Wheels or Hoisting Pulleys

For Manila
Rope

Fig. 991R



Japanned

Fig. 992L

Both styles are extra heavy pattern. Fig. 991R made with 10-inch and 12-inch diameter sheaves, iron bushed.

Fig. 991R—10-inch sheave, $\frac{5}{8}$ -inch rope, weight each 9 pounds, per dozen \$ 7.50

Fig. 991R—12-inch sheave, $\frac{3}{4}$ -inch rope, weight each, 14 pounds, per dozen 30.00

Fig. 992L Anti-Friction

With patent roller bushed sheave, 12-inch diameter for 1-inch rope, weight 15 pounds each. Has wrought iron strap and hook.

Price each \$2.75

Hay Fork Pulleys.

Incased Japanned
Cast Iron

Fig. 993R

1-inch Groove
for Rope

Fig. 994R

Fig. 993R—Has 5-inch sheave and weighs about 41 pounds per dozen, price per dozen \$4.30

Fig. 994R—Has 6-inch sheave and 3-inch opening for passing knotted rope, length over all 12 inches, weight per dozen 68 pounds, per dozen. 8.15

Side Pulleys
Cast Iron Japanned

Fig. 995R Single



Fig. 996R Double

Number	1 1/2	2	2 1/2	3	4	5
Diam. rope	1/4	5/8	3/8	7/8	5/8	3/4
Weight, doz.	3	5 1/2	8	14	34	60
Single, doz.	\$0.60	\$0.96	\$1.35	\$2.00	\$5.00	\$8.63
Double, doz.	1.17	1.70				

Hot House Pulleys

Cast Iron—Japanned

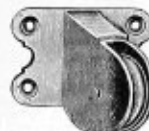


Fig. 997 Single

No.	Wt. Doz.		Diam. Rope, Inches	Price Dozen	
	Single	Double		Single	Double
1 1/2	9	10 1/2	1/4	\$1.25	\$2.00
2	9 1/2	13 1/2	5/8	1.50	2.38
2 1/2	13 1/2	19 1/2	3/8	2.00	3.38
3	18	26	7/8	2.75	4.00

Lumberman's Loading Blocks

Fig. 998 for
Manila Rope or ChainFig. 999 for
Wire Rope

Fig. 998—Has swivel grab hook and sheave 5x1 1/2x3/4 pin for either Manila rope or chain. Specify which is wanted.

Fig. 998—With rope sheave doz., \$16.00

Fig. 998—With chain sheave doz., 17.00

Fig. 999—Has 7-inch diameter sheave for wire rope, swivel hook and semi-circular guard pressed in a shell over sheave to prevent rope slipping between shell and sheave.

Per dozen \$11.00

Fast Eye Blocks



Galvanized Malleable Iron

Number	5	7	9	11	13
Length shell, inches	2	2 1/4	3	3 1/4	4
Diameter rope, inch	1 1/2	1 3/4	2	2 1/4	2 3/4
Size of sheave, inches	1 1/2	1 3/4	2	2 1/4	2 3/4
Weight each, pounds	3 1/2	5 1/2	7 1/2	11 1/2	15 1/2
Price each	\$0.11	\$0.16	\$0.25	\$0.29	\$0.62

Double Blocks

Number	6	8	10	12	14
Length shell, inches	2	2 1/4	3	3 1/4	4
Diameter rope, inch	1 1/2	1 3/4	2	2 1/4	2 3/4
Size of sheave, inches	1 1/2	1 3/4	2	2 1/4	2 3/4
Weight each, pounds	3 1/2	5 1/2	7 1/2	11 1/2	15 1/2
Price each	\$0.18	\$0.23	\$0.33	\$0.41	\$0.77

Double Eye Blocks



Galvanized Malleable Iron

Size Numbers	5 1/2	7 1/2	9 1/2	11 1/2	13 1/2
Length shell, inches	2	2 1/4	3	3 1/4	4
Diameter rope, inch	1 1/2	1 3/4	2	2 1/4	2 3/4
Size sheave, inches	1 1/2	1 3/4	2	2 1/4	2 3/4
Weight, pounds	3 1/2	5 1/2	7 1/2	11 1/2	15 1/2
Price each	\$0.11	\$0.16	\$0.25	\$0.29	\$0.62

Double Blocks

Size numbers	6 1/2	8 1/2	10 1/2	12 1/2	14 1/2
Weight, pounds	3 1/2	5 1/2	7 1/2	11 1/2	15 1/2
Price each	\$0.18	\$0.23	\$0.33	\$0.41	\$0.77

Loose Hook Blocks



Galv. Mall. Iron Shells—Wrought Iron Hooks					
Size Numbers	5 1/2 H	7 1/2 H	9 1/2 H	11 1/2 H	13 1/2 H
Weight, pounds	3 1/2	5 1/2	7 1/2	11 1/2	15 1/2
Price each	\$0.25	\$0.31	\$0.43	\$0.48	\$0.75

Double Blocks

Size Numbers	6 H	8 H	10 H	12 H	14 H
Weight, pounds	3 1/2	5 1/2	7 1/2	11 1/2	15 1/2
Price each	\$0.32	\$0.38	\$0.50	\$0.60	\$0.95

Sheaves same sizes as eye blocks.

Sheaves for Manila Rope


Style of Small Sheaves

Large Sheaves

For Snatch Block

No.	O. S. Diam. Inches	Width, Inches	Pin Hole, Inches	Diam. Rope	Price Each		No.	O. S. Diam. Inches	Width, Inches	Pin Hole, Inches	Diam., Rope	Price Each	
					Plain Bored	Self-Lub. Bronze B.						Plain Bored	Self-Lub. Bronze B.
38	2¼	5⁄8	¾	1½	\$0.12	\$ 0.70	68	14½	3¾	1½	3	\$9.50	\$15.00
39	3	¾	¾	1¾	.20	.90	Snatch Block Sizes						
41	3¼	1	¾	2	.25	1.40	40	3	1¼	¾	7⁄8	\$0.30	\$ 1.40
42	4¼	1	¾	2¼	.30	1.50	40X	3½	1¼	¾	7⁄8	.40	1.60
44	4¾	1½	¾	2¾	.35	1.85	43	4½	1½	¾	1	.50	1.90
45	4¾	1½	¾	2¾	.40	2.00	46	5	1½	¾	1½	.60	2.00
48	6¼	1½	¾	3¼	.55	2.25	47	5¼	1½	¾	1½	1.20	3.00
49	6¼	1½	¾	3¼	.65	2.75	50	6¼	2½	¾	1½	1.50	3.75
51	8	1½	¾	4¼	.90	2.95	53	8	2½	¾	1¾	1.85	4.50
52	8	1½	¾	4¼	1.05	3.25	55	9	2½	¾	1¾	2.25	5.50
56	9½	1¾	1	5¼	1.50	4.20	58	10	3	1½	2¼	3.00	7.00
59	11	2	1	6¼	2.00	5.95	61	11	3½	1½	2½	4.00	9.00
63	12	2½	1¼	7¼	6.00	8.00	62	11¾	4¼	1½	3	6.50	13.00
67	13½	2½	1¾	8½	7.00	11.00							

Sheaves for Wire Rope



No.	Dimensions			Thick Hub	Diam. Rope	Price Each		No.	Dimensions			Thick Hub	Diam. Rope	Price Each	
	Diam.	Width	Pin			Plain Bored	Self-Lub.		Diam.	Width	Pin			Plain Bored	Self-Lub.
104	4	3/4	1 1/2	5/8	3/4	\$ 0.30	\$ 1.15	128	18	1 3/4	1 3/4	1 3/8	5/8-3/4	\$ 7.40	\$ 9.00
105	5	3/8	1 3/4	5/8	3/4	.45	1.45	129	18	1 3/4	1 3/4	2	5/8-1	9.50	12.50
106	6	1	1 3/4	5/8	3/4	.75	2.00	130	18	2 1/8	1 3/4	2	1	10.25	12.75
107	7	1	1 3/4	5/8	3/4	1.10	2.30	131	18	2 1/8	1 3/4	2	1	10.50	13.50
108	8	1	1 3/4	5/8	3/4	1.20	2.65	132	20	1 7/8	1 3/4	2	5/8-1	12.00	15.00
109	8	1 1/4	1 3/4	5/8	3/4	1.40	2.90	133	20	2 1/8	1 3/4	2	5/8-1 1/4	12.50	15.50
110	10	1 1/4	1 3/4	5/8	3/4	1.80	3.50	134	22	1 3/4	1 3/4	2	5/8	13.00	16.00
111	10	1 1/4	1 3/4	5/8	3/4	2.50	3.75	135	22	1 3/4	1 3/4	2	5/8	15.00	18.00
112	10	1 1/4	1 3/4	5/8	3/4	2.50	4.00	136	24	2	1 3/4	2	1	19.00	22.00
113	10	1 1/2	1 3/4	5/8	3/4	2.70	4.50	137	28	1 7/8	1 3/4	2	1	21.00	27.00
114	12	1 1/2	1 3/4	5/8	3/4	2.50	4.25	138	30	2 1/8	2	2 1/8	1	27.00	34.00
115	12	1 1/4	1 3/4	5/8	3/4	3.00	5.00	Extra Heavy Pattern—Deep Rim							
116	12	1 1/2	1 3/4	5/8	3/4	3.50	5.50	211	8	1 1/4	3/8	1 3/8	5/8	\$ 1.25	\$ 3.25
117	12	1 1/2	1 3/4	5/8	3/4	3.50	5.75	212	10	1 1/4	1	1 3/8	5/8	2.65	4.00
118	12	1 1/4	1 3/4	5/8	3/4	3.75	6.00	213	12	1 1/4	1 1/8	1 3/8	5/8	3.25	6.00
119	14	1 1/2	1 3/4	5/8	3/4	4.40	6.50	214	14	1 1/2	1 1/8	1 3/8	5/8-3/8	4.20	7.75
120	14	1 1/2	1 3/4	5/8	3/4	4.45	6.90	215	16	1 1/2	1 1/8	1 3/8	5/8	6.50	9.00
121	14	1 1/2	1 3/4	5/8	3/4	4.45	7.00	216	18	1 1/2	1 1/8	1 3/8	5/8	7.75	10.75
122	14	1 3/4	1 3/4	5/8	3/4	5.40	7.60	217	18	1 3/4	1 1/8	1 3/8	5/8	7.85	10.90
123	14	1 3/4	1 3/4	5/8	3/4	6.50	8.75	218	20	1 7/8	1 1/8	1 3/8	5/8-1	8.10	12.25
124	16	1 3/4	1 3/4	5/8	3/4	7.00	9.75	219	20	2 1/8	1 1/8	1 3/8	5/8-1 1/4	9.25	13.50
125	16	1 3/4	1 3/4	5/8	3/4	7.00	9.50								
126	16	1 3/8	1 3/4	5/8	3/4	7.10	9.00								
127	16	1 3/8	1 3/4	5/8	3/4	7.10	9.75								

We can supply special sheaves of any size promptly. We must have diameter, width of score and hub, bore, diameter and kind of rope, as well as approximate load and purpose used.

Channon Self-Lubricating Graphited Bronze Bushings

Plain and Flanged—For Hard Service and High Speeds

Require no oil or attention. At least 5 per cent less friction for each sheave. Can be used on all kinds of bearings.

Tests of "common bushed" sheaves have shown a loss of power through friction to be as high as 12 per cent of the weight carried by each sheave. The same tests showed but 5 per cent loss when our self-lubricating bushings were used. Our bushings require no oil or attention and are suitable for heavy loads and high speeds.

The so-called "common iron" or "plain bushed sheave", in reality has no bushing at all. It has a plain bored hole and revolves on a steel pin or shaft. Copious oiling and constant attention are required, and wear in the hub soon necessitates a new sheave.



Wire Rope Sheave
Showing Bushing in
place.



The Bushing

The Channon Self-lubricating Bushing is a casting made of a special hard phosphor-bronze composition with small holes spaced and drilled through it. These holes are then filled with a graphite or plumbago lubricant and baked under intense heat. Each bushing is baked about four times, or until perfect, as the heat causes the lubricant in the holes to shrink, necessitating refilling and baking until both metal and lubricant are flush and smooth. The graphite forms a film which lubricates the pin.—Pressure can't squeeze this film out and the graphite plugs wear only as fast as the phosphor-bronze. When we furnish bushings in the sheaves the bushings are pressed in under enormous pressure, as it is important that the bushing does not move.

When a bushing is worn out another can be obtained at small cost, and it is not necessary to buy a complete new sheave. Long experience has demonstrated that this is the only perfect bushing for hard service and heavy loads. Ball and roller bearings crush, where they do not rust out.

Below we list a few common sizes—Any size furnished on short notice

Inside Diam.	Outside Diam.	Lengths—with price (each) of Plain Bushings, i. e. not flanged																			Add for Flange Bushing
		1	1 1/4	1 3/8	1 1/2	1 5/8	1 3/4	2	2 1/4	2 1/2	2 3/8	2 1/2	2 3/4	2 3/8	2 3/4	2 3/8	2 3/4	3	3 1/2	4	
1/8"	1 1/8"	\$ 0.68	\$ 0.86	\$ 1.04	\$ 1.22	\$ 1.40	\$ 1.58	\$ 1.76	\$ 1.94	\$ 2.12	\$ 2.30	\$ 2.48	\$ 2.66	\$ 2.84	\$ 3.02	\$ 3.20	\$ 3.38	\$ 3.56	\$ 3.74	\$ 3.92	\$.20
1/4"	1 1/4"	.74	.92	1.10	1.28	1.46	1.64	1.82	2.00	2.18	2.36	2.54	2.72	2.90	3.08	3.26	3.44	3.62	3.80	3.98	.26
3/8"	1 3/8"	.96	1.14	1.32	1.50	1.68	1.86	2.04	2.22	2.40	2.58	2.76	2.94	3.12	3.30	3.48	3.66	3.84	4.02	4.20	.28
1/2"	1 1/2"	1.00	1.18	1.36	1.54	1.72	1.90	2.08	2.26	2.44	2.62	2.80	2.98	3.16	3.34	3.52	3.70	3.88	4.06	4.24	.30
5/8"	1 5/8"	1.04	1.22	1.40	1.58	1.76	1.94	2.12	2.30	2.48	2.66	2.84	3.02	3.20	3.38	3.56	3.74	3.92	4.10	4.28	.32
3/4"	1 3/4"	1.12	1.30	1.48	1.66	1.84	2.02	2.20	2.38	2.56	2.74	2.92	3.10	3.28	3.46	3.64	3.82	4.00	4.18	4.36	.34
7/8"	1 7/8"	1.21	1.39	1.57	1.75	1.93	2.11	2.29	2.47	2.65	2.83	3.01	3.19	3.37	3.55	3.73	3.91	4.09	4.27	4.45	.36
1"	2"	1.21	1.39	1.57	1.75	1.93	2.11	2.29	2.47	2.65	2.83	3.01	3.19	3.37	3.55	3.73	3.91	4.09	4.27	4.45	.37
1 1/8"	2 1/8"	1.11	1.29	1.47	1.65	1.83	2.01	2.19	2.37	2.55	2.73	2.91	3.09	3.27	3.45	3.63	3.81	3.99	4.17	4.35	.44
1 1/4"	2 1/4"	1.18	1.36	1.54	1.72	1.90	2.08	2.26	2.44	2.62	2.80	2.98	3.16	3.34	3.52	3.70	3.88	4.06	4.24	4.42	.46
1 1/2"	2 1/2"	1.17	1.35	1.53	1.71	1.89	2.07	2.25	2.43	2.61	2.79	2.97	3.15	3.33	3.51	3.69	3.87	4.05	4.23	4.41	.46
1 3/4"	2 3/4"	1.46	1.64	1.82	2.00	2.18	2.36	2.54	2.72	2.90	3.08	3.26	3.44	3.62	3.80	3.98	4.16	4.34	4.52	4.70	.46
1 7/8"	2 7/8"	1.49	1.67	1.85	2.03	2.21	2.39	2.57	2.75	2.93	3.11	3.29	3.47	3.65	3.83	4.01	4.19	4.37	4.55	4.73	.46
2"	3"	1.56	1.74	1.92	2.10	2.28	2.46	2.64	2.82	3.00	3.18	3.36	3.54	3.72	3.90	4.08	4.26	4.44	4.62	4.80	.48
2 1/8"	3 1/8"	1.64	1.82	2.00	2.18	2.36	2.54	2.72	2.90	3.08	3.26	3.44	3.62	3.80	3.98	4.16	4.34	4.52	4.70	4.88	.48
2 1/4"	3 1/4"	2.07	2.25	2.43	2.61	2.79	2.97	3.15	3.33	3.51	3.69	3.87	4.05	4.23	4.41	4.59	4.77	4.95	5.13	5.31	.52
2 1/2"	3 1/2"	2.26	2.44	2.62	2.80	2.98	3.16	3.34	3.52	3.70	3.88	4.06	4.24	4.42	4.60	4.78	4.96	5.14	5.32	5.50	.55
2 3/8"	3 3/8"	2.35	2.53	2.71	2.89	3.07	3.25	3.43	3.61	3.79	3.97	4.15	4.33	4.51	4.69	4.87	5.05	5.23	5.41	5.59	.62
2 3/4"	3 3/4"	2.41	2.59	2.77	2.95	3.13	3.31	3.49	3.67	3.85	4.03	4.21	4.39	4.57	4.75	4.93	5.11	5.29	5.47	5.65	.62
2 7/8"	3 7/8"	2.57	2.75	2.93	3.11	3.29	3.47	3.65	3.83	4.01	4.19	4.37	4.55	4.73	4.91	5.09	5.27	5.45	5.63	5.81	.68
3"	4"	2.68	2.86	3.04	3.22	3.40	3.58	3.76	3.94	4.12	4.30	4.48	4.66	4.84	5.02	5.20	5.38	5.56	5.74	5.92	.72
3 1/8"	4 1/8"	2.82	3.00	3.18	3.36	3.54	3.72	3.90	4.08	4.26	4.44	4.62	4.80	4.98	5.16	5.34	5.52	5.70	5.88	6.06	.72
3 1/4"	4 1/4"	2.95	3.13	3.31	3.49	3.67	3.85	4.03	4.21	4.39	4.57	4.75	4.93	5.11	5.29	5.47	5.65	5.83	6.01	6.19	.78
3 1/2"	4 1/2"	3.19	3.37	3.55	3.73	3.91	4.09	4.27	4.45	4.63	4.81	4.99	5.17	5.35	5.53	5.71	5.89	6.07	6.25	6.43	.80
3 3/8"	4 3/8"	3.31	3.49	3.67	3.85	4.03	4.21	4.39	4.57	4.75	4.93	5.11	5.29	5.47	5.65	5.83	6.01	6.19	6.37	6.55	.81
3 3/4"	4 3/4"	3.53	3.71	3.89	4.07	4.25	4.43	4.61	4.79	4.97	5.15	5.33	5.51	5.69	5.87	6.05	6.23	6.41	6.59	6.77	.84
3 7/8"	4 7/8"	3.73	3.91	4.09	4.27	4.45	4.63	4.81	4.99	5.17	5.35	5.53	5.71	5.89	6.07	6.25	6.43	6.61	6.79	6.97	.89
4"	5"	3.97	4.15	4.33	4.51	4.69	4.87	5.05	5.23	5.41	5.59	5.77	5.95	6.13	6.31	6.49	6.67	6.85	7.03	7.21	.94
4 1/8"	5 1/8"	4.00	4.18	4.36	4.54	4.72	4.90	5.08	5.26	5.44	5.62	5.80	5.98	6.16	6.34	6.52	6.70	6.88	7.06	7.24	.98
4 1/4"	5 1/4"	4.04	4.22	4.40	4.58	4.76	4.94	5.12	5.30	5.48	5.66	5.84	6.02	6.20	6.38	6.56	6.74	6.92	7.10	7.28	1.03

Other sizes quoted promptly upon request—State quantity wanted and size
Special prices for quantities of one size

Mine Haulage Rollers and Appliances

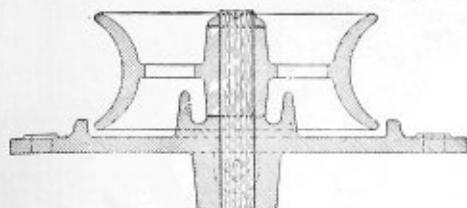


Fig. G136—Vertical Bell

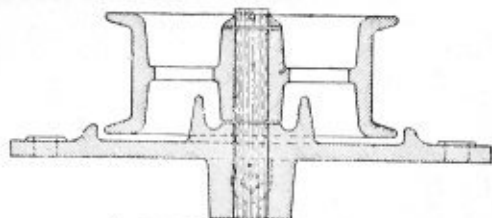


Fig. G147 Double Flange Straight Face

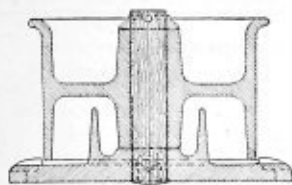


Fig. G148 Single Flange Straight Face

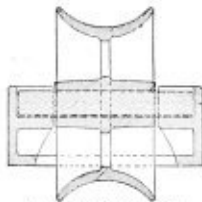


Fig. G149 Horiz. Bell

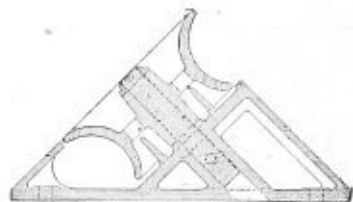


Fig. G150 Angle Bell

Track and Curve Rollers—Chilled Face

With Oil Reservoirs

Fig. No.	Face Diam.	Bore, Inches	Style	Price Sheave Only	Price Stand Only	Price Complete
G-146	6	1 1/4	Vertical Bell	\$2.80	\$2.80	\$5.60
G-146	9	1 1/4	Vertical Bell	3.50	3.50	7.00
G-146	12	1 1/4	Vertical Bell	5.00	3.50	8.50
G-147	6	1 1/4	Double Flange Straight Face	2.80	2.80	5.60
G-147	9	1 1/4	Double Flange Straight Face	3.50	3.50	7.00
G-147	12	1 1/4	Double Flange Straight Face	5.00	3.50	8.50
G-148	6	1 1/4	Single Flange Straight Face	3.50	3.50	7.00
G-149	9	1 1/4	Horizontal Bell	3.50	3.50	7.00
G-150	6	1 1/4	Angle Bell	4.00	5.00	9.00

Chilled Face Rollers



Fig. G153

Size, Inches	Price of Rollers	Price of Stands, per Pair	Price Bearings, per Pair
5x12	\$4.00	\$2.00	\$0.60
5x18	5.50	2.00	.60
5x24	7.00	2.00	.60

Gum Wood Rollers



Fig. G153

Size, Inches	Price of Rollers	Price Wood Bearings per Pair
6x12	\$0.60	\$0.35
6x15	.84	.36
6x18	1.08	.36

The McCain Grip

For Endless Cable Haulage

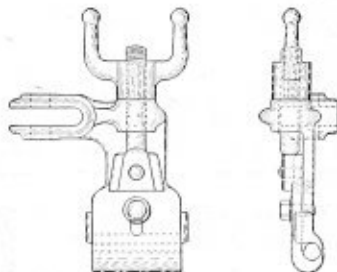


Fig. G154

- No. 1 For 1 -inch diam. cable, each..... \$12.00
 No. 2 For 1 1/4-inch diam. cable, each..... 14.00
 No. 3 For 1 1/2-inch diam. cable, each..... 16.00
 Vanadium steel extra, each..... 2.00

State size of cable and drop from center of draw head to center of line.

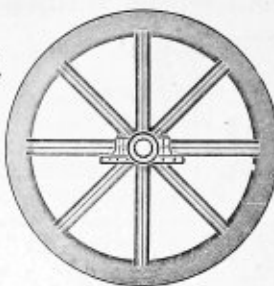
Miscellaneous Sheaves and Pulleys

Heavy Spoked Mine Hoisting Sheaves
Pennsylvania Type

Used for mine head shafts with $\frac{3}{4}$ to $1\frac{1}{2}$ diameter wire rope. They are heavy and well proportioned. Also suitable for large dredges.

Price includes shaft and journal boxes.

No.	Diameter at Bottom of Groove, Ins.	Diameter of Shaft, Inches	Price with Plain Iron Groove	Price with Rope Lined Groove
300	24	1 $\frac{1}{8}$	\$ 35.00	\$ 42.00
301	30	1 $\frac{3}{8}$	40.00	48.00
302	36	1 $\frac{1}{2}$	45.00	54.00
303	42	1 $\frac{3}{4}$	49.00	60.00
304	48	2 $\frac{1}{8}$	78.00	94.00
305	60	2 $\frac{3}{8}$	100.00	116.00
306	72	2 $\frac{1}{2}$	126.00	150.00



Rubber Lined Wire Rope Transmission Sheaves

These sheaves are well balanced and should be carefully fitted true on the shaft and the shaft set at right angles to the line of transmission. Otherwise rope will wear excessively.

Price includes boring and keyseating.

Diameter, Inches	No.	For $\frac{3}{4}$ or $\frac{1}{2}$ -inch Rope	No.	For $\frac{3}{4}$ or $\frac{1}{2}$ -inch Rope	No.	For $\frac{3}{4}$ or 1-inch Rope
18	307	\$22.00				
20	308	30.00				
30	309	33.00	316	\$48.00		
36	310	44.00	317	59.00	325	68.00
42	311	54.00	318	67.00		
48	312	65.00	319	80.00	326	91.00
54	313	80.00	320	88.00		
60	314	108.00	321	103.00	327	130.00
66			322	130.00		
72			323	150.00	328	152.00
84			324	180.00	329	210.00



Style of Groove



Sheave Filling

Sheaves with Shaft and Common Boxes

Furnished with sheave keyed or shrunk on shaft turning in babbitted boxes or with self-lubricating bronze bushed sheave loose on shaft with boxes set screwed to shaft.



Diam. of Sh'ves, Ins.	Width, Ins.	Diam. of Pin, Ins.	No.	Price with Babbitted Boxes	No.	Price Self-Lub. Bronze Bushed
6	1 $\frac{1}{2}$	1	187		194	\$10.30
8	1 $\frac{3}{8}$	1 $\frac{1}{8}$	188	\$ 7.50	195	11.65
10	1 $\frac{1}{2}$	1 $\frac{1}{8}$	189	8.65	196	15.20
12	1 $\frac{3}{8}$	1 $\frac{1}{8}$	190	10.30	197	16.35
14	1 $\frac{1}{2}$	1 $\frac{1}{8}$	191	11.85	198	18.10
16	1 $\frac{3}{8}$	1 $\frac{1}{8}$	192	14.30	199	20.00
18	1 $\frac{1}{2}$	1 $\frac{1}{8}$	193	16.00	200	23.00



Gate Sheaves with Stand

May be placed vertically as shown attached against wall or laid down flat.

A very handy guide sheave for elevator gates, safety doors, etc. Furnished with plain bored sheaves or self-lubricating graphite plug bronze bushed, which turn easy and require no oiling.

Diam. Sheave	Price Each with Plain Bored Sheaves	Price Each Self-Lub. Bronze Bushed
4 inches	No. 83 \$1.75	No. 85 \$3.50
6 inches	No. 84 3.60	No. 86 5.35

Halyard Blocks

Galvanized Malleable Iron.
Number No. 1 No. 2
Diam. of rope, ins. $\frac{1}{2}$ $\frac{3}{8}$
Size of sheave, ins. $1\frac{1}{4} \times \frac{3}{4}$ $1\frac{1}{2} \times \frac{1}{2}$
Weight each, lbs. $\frac{1}{2}$ $\frac{3}{4}$
Price each \$0.80 \$1.00



Sheaves with Stand

For Manila or Wire Rope Plain Bored Sheaves.

Number 544 545 546 547 548
Diam. of Sheave 8 10 12 14 16
Price each \$5.35 7.35 10.00 12.00 16.00



Deck Blocks

Galvanized malleable iron.
Number No. 0 No. 1 No. 3
Diam. of rope, ins. $\frac{1}{2}$ $\frac{3}{8}$ $\frac{1}{2}$
Size of sheave, ins. $1\frac{1}{4} \times \frac{3}{4}$ $1\frac{1}{2} \times \frac{1}{2}$ $2 \times \frac{1}{2}$
Weight each lbs. $\frac{1}{2}$ $\frac{3}{4}$ $\frac{1}{2}$
Price each \$0.40 \$0.54 \$0.91



Galvanized Malleable Iron—Swivel Eyes									
Length, Inches	Diam. Shell, Inches	Size Sheave, Inches	Single No.	Double No.	Length, Inches	Diam. Shell, Inches	Size Sheave, Inches	Single No.	Double No.
$\frac{1}{2}$	$\frac{1}{8}$	$\frac{1}{4} \times \frac{1}{4}$	000	\$0.96	4	$\frac{1}{2}$	$\frac{1}{2} \times \frac{1}{2}$	5	\$2.30
$\frac{3}{4}$	$\frac{1}{4}$	$\frac{1}{2} \times \frac{1}{2}$	1	1.10	2	$\frac{3}{4}$	$\frac{3}{4} \times \frac{3}{4}$	7	3.35
$1\frac{1}{2}$	$\frac{3}{4}$	1×1	3	1.50	4	$1\frac{1}{2}$	$1\frac{1}{2} \times 1\frac{1}{2}$	8	4.10
				2.65					



If your requirements are not shown in this catalog, send us your specifications.

Description of Chain Hoists

The lifting of loads is a universal need—a vital factor in every man's business. In foundries, machine shops, factories, sawmills, mines, quarries, warehouses, in power houses and boiler rooms—on railways, farms, ships and docks, heavy loads have to be lifted daily.

In the lifting of loads, safety and efficiency are of the highest importance. The most universal lifting device of modern times is the appliance known as the Chain Block or hoist.

The first essential in a chain block is **safety**—every part must be able to meet extra strains and shocks, because the very nature of its service exposes it to the hardest kind of usage and often at the hands of unskilled labor.

To be **efficient**, the chain block must be so designed and built as to lift the **maximum load with the least pull on the hand chain** and this efficiency must be permanent and lasting, the parts must be so designed as not to be subjected to rapid and unequal wear. Initial efficiency in a chain block is fairly easy to obtain, but to maintain the efficiency through years of hard service is quite another matter.

Our line of chain blocks embraces three types, each best for certain purposes; as follows:

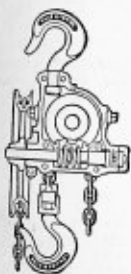


Spur-Gear

Spur-Gear Hoists (The "Triplex")

In the spur-gear hoist, power is transmitted from the hand-chain to the load-chain by a train of balanced spur-gears, thus giving the highest mechanical efficiency with the lowest frictional resistance and loss.

The functions of hoisting and of lowering are separated, the latter being effected by an automatic brake mechanism, simple, sensitive and absolutely safe. For further description see "Triplex" hoists, on following pages.



Screw-Gear

Screw Geared Hoists

In the screw-gear hoist, power is transmitted from the hand chain to the load chain through a worm wheel and screw, which, although necessarily involving higher frictional resistance and therefore lower efficiency than spur-gearing, has the advantage of lower first cost and of very smooth action in hoisting and lowering. This block, while inferior as a labor and money saver to the "Triplex," is preferred for some uses and has a well defined field. For further description see following pages.

The "Differential" Hoist

In the differential hoist the power is applied by pulling directly on the slack part of the load chain and is multiplied by the simple device of the "differential sheave." As compared to the spur or the screw geared, it is a crude machine, wasteful of time and power, but by reason of its cheapness and simplicity, it is, nevertheless, a useful hoist where economy of time and labor is unimportant and low first cost the chief requirement; also described further in the following pages.



Differential

Mechanical Efficiency

is the percentage of applied power returned in useful work—the relative efficiency of the foregoing three types is indicated by the following table which also shows approximately their relative durability or life and their relative first costs (on the basis of the two ton size).

	Differential	Screw-Gear	Spur-Gear
Relative efficiency.....	35	50	100
Relative durability.....	20	80	100
Relative cost.....	40	80	100
Relative economic value.....	20	60	100

The selection of the hoist, therefore, turns on the question of whether the controlling factor is low first cost or low operating cost. Where the use is frequent the "Triplex" is the best—in fact the first cost will usually be repaid within one year or less, by the great saving in time and labor.

Description of Chain Hoists—Continued



The most important part of a chain block is the chain. Not only must the load chain be strong enough to hold a load far in excess of the rated capacity of the block and to resist sudden shocks or strains, but it must meet these requirements without changing the shape of a single link. The moment a link stretches, trouble begins—it no longer fits the pockets in the load sheave and instead of slipping easily through, it begins to grind and cut—wearing away both itself and the sheave until the block is ruined.

The chain links of the triplex and duplex blocks will not stretch under double the load required to stretch the next best chain now used by any other chain block maker. This chain is steel and electrically welded by special process, making it the strongest and at the same time the most accurate obtainable.

In a recent test of a $\frac{1}{2}$ -inch chain, it held a load $5\frac{1}{4}$ times its rated capacity before breaking; the safe test for this chain is three times its rated capacity without injury to it.

The following figures were obtained by tests on triplex block chains at Lloyds' Proving House (England).

Rated capacity, pounds.....	1000	2000	3000	4000
Elastic Limit, pounds.....	4409	7173	11023	13787
Ultimate strength, pounds.....	6146	13339	17972	22242

The hooks used on the Triplex and Duplex Chain Hoists are forged from special selected steel stock subjected to both physical and chemical tests before being placed in the hoists.

The principal characteristic of the steel is high tensile strength combined with great ductility. The quality of this steel is such that if the block is dangerously overloaded, the hooks will give warning by bending without breaking.



Chain Block Hoisting Speeds, Hand Chain Pull, etc.

Capacity in Tons	Pull in Pounds Required on Hand Chain to Lift Full Loads			Feet of Hand Chain to be Pulled by Operator to Lift Load One Foot High			Hoisting Speeds, Feet per Minute Attainable and Number of Men Required for Hoisting Full Loads without Pulling Over 80 Pounds										Load One Man Can Handle without Pulling Over 80 Pounds		
	Triplex, Spur Geared	Screw Geared	Differential	Triplex, Spur Geared	Screw Geared	Differential	Triplex, Spur Geared				Screw Geared		Differential		Triplex, Spur Geared	Screw Geared	Differential		
							Full Load	Half Load	Quar- Load	No. of Men	Full Load	No. of Men	Full Load	No. of Men					
$\frac{1}{4}$	62	68	72	21	40	18	8.0	16.0	24.0	1	4.00	1	6.00	1	1000	1000	500		
$\frac{1}{2}$	82	87	122	31	59	30	4.0	8.0	12.0	1	2.00	1	3.70	3	2000	1700	800		
1	110	94	246	35	80	36	4.8	9.6	14.4	2	2.40	2	2.50	3	2300	2500	1000		
$1\frac{1}{2}$	120	115	308	42	93	42	3.6	7.2	10.8	2	1.80	2	2.30	4	2600	2700	1100		
2	114	132	557	69	126	38	2.3	4.6	6.9	2	1.10	2	2.30	7	4000	3300	1000		
3	124	142	.....	84	155	.....	1.7	3.5	5.2	2	.80	2	.....	.....	5000	4600	.....	
4	130	145	.....	126	195	.....	1.3	2.6	3.9	2	.65	2	.....	.....	6500	5300	.....	
5	130	145	.....	126	252	.....	1.1	2.2	3.3	2	.50	2	.....	.....	7000	6500	.....	
6	135	160	.....	168	310	.....	.8	1.6	2.4	2	.35	2	.....	.....	9000	7800	.....	
8	140	160	.....	210	390	.....	.6	1.2	1.8	2	.30	2	.....	.....	11000	10000	.....	
10	130*	.....	.....	126*	.....	.....	1.1	2.2	3.3	4	.....	.....	.....	.....	13000	.....	.....
12	135*	.....	.....	168*	.....	.....	.8	1.6	2.4	4	.....	.....	.....	.....	17000	.....	.....
16	140*	.....	.....	210*	.....	.....	.6	1.2	1.8	4	.....	.....	.....	.....	20000	.....	.....

*On each of the two hand chains.

†The number of men is based on each man pulling not over 80 pounds. One man pulling 160 pounds or less, as given in the first two columns can lift the full capacity of any Triplex or Duplex Block.

The speed of a chain hoist is governed by the pull required on the hand chain and the distance the hand chain must travel to lift the load the required distance.

The above speeds are given for short lifts with men accustomed to the work; for continuous easy lifting two-thirds of these speeds are attainable. The Triplex Block lifts rapidly and the speed increases for light loads because the length of hand chain to be overhauled is small. This fact also enables the operator to lower the load very quickly with the Triplex Block. The 12 and 20-ton Triplex have two hand wheels permitting two men to hoist simultaneously, thereby securing double speed.

Do you use Waste? We handle the best.

The Channon Differential Chain Hoist

Capacity $\frac{1}{4}$ to 3 Tons—Holds the Load at Any Point

The Differential chain hoist contains the fewest number of parts and costs the least of any chain block made.

It handles loads readily and on account of its simplicity and reliability is especially adapted for ordinary hoisting purposes where higher power and durability of the spur and screw geared blocks are not required.

With a Differential block, three men pulling 216 pounds can lift a ton, or one man can do the work which would require several men with rope-tackle, jacks, skids, crow-bars and rollers. Heat and cold do not affect it and it will stand all kinds of weather; one Differential chain hoist will outlast several rope hoists.

Our hoists are well designed and proportioned—the chains are accurate in size, finely finished and hardened to prevent wear. The sheaves are large and chain pockets are carefully formed to mesh accurately with the chain, assuring smooth working and also lessening the tendency of the chain to stretch when overloaded.

No.	Capacity, Tons	Will Lift, Feet	Price Each	Price Extra Lift, per Foot	Regular Chain	Extra Chain, per Foot	Weight, with Chain	Shortest Distance Between Hooks, Inches
1	$\frac{1}{4}$	6	\$18.00	\$2.80	22	\$0.70	20	17
2	$\frac{1}{2}$	7	21.00	2.80	26	.70	31	21
3	1	8	28.00	3.00	30	.75	53	26
4	1 $\frac{1}{2}$	8 $\frac{1}{2}$	36.00	3.20	33	.80	90	32
5	2	9	45.00	3.40	36	.85	128	39
6	3	10	60.00	4.00	38	1.00	167	44

Allow four feet of chain for each additional foot of lift.

Repair Parts	Capacity in Tons					
	$\frac{1}{4}$	$\frac{1}{2}$	1	1 $\frac{1}{2}$	2	3
Top sheave	\$ 3.60	\$ 4.80	\$ 6.00	\$ 8.40	\$12.00	\$15.60
Bottom sheave	.90	1.30	1.60	1.90	2.25	3.75
Top yoke and hook	3.60	3.75	4.50	6.50	7.50	11.00
Bottom yoke and hook	2.25	3.00	3.75	4.50	5.50	8.00
Top pin	.40	.50	.50	.60	.60	.70
Bottom pin	.30	.40	.40	.50	.50	.60
Regular chain	10.50	12.50	17.00	21.50	27.00	36.00

Star Self Locking Manila Rope Hoist Roller Bearing

A handy light weight hoist which rolls up compactly.

Yokes are drop forged and hooks are attached to yoke by a special double pressed and riveted steel swivel.

The locking device is of malleable iron and is attached to the axle. Pin lock acts on the hoist rope. A slight outward pull away from the block instantly locks the block and holds the load. Lock is released by a slight pull on the hoist rope toward the block.

Rope Extra—Specify Quantity Desired

No.	Price per Ft., no Rope	Diam. of Rope, Ins.	Approx. Strength Lbs.	Sheaves in Each Block	Wght., Lbs.
2	\$1.50	$\frac{3}{8}$	1000	2	4
21	2.50	$\frac{3}{8}$	2000	1	5
22	3.00	$\frac{3}{8}$	2000	2	6
32	4.00	$\frac{3}{8}$	4000	2	8
33	5.00	$\frac{3}{8}$	4000	3	10
43	7.50	$\frac{3}{8}$	6000	3	15
52	8.00	$\frac{3}{8}$	8000	2	18



Star
Manilla
Rope
Hoist

New Model Worm Gear Hoist

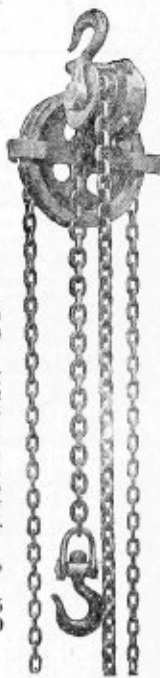
This hoist differs from regular worm geared hoists, principally in that it has only one load chain.

The frame is a crucible steel casting designed to withstand a strain of over 2 $\frac{1}{2}$ tons without breaking and 2 tons without bending.

The gears are cut from bar stock 25-pt. carbon, heat treated and case hardened. The gears are cut Hindly style as this type of worm gear will give a larger factor of safety, will wear longer and pull easier than the straight worm.

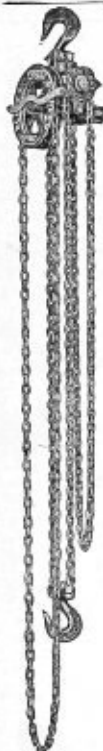
Lodd chain is electric welded, tested to two ton, fitted with steel hooks.

Made in 1-ton size only. Weight 45 pounds. Price.....\$30.00



New Model
Chain Hoist

H. Channon Company Chicago



Screw Geared Chain Hoists

The "Duplex" Screw Geared Chain Hoist

$\frac{1}{2}$ to 10 Tons Capacity

In efficiency, this hoist comes next to the Triplex spur-gear, but it is slower in speed. With the Duplex Hoist, one man pulling only 87 pounds, can lift a one-ton load.

This hoist requires little head room and it is especially adapted for portable use, as it is light, powerful and durable.

The load is carried by two distinct chains and to guard against accident, each of these chains has ample strength to carry any load up to the rated capacity of the hoist.

The safety guides prevent the load chain from slipping and the swivel connections prevent fouling of the chain.

The bronze worm wheels and steel worms have hardened and ground thrust bearings and run in oil, insuring smooth action and thorough lubrication.

Capacity in Tons	Price Complete	Regular Hoist, in Feet*	Extra Hoist, Price per Foot	Minimum Distance Between Hooks, in Inches	Reach†		Net Weight, in Pounds	Gross Weight, in Pounds	Chain Pull‡	
					Ft.	In.			Pounds	Feet
$\frac{1}{2}$	\$ 25.00	8	\$1.00	13	9	1	43	53	68	40
1	30.00	8	1.10	16	9	4	57	69	87	39
$1\frac{1}{2}$	40.00	8	1.20	19	9	7	76	95	94	30
2	50.00	9	1.30	21	10	9	104	125	115	26
3	75.00	10	1.50	25	12	1	180	212	132	23
4	95.00	10	1.60	29	12	5	215	250	142	15
5	140.00	12	2.40	31	14	7	330	375	145	19
6	180.00	12	2.50	33	14	9	340	385	145	25
8	210.00	12	2.70	36	15	0	380	418	160	310
10	275.00	12	3.25	45	15	9	560	626	160	390

*Height will hoist from level on which operator stands.

†The "reach" is the sum of the "hoist" and the "minimum distance between hooks," when hung at this height, the hand chain hangs down to within 18 inches of the floor.

‡Denotes pull in pounds to lift the full load and the number of feet of hand chain which must be handled to lift the load one foot.

The "Harrington" Screw Geared Chain Hoist

$\frac{1}{4}$ to 10 Tons Capacity

The steel worm or screw and the bronze worm gear are enclosed in an oil-tight case or housing—the working parts are thus always working in oil, insuring thorough lubrication. A hard grease should be used, as it lasts longer than oil.

The load is carried on two chains, and the hand chain guide is so placed that the operator can stand clear of the load.

The load wheels have square holes fitted to a square hub on the worm gear instead of clutches, increasing the strength and avoiding liability of breakage. They are also reversible—when one side of the pockets become worn, the wheels can be taken off and turned around, bringing the good sides of the pocket into action.

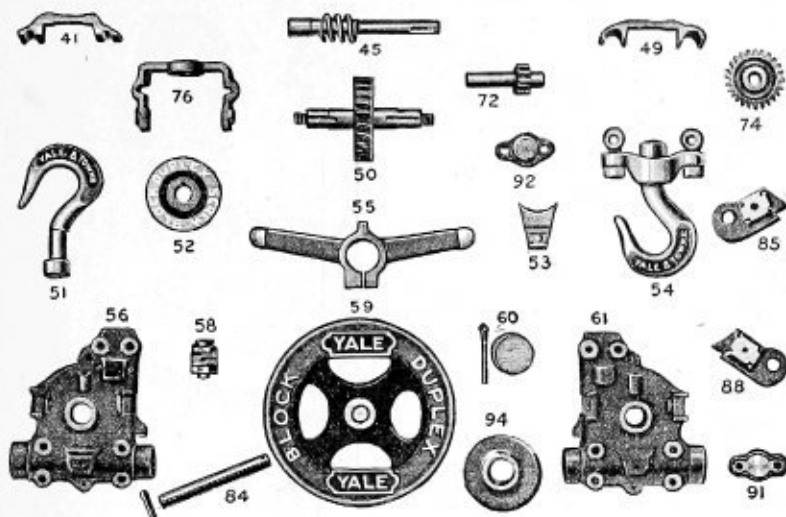
The load chain hook has swivel connections, so that any twist of the chain may be straightened without removal.

A thrust screw and bronze washer are placed at the end of the worm, instantly adjustable, to obtain fast or slow speed in lowering, as is desirable in some cases.

Cap'ty in Tons	Regular Lift, in Feet	Price of Hoist, Regular Lift	Price of Extra Lift, per Foot	Minimum Distance Between Hooks, in Inches	Weight of Hoist, in Pounds	Pull on Hand Chain to Lift Full Load	Feet of Chain Handled to Lift Load One Ft.	Number of Strands of Load Chain	Quantity of Chain in Hoists with Regular Lift	
									Load Chain	Hand Chain
$\frac{1}{4}$	8	\$ 22.50	\$1.10	14 $\frac{1}{2}$	43	20	64.0	2	18	17
$\frac{1}{2}$	8	25.00	1.20	17	71	49	60.5	2	18 $\frac{3}{4}$	17
1	8	30.00	1.30	18	78	71	76.0	2	18 $\frac{3}{4}$	17
$1\frac{1}{2}$	8	40.00	1.40	19	111	99	89.5	2	18 $\frac{3}{4}$	18
2	9	50.00	1.44	22	167	129	98.0	2	21	20
3	10	75.00	1.50	30	250	163	98.0	2	24	22
4	10	95.00	1.70	32	330	190	128.0	2	24	23
5	12	140.00	2.20	39	480	293	106.5	2	29	28
6	12	180.00	2.50	39	557	293	110.0	2	29	29
8	12	210.00	2.90	41	750	403	148.0	2	29	29
10	12	275.00	2.90	47	790	358	198.0	2	29	29



Repair Parts for "Duplex" Chain Hoists



Prices for Parts of Yale Duplex Blocks

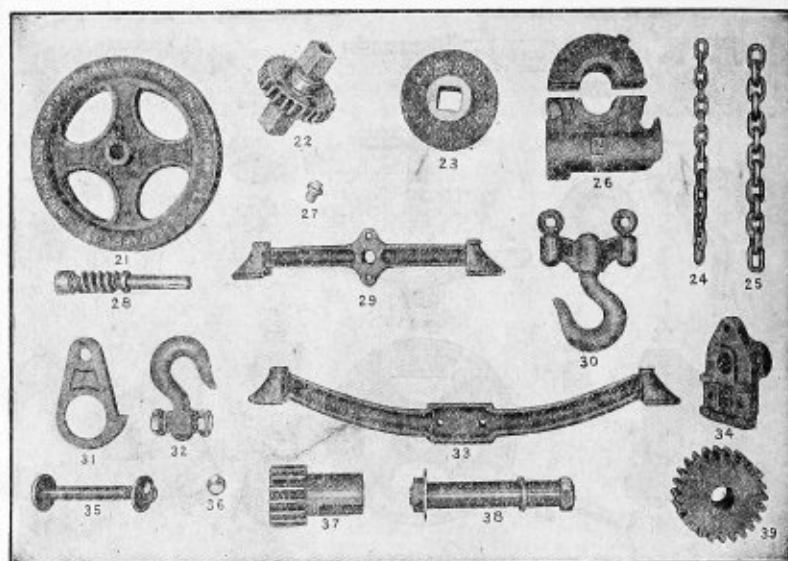
List No.	NAME	$\frac{1}{2}$ Ton	1 Ton	$1\frac{1}{2}$ Tons	2 Tons	3 Tons	$3\frac{1}{2}$ Tons	4 Tons	5 Tons	6 Tons	7 Tons	8 Tons	10 Tons
41	Load Chain Guide.....	\$ 0.40	\$ 0.50	\$ 0.60	\$ 0.70	\$ 1.00	\$ 1.20	\$ 1.40	\$ 1.60	\$ 1.70	\$ 1.80	\$ 1.90	\$ 2.50
45	Worm and Shaft.....	3.00	3.50	4.00	4.50	5.00	6.00	7.00	10.00	12.00	15.00	18.00	22.00
49	Load Chain Guard.....	.30	.40	.50	.60	.70	.80	.90	1.00	1.10	1.20	1.30	1.40
50	Worm Wheel.....	3.50	4.00	5.00	6.00	7.00	9.00	11.00	15.00	16.00	18.00	20.00	25.00
51	Top Hook.....	1.00	1.40	1.80	2.40	3.00	4.00	5.00	6.00	7.00	8.00	12.00	15.00
52	Load Sheave, per pair.....	1.50	2.00	2.50	3.00	3.50	4.00	4.50	5.00	5.50	6.00	8.00	9.00
53	Strippers per pair.....	.30	.40	.50	.60	.70	.80	.90	1.00				
54 & 57	Bottom Hook Swivel and Eye Bolts.....	2.00	2.50	3.00	3.50	4.50	5.00	6.00	8.00	12.00	16.00	20.00	25.00
55	Hand Chain Guide.....	.90	1.00	1.30	1.80	2.00	2.40	2.60	2.80	3.00	3.00	3.00	4.00
56 & 61	Housing, each half.....	2.50	3.00	4.00	5.60	6.00	7.00	10.00	15.00	16.00	18.00	20.00	30.00
58	Friction Plug.....	1.20	1.40	1.70	2.00								
59	Hand Wheel, see note below.....	1.50*	1.60*	2.50*	3.00*	3.50	4.00	4.50	5.00	5.00	5.00	6.50	7.00
60	Friction Plug Cover.....	.30	.30	.40	.50								
72	Pinion Shaft.....					4.00	4.20	4.40	4.60	4.80	5.00	5.20	6.00
74	Gear.....					1.60	1.80	2.00	2.20	2.30	2.40	2.50	3.00
78	Bottom Guides per pair.....									4.50	5.00	6.00	7.00
84	Clevis Pin.....									.50	.60	.70	1.00
85 & 88	Strippers, per pair.....									1.50	2.00	2.50	3.50
91	Friction Plug Cover.....					.50	.50	.50	.50	.50	.50	.60	.60
92	Friction Plug.....					2.50	3.00	3.50	4.00	4.20	4.40	4.60	5.40
94	Bottom Sheaves, per pair.....									3.00	4.00	6.00	7.00
	Load Chain, steel, ft.....	.37 $\frac{1}{2}$	.40	.42 $\frac{1}{2}$	.45	.50	.55	.55	.60	.50	.55	.55	.60
	Hand Chain, steel, ft.....	.25 $\frac{1}{2}$	.25 $\frac{1}{2}$	.25 $\frac{1}{2}$	.25 $\frac{1}{2}$	.25	.40	.40	.40	.40	.40	.40	.40

*In ordering Hand Wheels or Hand Chain give number of pockets for chain links in rim of wheel.

†Hand chain for old model Blocks \$0.37 $\frac{1}{2}$ per foot for $\frac{1}{2}$, 1, $1\frac{1}{2}$ and 2 Ton sizes.

For Price of Complete Duplex Blocks see page 921.

Repair Parts for Harrington Screw Geared Hoists 1894 Model

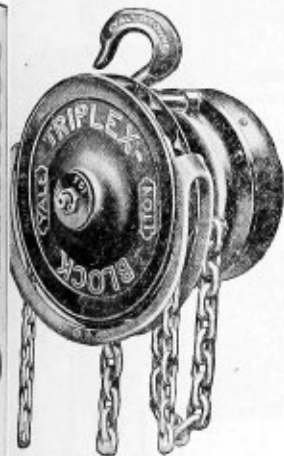


List No.	NAME	500	1000	2000	3000	4000	6000	8000	10000	12000	16000	20000
21	Hand Wheel	\$1.00	\$1.50	\$1.50	\$2.50	\$2.80	\$5.00	\$ 7.00	\$ 8.00	\$11.50	\$12.00	\$12.00
22	Worm Gear and Hub	3.00	3.20	4.00	5.00	6.00	7.00	9.00	16.00	16.00	23.00	23.00
23	Load Wheels (2)	1.60	1.80	2.00	3.00	3.50	6.00	8.50	10.50	15.00	18.00	20.00
24	Hand Chain, per foot	.25	.25	.25	.25	.25	.25	.30	.35	.35	.35	.35
25	Load Chain, per foot	.30	.35	.40	.45	.47	.50	.55	.75	.90	1.10	1.10
26	Case and Cap	1.50	2.00	2.50	4.00	5.50	9.50	11.00	16.00	16.00	20.00	20.00
27	Thrust Screw	.30	.40	.40	.50	.60	1.50	1.50	2.00	2.00	2.00	2.00
28	Worm	1.00	1.50	1.50	2.50	3.20	6.50	7.00	12.00	12.00	16.00	16.00
30	Bottom Hook and Swivel	1.70	2.00	2.60	3.50	4.10	5.20	11.00	13.50	19.50	23.00	35.00
31	Side Plates (2)	.60	.80	.90	1.30	1.80	4.00	6.00	10.00	10.00	14.00	14.00
32	Top Hook and Swivel	1.70	2.00	2.60	3.50	4.10	5.20	11.00	13.50	19.50	23.00	35.00
33	Hand Chain Guard†					1.50	2.00	3.00	4.00	7.00	8.00	8.00
34	Gland					2.00	3.00	3.50	5.00	5.00	6.00	8.00
35	Center Bolt and Washers	.30	.40	.50	.55	.60	1.00	1.50	2.50	2.50	3.00	3.00
36	Thrust Washer	.20	.20	.20	.25	.30	.50	.50	1.00	1.00	1.00	1.00
37	Pinion										5.00	7.00
38	Stud										3.00	3.00
39	Gear										5.00	7.00
	Hand Chain, Regular Lift	4.25	4.25	4.25	4.50	5.00	5.50	6.90	9.80	10.15	10.15	10.15
	Load Chains, Regular Lift with Hook and Swivel	7.10	8.56	10.10	11.94	13.97	17.20	24.20	35.25	45.60	54.90	66.00

†Old Style Hand Chain Guards can be furnished for this Model if desired.

Description

The "Triplex" Spur-Gearred Chain Hoist



Steel Gears—Steel Sheaves—Steel Pin—Steel Hooks—in fact a line of steel from hook to hook

All Steel Construction.

This is the hoist we offer for the greatest strength, the greatest safety, the greatest efficiency and the best economy—with it one man can lift heavier loads at greater speed and with less effort than any other.

The Triplex Block saves and utilizes the power, which in blocks of other kinds is wasted in overcoming the friction relied upon to sustain the load. Previous to this invention no block existed in which the sustaining mechanism was separated from the hoisting mechanism so that the friction of the former did not augment the resistance to be overcome in hoisting.

In the Triplex the load is sustained by a device entirely independent of the hoisting mechanism—thus 80% of the power exerted by a man pulling on the hand chain of a Triplex block is transformed into lifting energy and this lifting energy is so multiplied that **one man pulling only 82 pounds can lift one ton.**

While efficiency is a prime factor in a chain hoist, safety is a greater one. An accident due to defective design or construction may cost a life—considerable delay or loss of material—you cannot, therefore, afford to take the smallest chance on the reliability of a chain hoist to carry its rated load—every Triplex hoist is tested to 50% overload beyond its rated capacity—every link in the chain is minutely inspected both before and during the chain test.

The hoisting mechanism consists of a balanced train of spur gears, from the small central pinion to the shrouded internal gear, of heavy pitch, constituting a part of the frame and of the full diameter of the block. The two intermediate gears are carried by a circular frame or "pinion cage," keyed to the load-chain sheave, and revolving with the internal gear, thus forming a planetary motion which gives the desired leverage.

In this system the gear pressures are so balanced that all wear is equally distributed to every tooth in every gear and equally upon all bearings. The wear is thus reduced to a minimum and also distributed so that it is actually eliminated at any one point.

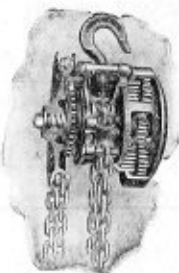
The sustaining mechanism consists of a set of friction discs, one of which has external ratchet teeth engaging with a drop-foreg pawl. The hand wheel is screwed upon the central hub, and in hoisting clamps the discs tightly together. In lowering, the reverse motion of the hand wheel releases the engagement of the discs, and allows the load to lower smoothly and rapidly, but only so long as the hand wheel is revolved backwards; when this motion ceases the discs automatically tighten and the load is securely held.

Every Hoist Tested to 50% Overload Beyond Its Rated Capacity

Referring to the illustration at the left—when the hand chain of the Triplex hoist is pulled, the central pinion is rotated, transmitting its energy through two intermediate gears, meshing with it, at two points always diametrically opposite each other. The two intermediate gears engage with a large internal gear which acts as a fulcrum to compel the revolution of the pinion cage which latter is keyed to the load sheave and lifts the load.

All tendency to thrust and to wear the bearings apart, is neutralized by the counteracting pressure due to the meshing of the intermediate gears with the large internal gear which encloses and is the final complement of the planetary movement.

The thrust of the tooth pressures under load is absolutely neutralized by counteracting tooth pressures—this means practically no wear on the bearings.



Sectional View

Showing steel gear cover and hand chain wheel cut open and pinion cage broken away.



Gear Cover Removed
ut steel intermediate gears.
arge internal gear with large pinions and liberal wearing surfaces.

"Triplex" Spur Geared Chain Hoists

$\frac{1}{2}$ to 40 Tons—All Steel Construction



2-Ton



4-Ton



10-Ton



20-Ton

Capacity in Tons	Price Complete	Regular Hoist in Feet*	Reach in Feet and Inches	Extra Hoist Price per Ft.	Minimum Distance Between Hooks in Inches	Net Weight in Pounds	Gross Weight in Pounds	Chain Pull in Pounds to Lift Full Load	Feet of Chain Handled to Lift Load One Foot
$\frac{1}{2}$	\$ 35.00	8	9 3	\$0.90	15	53	67	62	21
1	45.00	8	9 5	.95	17	80	95	82	31
$1\frac{1}{2}$	60.00	8	9 7 $\frac{1}{2}$	1.00	19 $\frac{1}{2}$	124	144	110	35
2	70.00	9	11 0	1.05	24	188	212	120	42
3	90.00	10	12 8	1.50	32	200	229	114	69
4	110.00	10	13 1	1.60	37	283	317	124	84
5	140.00	12	15 9	2.15	45	380	428	110	126
6	165.00	12	15 10	2.15	46	390	440	130	126
8	200.00	12	16 3	2.70	51	455	504	135	168
10	240.00	12	16 9	3.25	57	570	624	140	210
12	300.00	12	16 9	4.30	57	795	909	130†	126†
16	360.00	12	17 1	5.40	61	967	1112	135†	168†
20	425.00	12	18 5	6.50	77	1375	1635	140†	210†
32	Prices and full particulars upon request.								
40									

*Figures denote height in feet which blocks with regular lengths of chain will hoist above level on which operator stands.

†For each hand chain.

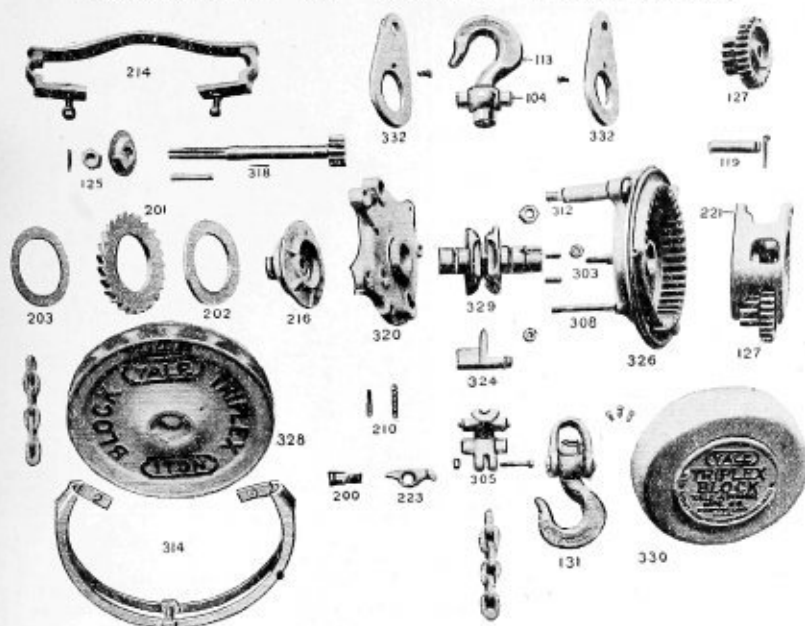
The chains and working parts of all Triplex Blocks from 4 to 20 tons capacity are interchangeable with the 2 ton size. The added power and strength is obtained by multiplying sheaves with heavy yokes and hooks.

High-Speed Triplex Hoists

$\frac{1}{4}$ -Ton.....\$35.00 $\frac{1}{2}$ -Ton.....\$45.00

The High-Speed Triplex is made with special gearing in the above two sizes only and are suitable for rapid work in frequent lifting of loads weighing less than five hundred pounds. They handle light loads at double speed, but require double the chain pull. For easy lifting, the regular Triplex Blocks are faster than any others, considering the force which a man can exert continuously on the hand chain.

Repair Parts for "Triplex" Chain Hoists



In ordering parts state whether for "1898 Model" or "Model S. S." Parts 303 to 332 differ.
Prices and full particulars on request.

let No.	Name	1/2 Ton	1 Ton	1 1/2 Tons	2 Tons	3 Tons	4 to 10 Tons
103	Small Separator	\$0.40	\$0.50	\$0.60	\$0.70	\$0.60	\$0.70
104	Top Cross Head	1.00	1.40	2.00	2.40		
105	Load Chain Guide	.30	.30	.40	.50	.40	.50
108	Load Chain Guide Bolt	.20	.20	.30	.40	.30	.40
112	Large Separator	.60	.70	.80	1.00	.80	1.00
113	Top Hook	1.00	1.40	1.80	2.00		
119	Gear and Pinion Pins	.40	.60	.70	.80	.70	.80
124	Stripper	.30	.40	.50	.50	.50	.50
125	Check Washer	.40	.50	.70	.90	.70	.90
126	Internal Gear	2.40	3.20	5.00	6.00	5.00	6.00
127	Gear and Pinions	.80†	1.10†	1.40†	1.60†	1.40†	1.60†
129	Load Sheave	2.00	3.20	4.75	6.35	4.75	6.35
130	Gear Cover	1.20	1.60	1.80	2.10	1.80	2.10
131	Lower Swivel Hook	1.50	2.30	3.20	5.50		
200	Pawl Stud	.40	.40	.50	.50	.50	.50
201	Ratchet Disc	.80	1.00	1.40	1.50	1.40	1.50
202	Leather Disc	.40	.40	.50	.60	.50	.60
203	Galvanized Iron Disc	.40	.40	.50	.60	.50	.60
210	Pawl Spring	.20	.20	.30	.30	.30	.30
214	Strap Hand Chain Guide	.75	1.20	1.50	1.80	1.50	1.80
216	Disc Hub	1.80	2.30	3.20	4.20	3.20	4.20
218	Driving Pinion	3.00†	4.00†	5.00†	6.00†	5.00†	6.00†
220	Ratchet Case	2.50	3.50	4.50	5.50	4.50	5.50
221	Pinion Cage	1.60	2.10	3.20	4.20	3.20	4.20
223	Pawl	.20	.20	.30	.30	.30	.30
228	Hand Wheel	1.80	2.30	3.00	3.60	3.00	3.60
303	Small Separator	.40	.50	.60	.70	.60	.70
304	Top Cross Head	1.00	1.40	2.00	2.40		
305	Load Chain Guide	.30	.30	.40	.50	.40	.50
308	Load Chain Guide Bolt	.20	.20	.30	.40	.30	.40
312	Large Separator	.60	.70	.80	1.00	.80	1.00
314	Continuous Hand Chain Guide	1.50	2.00	2.50	3.00	2.50	3.00
318	Driving Pinion	3.00†	4.00	5.00	6.00	5.00	6.00
320	Ratchet Case	2.50	3.50	4.50	5.50	4.50	5.50
324	Stripper	.30	.40	.50	.50	.50	.50
326	Internal Gear	2.40	3.20	5.00	6.00	5.00	6.00
328	Hand Wheel	1.80†	2.30	3.00	3.60	3.00	3.60
329	Load Sheave	2.00	3.20	4.75	6.35	4.75	6.35
330	Gear Cover	1.20	1.50	1.80	2.10	1.80	2.10
332	Suspension Plate (each)	1.50	2.00	2.50	3.00	2.50	3.00
000	Load Chain, per foot	.40*	.45*	.50*	.55*	.50*	.55*
000	Hand Chain, Steel, per foot	.25	.25	.25	.25	.25	.25

In ordering Load Chains specify whether or not hook is required.
Parts 218 and 127 should be specified "Quick Speed" for blocks so marked on the gear cover.

"Y and T" Electric Hoists

Direct or Alt. Current, 110 to 650 Volts

These are high grade Machines designed to give uninterrupted service and operate at minimum cost. The hoist consists of two winding drums, hung in steel suspension plates and driven by specially designed motors.

Specification Data

Motors: Direct Current.—For 110-220-500 volts. The motors are specially designed to meet the requirements of hoisting work. The windings are heavily insulated for protection against moisture.

Alternating Current.—For 220 volts, two or three phase sixty cycles and 440 volts three phase sixty cycles. Single phase hoists are not supplied. These are enclosed induction motors of special design to develop high starting torque with low current inrush. Windings are heavily insulated for protection against moisture.

Controllers.—Cylinder drum type. Fingers and contacts liberally constructed for hoisting work. Contacts adjustable and can be easily renewed.

Rheostat.—Resistance units are of the flat type and are easily accessible. Windings are covered with an insulating cement which prevents oxidation from moisture or acid fumes.

Suspension.—Suspension members are steel, so that the load is supported from "Hook-to-hook-a-line-of-steel."

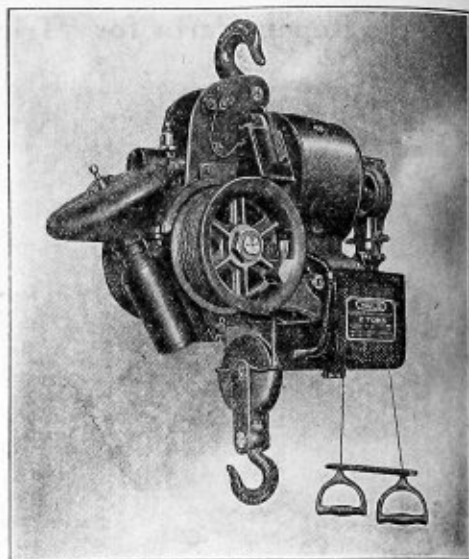
Automatic Emergency Stop.—"KY" type hoists have adjustable emergency stop which automatically shuts off the controller when the top and bottom limits of hook travel are reached.

Brake.—Load is sustained at all times by the interlocking gearing in the "KY" type machine.

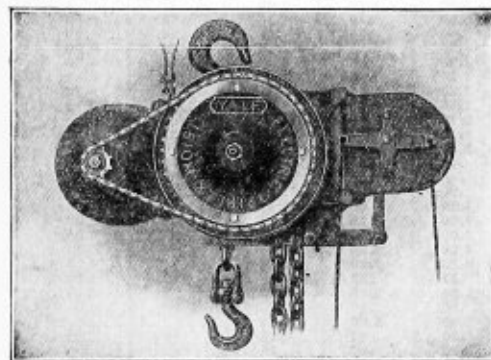
Gearing.—Main gearing runs at all times in a bath of oil.

Lubrication.—All important bearings are equipped with grease cups or oil ring bearings so that the minimum of care and attention is required. The main gears run submerged in a bath of oil.

Over-Load Test.—Before shipment, each hoist is given a long running test and required to lift a 50 percent overload.



No.	Capacity, Tons	H. P. of Motor	Regular Lift, Feet	Maximum Lift, Feet	Minimum Distance Between Hooks, Inches	Speed in Feet per Minute Full Load		Number of Parts of Hoisting Rope	Weight, Pounds	Price with Regular Lift, F. O. B. Factory D. C. or A. C.
						Direct Current	Alt. Current			
86	1	3	15	45	52	20	15	Wire 2 parts	640	\$ 800.00
87	2	3	15	45	46	15	15	Wire 2 parts	560	850.00
88	4	3	15	22	57	8	7	Wire 4 parts	800	900.00
89	5	7	15	45	74	16	15	Wire 2 parts	1700	1400.00
90	6	3	10	15	67	5	5	Wire 6 parts	870	970.00
91	10	7	15	22	81	8	7 1/2	Wire 4 parts	2100	1900.00

**The Electric Triplex Hoist**

Takes the place of a hand chain hoist at a moderate additional cost and gives from 5 to 10 times greater speed. Where loads up to 1 ton are repeatedly lifted and lowered as in serving machine tools, etc., this is the most economical hoist to use. It is well adapted for use on overhead trolley systems, for attachment to small traveling cranes, etc.

The installation involves simply hooking the hoist onto a firm support and attaching two wires for current—it is then ready to do the work of five men.

Consists of a regular Triplex chain hoist with electric motor attached and driven by chain as shown. The 1 ton Electric Triplex uses the 2 ton chain hoist—the 1/2 ton Electric, the 1 ton chain hoist. Should the power fail, may be operated by the hand chain.

Capacity, Tons	Dimensions			Standard Lift, Feet	Weight, Pounds	Price, F. O. B. Factory		
	Minimum Distance Between Hooks, Inches	Overall Width, Inches	Overall Length, Inches			Hoist with Standard Lift Direct Current	Hoist with Standard Lift Alternating Current	Extra Lift per Foot
1/2	20	16	33	10	250	\$450.00	\$500.00	\$1.50
1	22	18	37 1/2	10	400	\$20.00	\$80.00	1.80
2	28 1/2	18	37 1/2	10	500	\$10.00	\$80.00	2.90

State current and voltage—if alternating, state cycles and phases also.

Sprague Electric Hoists

Capacity 1-4 to 6 Tons



S-1 Hoist with Style A Plain Trolley Carriage

Standard hoists are spur-gearred, but worm-gearred can be furnished where high speeds are not desired.

Spur-gearred hoists are equipped with automatic brakes which hold loads absolutely at any point, whether or not the hoist is supplied with current.

Hoists can be equipped with either single speed controller for quick handling of loads or with rheostatic or foundry type controller where extreme accuracy is required in handling the load.

All hoists are fitted with automatic limit switch, which absolutely prevents damage to hoist through running the hook too high.

All hoists may be equipped with a lowering limit switch.

Illustration shows hoist with Style A plain carriage for running on lower flange of single I-beam. Hoist can also be furnished with carriage for running on upper flange of single I-beam or with carriage for running on top of double beams for bridge cranes.

Carriages can be furnished plain, hand geared or motor driven, also with cage for operator.

All hoists have enclosed motors designed especially for the purpose; all working parts are entirely enclosed and hoists may be used in dusty places or outdoors.

Speeds, Loads, Weights and Lifts of Standard Hoists and Trolley Carriages

Cap'ty. Tons	Hoist- ing Speed, Feet	Max. Height of Lift	Hoist Symbol	No. of Ropes	Motor		Weight of Hoist without Carriage	†Weight of Hoist and Carriage						
					Symbol	Horse Power Crane Rating		*Style A Carriage			*Style C Carriage			
								Plain	Hand Geared	Motor Driven, Rigid	Plain	Hand Geared	Motor Driven	
1/4	25	25	I5	1	H1/4	1	225	250						
1/2	30	28	S1	1	H1/2	1 1/2	480	600	630	1015	870	990	1240	
1	15	13	S1	2	H1 1/2	1 1/2	505	625	655	1040	895	1015	1265	
1	20	30	W1	2	M1	3	540	800	870	1095	940	1060	1315	
1	40	30	W1	2	M2	6	660	920	990	1215	1060	1180	1435	
1 1/2	26	50	W2	2	M2	6	870	1140	1200	1610	1270	1390	1645	
2	10	15	W1	4	M1	3	590	850	920	1145	990	1110	1370	
2	20	15	W1	4	M2	6	710	970	1040	1270	1110	1230	1490	
2	30	40	W2	2	M3	9	970	1240	1300	1710	1370	1490	1745	
2	35	31	S2	2	M2	6	1550	1810	1870	2050	2010	2210	2350	
3	13	25	W2	4	M2	6	930	1200	1260	1670	1330	1450	1705	
3	23	21	S2	3	M2	6	1560	1820	1880	2060	2020	2220	2360	
3	50	48	S3	2	M4	12	2550	2950	3050	3620	3000	3200	3550	
4	15	20	W2	4	M3	9	1030	1300	1360	1770	1430	1550	1805	
4	17	15	S2	4	M2	6	1600	1860	1920	2100	2060	2260	2400	
4 1/2	32	31	S3	3	M4	12	2570	2970	3070	3640	3020	3220	3570	
6	25	23	S3	4	M4	12	2640	3040	3160	3710	3090	3290	3640	
6	10	16	W2	6	M3	6	1460	1730	1790	2260	1860	1980	2235	

Cylinder Air Hoists

Improved Adjustable Valve, combining in one body the inlet and exhaust functions, the speed adjustment, cut-off and the safety check. Few parts; adjustable to wear; no stuffing-box.

Adjustable Speed Attachment regulates speed delicately from very slow to very fast, independently of the operating lever.

Automatic Cut-Off closes air supply at any required height, in connection with adjustable slip collar on piston rod; but at the same time allows operator to lift and lower and still have both hands free to handle his work. Saves air.

Safety Stop Device stops load from running down if air supply is broken.

Patent Exhaust Attachment. Only clean exhaust air can be drawn into top of cylinder when piston is lowering. Shuts out dirt and grit. Saves piston packing. We have exclusive use of this device.

Automatic Lubrication both of valve and piston rod. Oil placed in top of hoist lubricates the piston and surplus oil is drained down to piston rod stuffing-box.

Accessible Design. Valve can be removed without removing heads and without unscrewing the inlet or exhaust pipes. No "screwed on" heads used; all heads removable by simply taking off a few nuts. Through rods from top to bottom strengthen the machine.

Cushioned Stop at top and bottom of cylinder prevents sudden stops and jars.

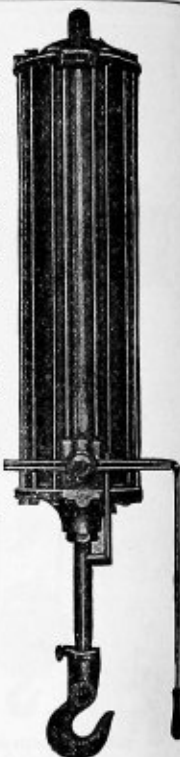
Universal Hook. Ball and socket type easily removable.

Polished Cylinder inside, insuring high efficiency; die pressed piston packing; brass piston rod gland.

Self-Closing Valves are supplied when specially ordered, but are not suited to some duties.

Inside Diam. of Cylinder, Inches	Lifting Capacities at Various Air Pressures (actual) in Pounds			Approximate Shipping Weight, Packed		Cu. Ft. Free Air Used per Ft. of Lift at 60 Lbs.	Price with Std. 4-Foot Lift	Price Extra Lift per Ft. 4 to 8 Ft. Only
	At 60 Pounds	At 80 Pounds	At 100 Pounds	4-Foot Lift	Per Foot Additional			
3	380	510	630	118 lbs.	10 lbs.	0.30	\$ 40.00	\$ 4.50
4	680	900	1,130	160 "	20 "	.45	43.00	5.00
5	1,060	1,410	1,770	180 "	25 "	.68	50.00	5.50
6	1,530	2,040	2,540	240 "	31 "	.99	60.00	6.00
7	2,080	2,770	3,460	390 "	82 "	1.36	73.00	7.00
8	2,710	3,620	4,520	470 "	101 "	1.76	76.00	8.00
10	4,250	5,660	7,080	760 "	140 "	2.77	100.00	10.00
12	6,160	8,220	10,280	900 "	160 "	3.99	135.00	13.50
14	8,310	11,080	13,850	1,040 "	200 "	5.42	165.00	16.00
16	10,860	14,480	18,100	1,440 "	260 "	6.91	210.00	18.00
20	16,960	22,620	28,280	2,200 "	360 "	11.10	290.00	23.00
24	24,430	32,570	40,720	3,050 "	410 "	15.80	390.00	36.00

All hoists over 8-foot stroke take special prices.



Motor Air Hoists

Equipped with motors or air engines of the double oscillating cylinder type with bronze seats and bearings. These motors are very compact and thoroughly protected from dirt. Castings are semi-steel.

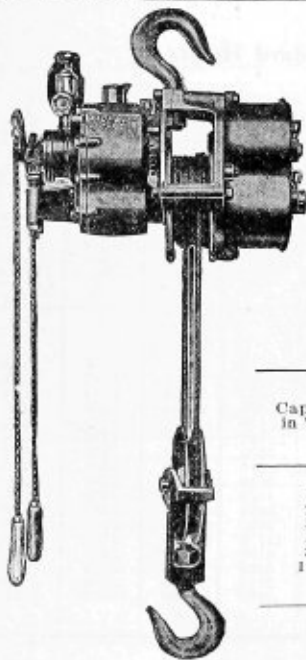
Motor may be instantly started, stopped or reversed by two pendant chains, reaching to within five feet of the floor—the control valve is self-closing when chains are released—holds the load with the air hoist attached.

Hoists are designed to be operated by common labor and constructed to handle loads up to 10 tons capacity to a height of 25 feet or more with minimum air consumption.

All ratings based on 80-pound air pressure at the motor.

Capacity in Tons	Std. Height of Lift, Feet	Lifting Speed, Feet per Minute	Shortest Distance Between Hooks, In.	Approx. Weight, Pounds	Price Each Std. Lift
1	15	30	31	240	\$180.00
2	15	16	33	240	210.00
3 1/2	12	12	35	330	250.00
5	12	8	37	450	350.00
8	15	8	47	675	450.00
10	15	6	57	1050	500.00

We have a hoist for every purpose.



I Beam Trolley Systems

The overhead or tramrail system of handling and transporting heavy materials possesses marked advantages in convenience, speed and efficiency over other methods of handling heavy loads.

Great saving can be made with this system in both small and large installations.

One man can handle loads many times as heavy as by the other methods in about one-fifth the time required by the next best way—he can handle the load wherever the trolley runs, from one end of the plant to the other with switches and turn-outs wherever necessary.

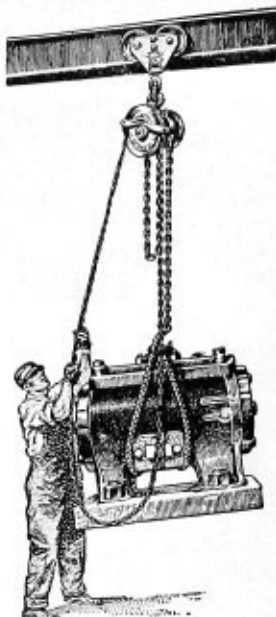
Installation of I beam track is a simple matter and we can supply promptly straight or curved track all drilled and ready to attach with hangers, switches, etc.

I Beam Trolley Track



The safest and most substantial form of overhead track or tramrail consists of standard steel I beams.

By use of trolleys running on the lower flange of the beam, the head-room is reduced to a minimum. The strength and stiffness of this track are so great that few supports are required, making it the cheapest and easiest to erect.



Prices I Beam Trolley Track, Curves and Joints



Splices, Fig. 11

Capacity in tons..... tons	1/4	1/2	1	1 1/2	2	3	4	5	6	8	10
Size of I beam..... inches	4	5	6	7	8	9	10	12	15	20	24
Distance betw. supports..... ft.	13	14	14	15	16	16	16	18	22	25	30
Price of straight track, per ft.	\$0.60	\$0.80	\$1.00	\$1.10	\$1.20	\$1.40	\$1.70	\$2.00	\$2.40	\$3.50	\$4.50
*Curves, price for bending only, each.....	4.50	5.00	5.50	6.00	7.00	8.00	10.00	12.00	18.00	28.00	36.00
Splices or joints, Fig. 11, complete, each.....	2.50	2.50	3.00	3.50	4.00	4.50	5.00	6.00	7.00	9.00	10.00

*The price of each curve is charged for each 90° of curvature or fraction thereof and is additional to the price of the I beam used. For shipment of trolley track in less than carload lots, splices should be so spaced as to make the lengths 20 feet or less for box cars and 30-foot lengths for flat cars.

Fig. 11. Splices have heavy plates at top of track and keyed hanger for which hole is drilled through top center of the I beam. The bolt is slotted and track held by flat cross-key with lock nut on top of spliced plate, making a very rigid joint.

Hangers for I Beam Trolley Track



Fig. 13. Hanger Bolt



Fig. 14. "V" Hanger

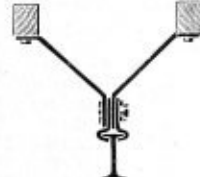
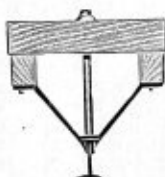


Fig. 14A. "V" Hanger



Fig. 15. Clip

The track may be suspended by bolting directly to the overhead timbers or by means of the hanger bolts shown above—leaving the beam clear for the trolley wheels to pass.

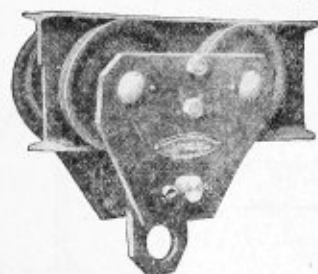
For drop hangers the "V" construction is generally used and for steel construction the Fig. 15 Hanger Clips. Fig. 14-A hanger is popular—no drilling of track necessary.

Capacity..... tons	1/4	1/2	1	1 1/2	2	3	4	5	6	8	10
Size of I beam..... inches	4	5	6	7	8	9	10	12	15	20	24
Distance between supports..... feet	13	14	14	15	16	16	16	18	22	25	30
Fig. 13 Hanger bolt, 12 ins. long, each	\$0.50	\$0.50	\$0.60	\$0.80	\$1.00	\$1.25	\$1.50	\$1.80	\$2.10	\$2.50	\$3.00
For each 3 inches longer, add.....	.05	.05	.05	.05	.10	.10	.10	.10	.15	.15	.20
Fig. 14 or 14A "V" hangers with lag screws and key-bolts, 12-inch drop.	3.50	3.50	4.25	5.00	6.00	7.00	8.00	9.00	10.00	11.00	13.00
For each 3 inches longer, add.....	.25	.25	.25	.25	.25	.40	.40	.50	.50	.75	.75
Fig. 15 Clip hangers with bolts, 12-in. drop.....	1.50	1.50	2.00	2.50	3.00	4.00	6.00	8.00	10.00	12.50	13.50
For each 3 inches longer, add.....	.05	.05	.05	.05	.10	.10	.10	.10	.15	.15	.20

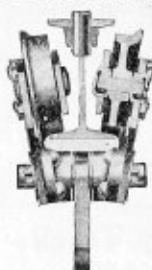
Special Hangers, Switches and Turntables for any installation.

"Brownhoist" Patent Equalizing Trolleys

To Run on Lower Flanges of I Beam



Plain Trolley



Geared Trolley

In these trolleys the plane of the wheels is perpendicular to the flanges of the I beam on which they tread, so that the lines of force due to the load intersect at the point of suspension—in the eye of the clevis. The outside plates are connected by means of bolts and separators to inner steel bearing plates. Each wheel has an inner as well as an outer bearing. The two halves of the trolley are connected by a suspension pin so that trolley may be easily adjusted for wider beams by lengthening this pin. The pin being a loose fit, allows the two sides of the trolley to equalize so that each wheel always takes its full share of the suspended load notwithstanding irregularities in the track. The construction also permits of placing trolley on I beams having both ends already imbedded in the walls.

Each of the four wheels is pressed on to its axle which is supported at each end in eight self-aligning bronze, dust-proof, oil reservoir bearings having oil pockets to hold oily waste. The trolley need not be oiled more than once in six months.

The tread of the wheels is parallel to the axis of the trolley and the wheels are at right angles to the bearing surface of the I beam track—there is no grinding on the tread. The flange of the trolley wheel is correctly shaped and meets the flange of the I beam easily—so that it turns truly on the beam and rolls smoothly around curves.

Geared Trolleys. These differ from the plain trolleys in that they are moved along the track by pulling on a pendant hand chain instead of pushing on the load.

The hand chain wheel is attached to a shaft, on one end of which is a pinion that engages with gears of the same diameter as the trolley wheels.

Geared trolleys should be specified in most cases for loads three tons and over as the gearing enables the operator to handle the load with ease. Geared trolleys are also used where the load is to be moved accurately within a few inches.

Sizes and Prices

PLAIN TROLLEYS

Capacity in Tons	Standard Size of I-Beam Light Section	Limit of Widening Inches	Greatest Distance Between Supports	Price Plain Trolley	Weight in Lbs.	Smallest Radius for I-Beam Curve	Diameter of Tread of Wheels	Direct Pull to Start Fully Loaded Trolley Along Track
1/4	4	9	14	\$ 14.00	25	18	3 1/2	25
1/2	5	10	14	16.00	30	21	4	26
1	6	18	13	20.00	50	21	5	47
1 1/2	7	20	13	25.00	95	34	6	65
2	8	20	13	30.00	115	36	7	74
3	9	20	13	40.00	150	42	9	106
4	10	20	13	50.00	210	48	9	145
5	12	20	15	65.00	270	54	10 1/2	60
6	15	24	18	80.00	350	66	13	70
8	20	24	25	95.00	420	66	13	90
10	24	24	27	110.00	550	66	13	115
12	24	.....	23	110.00	600	96	18	150
15	24	.....	20	180.00	1100	96	18	180
20	24	.....	16	200.00	1200	96	18	260

GEARED TROLLEYS With Pendant Hand Chains

Price Geared Trolleys	Weight in Lbs.	Diam. of Tread of Wheels Inches	Pull on Hand Chain to Move Fully Loaded Trolley Along Track
\$ 40.00	90	5	15
45.00	140	5	24
50.00	170	7	23
60.00	180	7	30
70.00	350	9	45
90.00	360	9	55
100.00	460	13	23
110.00	540	13	28
130.00	650	13	35
130.00	700	18	42
220.00	1400	18	44
250.00	1500	18	49

Hand chains furnished with geared trolleys is same length as chain supplied with standard Triplex chain hoist of corresponding size.

Trolleys with current collectors, also motor driven trolleys for use with electric hoists quoted upon request.

Trolleys 3-ton and larger have roller bearings.

Hyatt Flexible Roller Bearing I Beam Trolleys

Cast Steel, Equalizing Adjustable Frames. Easy Running

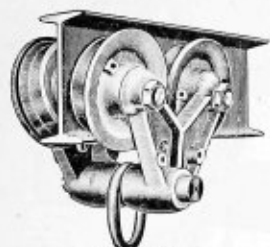
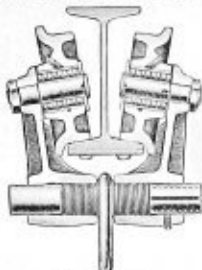


Fig. 101 Plain



Sectional View

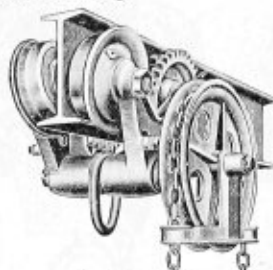


Fig. 102 Geared

The easy running feature of this trolley is accounted for by the Hyatt Roller Bearings. Note pull required in table below.

The side frames are cast steel, well ribbed and have adjustable spreading feature, for use on any sized beam. They are positively locked and hold the load centrally between the frames, but permit one frame to rock on the shaft and equally distribute the load to all wheels under all track way conditions.



Hyatt Flexible Roller Bearing

Cross-shaft is threaded right and left-hand with locking pin.

Wheels are large diameter, of turned hard cast iron, with anti-friction, anti-climbing flanges. Wheels are at right angles to track and have crowned faces.

Geared trolleys are used for heavy loads, and where it is desired to spot the load accurately, they are driven by two pinions on opposite wheels. Pinion shelf brackets and chain guards are of steel. Hand chain for 12 feet above floor.

Cap'ty Safe Load, Tons	I Beam Track			Plain Trolleys				Geared Trolleys				Under Beam to Trolley Eye	Diam. of Wheels, Inches	Cast Steel Wheels, Extra
	Min. Depth, Inches	Max. Depth, Inches	Min. Radius, Feet	Price Fig. 101	Net Weight, Pounds	Pull, Pounds	Traction %	Price Fig. 102	Net Weight, Pounds	Pull, Pounds	Traction %			
1	6	15	3	\$ 27.00	50	35	1.75					5 1/2	4 1/2	\$7.50
2	8	18	4	37.00	100	25	1.30	\$ 54.00	150	12	.60	6 1/2	6 1/2	10.50
3	10	24	6	48.00	140	22	1.05	55.00	200	10	.50	7 1/2	8 1/2	13.50
6	12	24	8	74.00	270	18	.87	100.00	330	10	.50	8 1/2	10 1/2	18.00
10	15	24	10	128.00	500	14	.70	160.00	560	10	.50	11 1/2	12 1/2	21.00

Pull—Force in pounds required to propel one ton on a dry straight track.

Traction—Force required to propel, given as a percentage of the load carried by the trolley. Large trolleys require less force to move them in proportion to their loads.

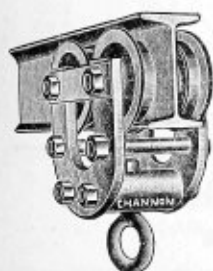


Fig. 113 Plain

Steel Yoke Trolleys

A straight-sided, forged-steel frame trolley. Steel roller bushed wheels. Treads are tapered and trolley is not self-equalizing.

Capacity, Tons	Plain		Geared		Underside of Beam to Bottom of Eye		Tread Diam. of Wheels
	Price Fig. 113	Weight, Pounds	Price Fig. 112	Weight, Pounds	Fig. 113	Fig. 112	
1	\$20.00	70	\$35.00	110	8 1/2	9 3/4	5
1 1/2	26.00	75	38.00	120	8 3/4	9 3/4	5
2	28.00	85	40.00	132	8 3/4	9 3/4	5
3	33.00	90	47.00	165	9	10	5 1/2
4	37.00	150	52.00	225	10 1/2	10 1/2	6
5	43.00	180	65.00	242	11	11	6

Be sure to state size of I beam when ordering.

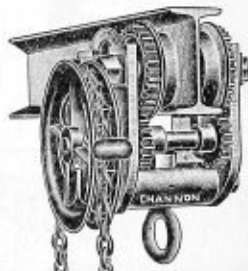
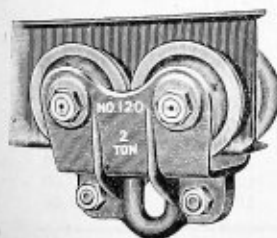


Fig. 112 Geared



No. 120 Plain Trolley

A popular, low priced trolley for garages, etc., where they receive but little hard service. Frame is of cast iron. The four wheels have plain bearings.

Capacity, Tons	Price Each	For I Beams, Size, Inches	Tread Diam. of Wheels, Inches	Weight, Pounds
1/4	\$14.00	3 and 4	2	13
1/2	16.00	5 and 6	3 1/2	29
1	21.00	5 and 6	3 3/4	33
1 1/2	27.00	6 and 7	4 1/2	52
2	34.00	7 and 8	5 1/2	72

In ordering be sure to state size and weight of I beam.

We Supply Complete Trolley Systems.

Channon Flat Track Overhead Trolley System



Fig. 10 Geared—Wrought Iron Trolley



Fig. 12. Plain—Steel Plate Trolley

Flat Track Trolleys

Wheels are bushed with our self-lubricating graphite bronze bushings and require no oil.

Capacity in tons	$\frac{1}{4}$	$\frac{1}{2}$	1	$1\frac{1}{2}$	2	3
For flat track, size, inches	$3 \times \frac{1}{2}$	$3 \times \frac{1}{2}$	$4 \times \frac{3}{4}$	$4 \times \frac{3}{4}$	$4 \times \frac{3}{4}$	6×1
Price, plain trolleys, each	\$9.00	\$9.00	\$15.00	\$15.00	\$15.00	\$30.00
Price, geared trolleys, each			35.00	35.00	35.00	50.00

Geared trolleys have hand wheel and chain for moving trolley on track.

Straight Flat Trolley Track

Capacity in tons	$\frac{1}{4}$	$\frac{1}{2}$	1	$1\frac{1}{2}$	2	3
Size of track, inches	$3 \times \frac{1}{2}$	$3 \times \frac{1}{2}$	$4 \times \frac{3}{4}$	$4 \times \frac{3}{4}$	$4 \times \frac{3}{4}$	6×1
Distance between hangers, feet	7	5	6	5	4	6
Price of straight track, per foot	\$0.55	\$0.55	\$0.95	\$0.95	\$0.95	\$2.00

Above prices include splices where necessary and drilling for the hangers.

Fig. 21
Short Hangers

Fig. 22

Fig. 23 Long
Braced Hangers

Hangers for Flat Track

Price Fig. 21 and Fig. 22

Capacity, Tons	10-Inch Drop	12-Inch Drop	15-Inch Drop	18-Inch Drop
$\frac{1}{4}$	\$4.00	\$4.50	\$5.00	\$5.50
$\frac{1}{2}$	4.00	4.50	5.00	5.50
1	6.00	6.50	7.00	8.00
$1\frac{1}{2}$	6.50	7.20	7.60	8.35
2	8.00	9.00	9.60	10.00
3	8.00	9.00	9.75	10.50

Price Fig. 23—Long braced hangers upon request.
Always state drop when ordering.

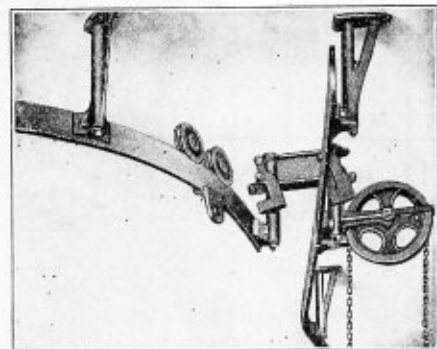


Fig. 24. Switch

Flat Track Switches and Turntables

Switch consists of a rail moved by an eccentric jointed lever, which is worked by chain wheel and a pendant chain. Rails are fitted with automatic stops so that load can not run off when switch is open.

Capacity in Tons	Size of Track, Inches	Price Two-way Switch	Price Turntable, Outlets
$\frac{1}{4}$	$3 \times \frac{1}{2}$	\$100.00	\$170.00
$\frac{1}{2}$	$3 \times \frac{1}{2}$	100.00	170.00
1	$4 \times \frac{3}{4}$	110.00	180.00
$1\frac{1}{2}$	$4 \times \frac{3}{4}$	110.00	180.00
2	$4 \times \frac{3}{4}$	130.00	200.00
3	6×1	150.00	230.00

I Beam Switches and Turntables

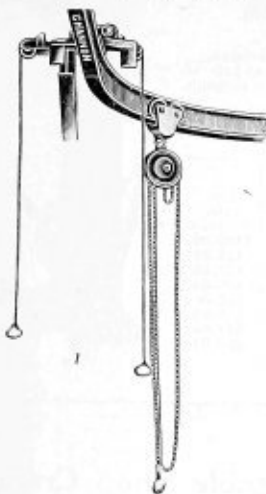


Fig. 18—Two-way Switch



Fig. 19—Three-way Switch

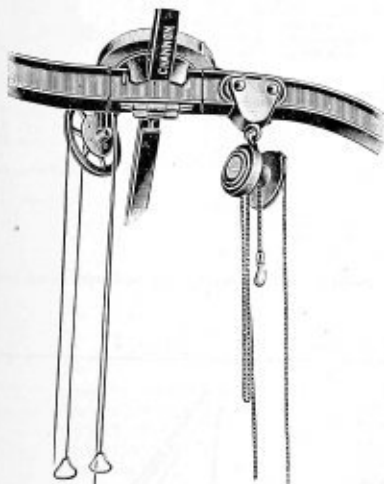


Fig. 20—Turntable in First Position

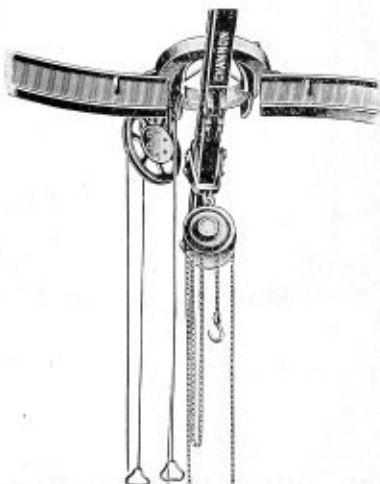


Fig. 21—Turntable in Second Position

They are operated from the floor by pulling on pendant hand chains shown, and can be used with absolute safety, as they are so arranged that the trolley cannot run off the rail under any conditions of use.

Capacity..... tons	$\frac{1}{4}$	$\frac{1}{2}$	1	$1\frac{1}{2}$	2	3	4	5	6	8	10
Size of I beam..... inches	4	5	6	7	8	9	10	12	15	20	24
Fig. 18—2-way switch, Style "A".....	\$ 50	\$ 50	\$ 50	\$100	\$100	\$100	\$160	\$160	\$300	\$300	\$300
Fig. 18—2-way switch, Style "B".....			120	120	120	120	160	160	300	300	300
Fig. 19—3-way switch, Style "A".....	80	80	80	130	130	130	170	170	440	440	440
Fig. 19—3-way switch, Style "B".....			150	150	150	150	220	220	360	360	360
Turntables, Style "A".....	170	170	170	170	170	310	310	310	400	400	400
Turntables, Style "B".....			170	170	310	310	310	310	400	400	400

Style "A" are for use with plain steel trolleys only. Style "B" are for use with geared steel trolleys. Style "C" are for use with Triplex Trolley Blocks—prices upon request. All trolleys for use with turntables require special locking device which must be specified when trolley is ordered.

Channon Overhung Portable Shop Crane

An invaluable addition to the shop for serving machine tools, assembling and handling the heavier pieces. No. 1 is the auto repair shop size.

The load is hoisted, lowered and transported all by the same machine. **Roller bearings.** The body of the crane base, wheels and projecting arms are of cast iron—the front axle of cast steel. A wide, heavy band of wrought iron reinforces the projecting arms, bolted through the hook plates and extends through the base.

Furnished with two styles of bed plates—regulator flat bed plate is 12 inches in height and the "low-down" bed plate 6½ inches high—permitting the crane to run under the machines. No. 5 made "low-down" only.

Size	Lifting Capacity Lbs.	Total Height, Ft. In.	Lift, Ft. In.	Over Hang, Ft. In.	Width of Bed		Length Bed, Ft. In.	Weight, Lbs.	List Price
					Outside, Ft. In.	Inside, Ft. In.			
1	2000	5 8	4 6	2 3	2 5	1 10	2 11	600	\$100.00
2	4000	6 6	5 4	2 6	2 8	2 1	3 2	740	112.50
3	5000	7 6	6 4	2 9	2 10	2 4	3 9	890	125.00
4	6000	8 6	7 4	3 0	3 4	2 8	4 0	1150	150.00
5	6500	9 6	8 3	3 3	3 8	3 0	4 3	1300	162.50
6	7000	10 6	9 3	3 6	4 0	3 4	4 6	1550	175.00
7	7000	11 6	10 3	3 9	4 5	3 8	4 9	1800	187.50
8	7000	12 6	11 3	4 0	4 10½	4 1½	5 1	2000	200.00

Special Sizes on request.



"Hercules" Portable Shop Crane

This crane is built in a strong, substantial manner of steel angle frame and malleable castings. Wheels large in diameter, broad face and roller bearing.

No. 1. Weight 285 pounds, capacity 1,000 pounds.	Price.....	\$45.00
No. 2. Weight 325 pounds, capacity 2,000 pounds.	Price.....	\$7.50
No. 3. Weight 425 pounds, capacity 3,000 pounds.	Price.....	70.00

Automobile Nos. 2-A, 3-A and 4-A

Height over all.....	8 feet
Hoist.....	6 feet, 10 inches
Overhang.....	3 feet
Height of bed.....	7½ inches
Width of bed, outside.....	46 inches
Width of bed, inside.....	37 inches
Length of bed, outside.....	6 feet
Length of bed, inside.....	4 feet

No. 2-A. Weight 425 pounds, capacity 1,000 pounds.	Price.....	\$65.00
No. 3-A. Weight 500 pounds, capacity 2,000 pounds.	Price.....	77.50
No. 4-A. Weight 640 pounds, capacity 3,000 pounds.	Price.....	90.00

Showing standard pattern. Automobile pattern with low bed and long overhang listed but not illustrated.

Standard Nos. 1, 2 and 3

Height over all.....	8 feet
Hoist.....	6 feet, 9 inches
Width of bed, outside.....	4 feet, 2 inches
Width of bed, inside.....	3 feet, 5 inches
Length of bed, outside.....	4 feet
Length of bed, inside.....	2 feet, 6 inches
Height of bed.....	12 inches
Overhang.....	1 foot, 11 inches

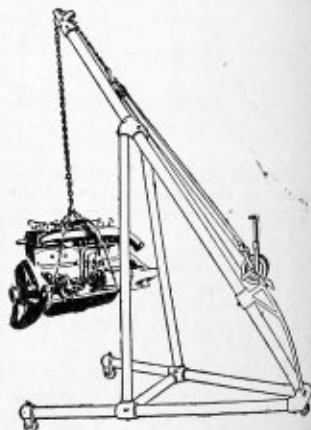
The "Pull-U-Out" Portable Crane

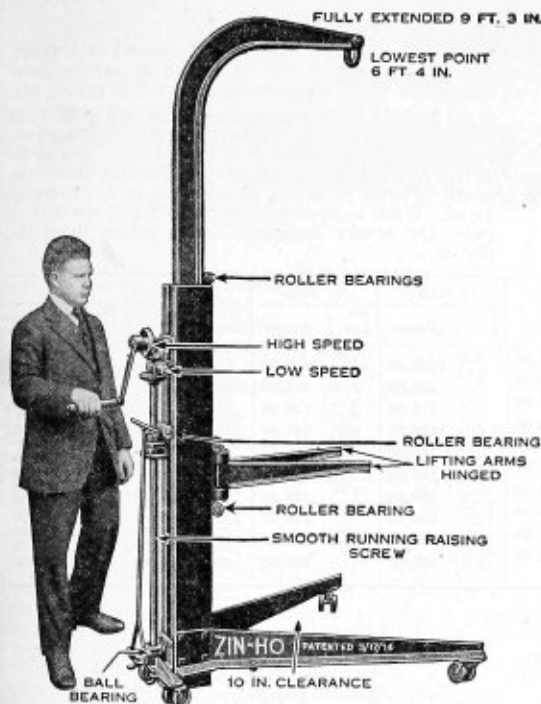
This unique and handy crane consists of the famous "Pull-U-Out" attached to a floor crane constructed of 2½-inch extra heavy steel tubing, slip jointed, that can be put together in five minutes with a monkey wrench. Cannot be tipped over. The "Pull-U-Out" can be instantly detached and used for various hoisting or pulling jobs around the plant.

Base 3 feet 3 inches wide, 6 feet deep. Lift 9 feet 6 inches. Total height 10 feet. Weight 250 pounds.

Erecting instructions furnished with crane.
Shipped ready to put together.

Price, complete, with "Pull-U-Out".....\$50.00





Duplex Portable Crane

Guaranteed lifting capacity of 4000 pounds. No chains to slip. Load held at any point without brakes or dogs.

Swing arms out of way if you wish to use boom only. Has two speeds easily operated by one man. Load is raised by smooth running screw, enabling operator to raise or lower load to a decimal part of an inch.

Every garage needs them for removing engines, transmissions, bodies, and for jacking up cars, etc. All machine shops need them. The fine thread lifting screw enables the operator to stop machinery with ease and exactness.

Shipping rooms and freight houses use them for transferring loads to platforms, cars, trucks, etc.

Weight, 3000 pounds.

Price \$85.00

Hand Power Pillar Cranes

These cranes are extensively used by railroads and on docks for locations where a top support is not available. We make them in a variety of designs, with and without auxiliary or whip hoists. The pillar is made of either cast iron or steel, as conditions require.

They may be made for operation by hand power or by electric power, or, in some cases, by direct acting air hoists. The straight boom is standard.

Hand Power List

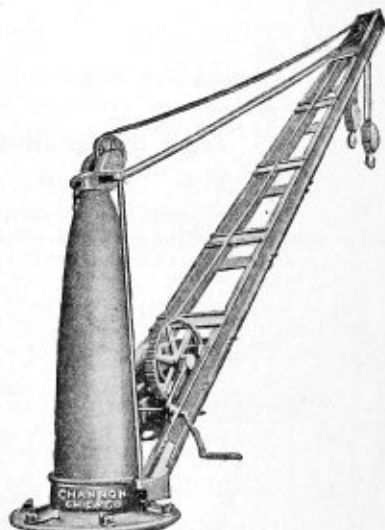
Standard capacities, 2, 3, 5, 7½, 10 and 15 tons.

Standard radius, 15 feet.

Special radii to order, 10, 12, 15, 20 feet.

The cut shows double block design with auxiliary power whip hoist. The standard type has only one block.

Prices on application



All Steel Bracket Jib Cranes

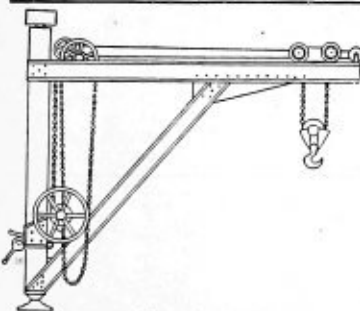


Prices include Plain Trolley but no Hoist.

With chain hoist attached to trolley—load can be raised or lowered, moved in and out or swung from side to side—a simple, inexpensive crane for attachment to columns or walls, supplementing traveling cranes, etc.

All parts of these cranes are of steel, pintle bearings are babbitted and lubricated by compression grease cups. Full length mast is of turned shafting and diagonal rods are threaded both ends allowing for adjustment. Factor of safety figured is 5 to 1 for cranes listed. Walls or posts must have sufficient strength to resist the severe horizontal forces acting upon the pintles.

Effective Radius	Ratio R to H	1½ Ton		1 Ton		1½ Tons		2 Tons		2½ Tons		3 Tons		4 Tons	
		Wt., Lbs.	Price	Wt., Lbs.	Price	Wt., Lbs.	Price	Wt., Lbs.	Price	Wt., Lbs.	Price	Wt., Lbs.	Price	Wt., Lbs.	Price
10 0	2-1	375		425		500	\$ 95.00	600		725		775	\$125.00	1075	\$180.00
10 0	3-1	375	\$ 70.00	425	\$ 75.00	550	110.00	600	\$105.00	725	\$120.00	900	145.00	1175	205.00
10 0	4-1	375		425		550		725	125.00	850	145.00	1000	170.00	1200	205.00
12 6	2-1	450		500		625	105.00	700	115.00	800	130.00	925	140.00	1200	190.00
12 6	3-1	450	85.00	500	90.00	675	120.00	700		800		1050	160.00	1300	230.00
12 6	4-1	450		500		675		825	145.00	925	160.00	1150	190.00	1300	230.00
15 0	2-1	550		600		700	120.00	900	135.00	1000	150.00	1050	150.00	1400	210.00
15 0	3-1	550	95.00	600	100.00	750	135.00	900	145.00	1000	160.00	1175	170.00	1500	240.00
15 0	4-1	550		600		750		1025	145.00	1200	180.00	1275	210.00	1500	240.00
17 6	2-1	700		750		875	142.00	1050	150.00	1200	168.00	1300	175.00	1700	240.00
17 6	3-1	700	100.00	750	110.00	925	150.00	1175	180.00	1325	195.00	1550	220.00	1850	270.00
17 6	4-1	700		750		925		1100	155.00	1300	168.00	1375	180.00	1700	245.00
20 0	2-1	800		850		950	140.00	1100	155.00	1300	168.00	1500	195.00	1800	270.00
20 0	3-1	800	110.00	850	115.00	1025	155.00	1250	180.00	1450	200.00	1625	230.00	1850	270.00
20 0	4-1	800		850		1025									



Type A

Single Braced Jib Cranes

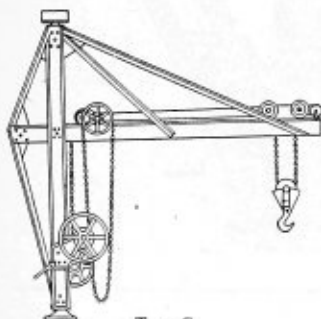
Type A

Usually the single braced jib can be constructed at a lower cost than any other type. It represents the simplest form of jib crane and is adaptable in nearly all locations.

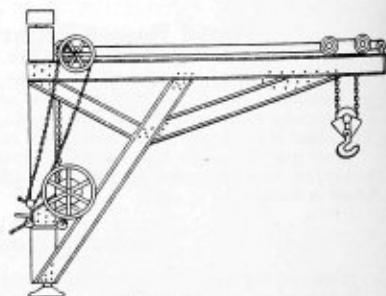
Triple Braced Jib Cranes

Type B

The triple braced frame is most suitable for locations requiring ample clearance under the jib and proportionately large radius of jib.



Type C



Type B

Top Braced Jib Cranes

Type C

The top braced jib is adapted to high ceilings and to yard use. It possesses the advantage of a perfectly clear space under the jib. This type cannot be advantageously used where ceiling is low unless the jib is comparatively short.

Give capacity, height of mast, length of jib, type of frame, most available power and class of work.

Hand Power Traveling Bridge Cranes

Single I Beam Type—Roller Bearing



Capacity up to 5 Tons—Spans up to 35 ft.

Illustration Shows Racking Device to Propel Both Bridge and Trolley—Also Furnished Without

This is the simplest form of traveling bridge crane—can be used with plain trolley and without racking device, in the light sizes, in which case the trolley is moved on the I beam and the crane propelled on its tracks—by simply pushing on the load suspended from a chain hoist hooked into the trolley. Or—the crane may have geared trolley and also racking device with pendant floor chains to propel both bridge and trolley—as shown in above cut.

Safety is secured by using parts amply strong, with margin of safety much in excess of rated load. All cranes are figured for a factor of safety of not less than five—after making all deductions for length, concentrated load, side pull, lack of lateral support, etc.—and, by using cast steel instead of cast iron, wherever heavy stresses are encountered. Cranes are also figured for deflection as well as stresses.

End Trucks.—Each crane end is a single piece casting bolted to the bridge beam in such a manner that the bolts bear no portion of the strain due to the crane load. Additional bracing is secured by heavy diagonals from end to bridge—see illustration above. The ends have long wheel-base, 60 to 66 inches, and the ends are forked to receive the wheels. This self-contained feature makes erection a simple matter and the cost of installation low. By this design of solid cast forked end trucks—minimum end clearance is secured—avoiding over-hung wheels, which are most unsatisfactory. Small end clearance decreases the cost of supporting brackets for runway rails, decreases the strain on posts or wall and increases the effective span of the crane. The wheels are large in diameter, 17 to 19 inches, insuring least bearing movement for given travel, have machined treads and are bushed with Hyatt flexible roller bearings, and revolve around hollow shafts that are held stationary by a bolt passing through fork and shaft, binding them firmly together—these bolts are positively locked and cannot work loose. Owing to the above features—only the minimum amount of energy is required to move them, as no expense has been spared to the end that frictional losses be eliminated.

Trolleys.—In this type of crane travel upon the lower flange of the single I beam—saving headroom. Trolleys may be plain or geared as desired—for the heavier loads the geared type operated by pendant hand chains are recommended—see preceding pages for styles and prices.

Hoists.—Chain hoist of all types will be found listed on preceding pages.

Size of Beams—Approximate Weight, without Hoists—Span, Outside to Outside of Rails

Capacity, Tons	15-foot Span	17 1/2-foot Span	20-foot Span	22 1/2-foot Span	25-foot Span	27 1/2-foot Span	30-foot Span	32 1/2-foot Span	35-foot Span
1/2	6 in. Plain 950 lbs.	7 in. Plain 1025 lbs.	8 in. Plain 1125 lbs.	9 in. Plain 1325 lbs.	9 in. Plain 1400 lbs.	10 in. Plain 1550 lbs.	10 in. Plain 1600 lbs.	8 in. Reinf. 1700 lbs.	8 in. Reinf. 1900 lbs.
1	8 in. Plain 1125 lbs.	9 in. Plain 1225 lbs.	10 in. Plain 1300 lbs.	10 in. Plain 1425 lbs.	10 in. Plain 1725 lbs.	12 in. Plain 1800 lbs.	10 in. Reinf. 1900 lbs.	10 in. Reinf. 2100 lbs.	10 in. Reinf. 2425 lbs.
1 1/2	9 in. Plain 1300 lbs.	10 in. Plain 1425 lbs.	12 in. Plain 1750 lbs.	12 in. Plain 1850 lbs.	15 in. Plain 2225 lbs.	15 in. Plain 2325 lbs.	12 in. Reinf. 2400 lbs.	12 in. Reinf. 2650 lbs.	12 in. Reinf. 3000 lbs.
2	10 in. Plain 1375 lbs.	12 in. Plain 1700 lbs.	12 in. Plain 1750 lbs.	15 in. Plain 2100 lbs.	15 in. Plain 2225 lbs.	15 in. Plain 2325 lbs.	12 in. Reinf. 2700 lbs.	15 in. Reinf. 2850 lbs.	15 in. Reinf. 3100 lbs.
2 1/2	12 in. Plain 1650 lbs.	12 in. Plain 1725 lbs.	15 in. Plain 2300 lbs.	15 in. Plain 2400 lbs.	15 in. Plain 2525 lbs.	15 in. Reinf. 2900 lbs.	15 in. Reinf. 3060 lbs.	15 in. Reinf. 3325 lbs.	15 in. Reinf. 3650 lbs.
3	12 in. Plain 1650 lbs.	15 in. Plain 2200 lbs.	15 in. Plain 2300 lbs.	15 in. Plain 2400 lbs.	18 in. Plain 2975 lbs.	15 in. Reinf. 3000 lbs.	15 in. Reinf. 3200 lbs.	15 in. Reinf. 3500 lbs.	18 in. Reinf. 4000 lbs.
3 1/2	12 in. Plain 1650 lbs.	15 in. Plain 2200 lbs.	15 in. Plain 2300 lbs.	18 in. Plain 2850 lbs.	18 in. Plain 2975 lbs.	15 in. Reinf. 3050 lbs.	18 in. Reinf. 3600 lbs.	18 in. Reinf. 3800 lbs.	18 in. Reinf. 4050 lbs.
4	15 in. Plain 2225 lbs.	15 in. Plain 2350 lbs.	15 in. Plain 2450 lbs.	18 in. Plain 2850 lbs.	18 in. Plain 2975 lbs.	18 in. Reinf. 3400 lbs.	18 in. Reinf. 3600 lbs.	18 in. Reinf. 3875 lbs.	18 in. Reinf. 4250 lbs.
5	15 in. Plain 2225 lbs.	15 in. Plain 2350 lbs.	18 in. Plain 2600 lbs.	18 in. Plain 2850 lbs.	20 in. Plain 3500 lbs.	18 in. Reinf. 3500 lbs.	18 in. Reinf. 3900 lbs.	20 in. Reinf. 4450 lbs.	20 in. Reinf. 4850 lbs.

Capacity given is the net safe load that can be handled, as the weight of trolley as well as the hoist has been absorbed. These cranes will stand an occasional overload of 50 to 100 per cent without harm, but such practice is bad and can not be advised. "Reinf." beams in table above are reinforced with a channel on top.

Prices quoted upon request.

Hand Power Traveling Bridge Cranes

Double I Beam Types—Roller Bearing



Crane with trolley inside bridge—racking device and geared trolley.



Crane with trolley on top of bridge—racking device and geared trolley.

The double I beam cranes, above illustrated, whether formed of channels, I beams or I beams reinforced with channels—with trolley on top or between beams—all have the characteristics described in our single I beam type on preceding page—of large factor of safety, rigidity, large diameter wheels, Hyatt flexible roller bearings and single piece crane ends with long wheel bases.

Double beam cranes are made in spans up to 40 feet and in capacities up to 12 tons. The bridge or trolley can be propelled by hand chains reaching to the floor. The hand chain sheaves are attached direct to the wheels on trolleys 4 tons capacity or under and geared to wheels on trolleys larger than 4 tons capacity. When the bridge is propelled by hand chains a squaring shaft is used which is connected to the crane wheels by internal gearing.

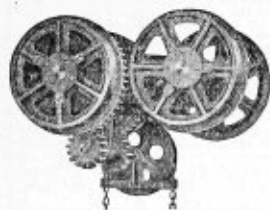
Cranes, with the trolley inside the beams, save headroom and permit runway rails being placed very close to the ceiling. Their clearances are almost identical with our single I beam cranes, as the trolley runs entirely inside the bridge.

Wheels have extra long hubs, providing a larger bearing surface than usual—are large in diameter, insuring least bearing movement. Treads are machined and hubs bushed with steel liners and Hyatt flexible roller bearings which reduce friction losses to an extent that, for ease of movement, these cranes are unsurpassed.

The roller bearing consists of a set of spiral rollers mounted in a simple, effective cage, which constitutes the whole bearing. Under all conditions there is a line of contact the full length of the roller. The hollows of the rollers act as oil reservoirs. Their alternate right and left spirals carry the oil back and forth and take up any grit or dirt.

We can furnish these cranes with electrically operated bridge travel if desired. The electric motor is fully enclosed and drives the squaring shaft through compound gears, the first pair of which is machine cut from the solid to insure perfect mesh. The controller may be placed wherever desired and controlled from the floor by means of pendant hand ropes or chains, doing away with the necessity of having an operator's cage. A centering spring on controller brings the arm to full "off" position when operator releases the control rope. This makes an efficient power travel, capable of doing as much as larger and much more expensive outfits.

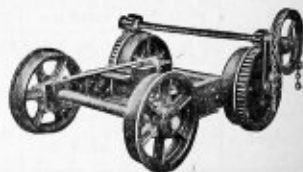
Hoists for use with these cranes will be found listed on preceding pages.



Trolley to go between bridge beams



Crane wheel with Flexible Roller Bearings

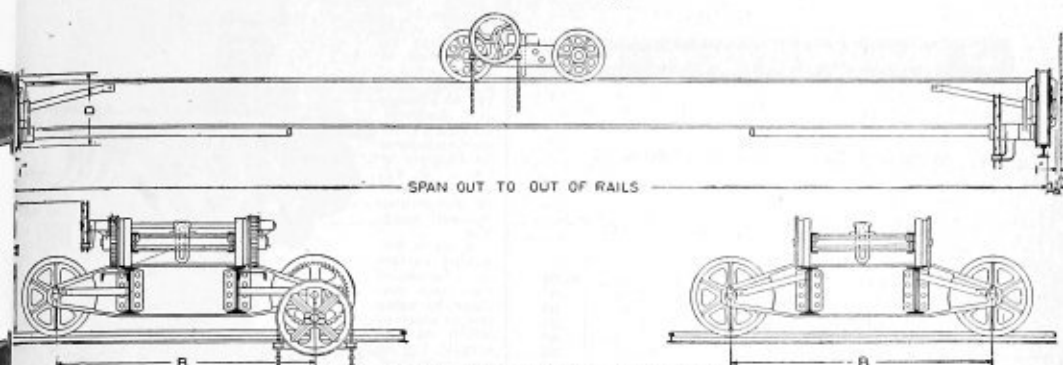


Trolley to run on top of bridge beams. Shows trolley for over 5000 lbs. capacity.

Prices quoted upon request.

Hand Power Traveling Bridge Cranes

Double I Beam Types



WEIGHTS AND APPROXIMATE DIMENSIONS

SPAN—OUTSIDE TO OUTSIDE OF CRANE RAILS—DIMENSIONS ARE IN INCHES

Capacity in Tons See Note	15 Ft.	17 1/2 Ft.	20 Ft.	22 1/2 Ft.	25 Ft.	27 1/2 Ft.	30 Ft.	32 1/2 Ft.	35 Ft.	37 1/2 Ft.	40 Ft.
	Weight Beam A B-D	Weight Beam A B-D	Weight Beam A B-D	Weight Beam A B-D	Weight Beam A B-D	Weight Beam A B-D	Weight Beam A B-D	Weight Beam A B-D	Weight Beam A B-D	Weight Beam A B-D	Weight Beam A B-D
1/2	1650 8C-22 60-16	1850 9C-22 60-16	2000 10C-22 60-16	2100 10C-22 60-16	2150 8CR-22 60-16	2350 9CR-22 60-16	2450 9CR-22 60-16	2650 10CR-22 60-16	3050 10CR-22 60-16	.....	.....
1	1850 10C-24 60-16	1950 8CR-22 60-16	2100 9CR-23 60-16	2200 9CR-23 60-16	2350 10CR-24 60-16	2700 10P-24 60-16	3500 12P-27 66-16	3650 12P-27 66-16	3650 12CR-27 66-16	.....	.....
1 1/2	1850 8P-25 66-16	1950 8P-25 66-16	2150 9P-26 66-16	2450 10P-27 66-16	2550 10P-27 66-16	3200 12P-27 66-16	3350 12P-27 66-16	3300 9R-26 66-16	3700 10R-27 66-16	4600 15P-27 66-16	5000 12R-27 66-16
2	2000 8P-25 66-16	2100 9P-26 66-16	2400 10P-27 66-16	2950 12P-27 66-16	3100 12P-27 66-16	3300 12P-27 66-16	3350 10R-27 66-16	3600 10R-27 66-16	4500 15P-27 66-16	4600 12R-27 66-16	5900 15R-27 66-16
2 1/2	2000 8P-26 66-18	2300 10P-28 66-18	2400 10P-28 66-18	3000 12P-28 66-18	3150 12P-28 66-18	4200 15P-28 66-18	3500 10R-28 66-18	4200 12R-28 66-18	4400 12R-28 66-18	4700 12R-28 66-18	6200 15R-28 66-18
3	2250 10P-28 66-18	2400 10P-28 66-18	2900 12P-28 66-18	3000 12P-28 66-18	4100 15P-28 66-18	4300 15P-28 66-18	4500 15P-28 66-18	4300 12R-28 66-18	4600 12R-28 66-18	5900 15R-28 66-18	6500 15R-28 66-18
4	2250 10P-28 66-18	2800 12P-28 66-18	2900 12P-28 66-18	3300 15P-28 66-18	4100 15P-28 66-18	4300 15P-28 66-18	4100 12R-28 66-18	5300 15R-28 66-18	5600 15R-28 66-18	6000 15R-28 66-18	7300 18R-28 66-18
5	2700 12P-33 66-18	2900 12P-33 66-18	3800 15P-33 66-18	4000 15P-33 66-18	4200 15P-33 66-18	5100 18P-33 66-18	5400 18P-33 66-18	5400 15R-33 66-18	5700 15R-33 66-18	7100 18R-33 66-18	7600 18R-33 66-18
6	2700 12P-33 66-18	3500 15P-33 66-18	3800 15P-33 66-18	4500 18P-33 66-18	4800 18P-33 66-18	5100 18P-33 66-18	5100 15R-33 66-18	5500 15R-33 66-18	6500 18R-33 66-18	7100 18R-33 66-18	7600 18R-33 66-18
8	3500 15P-36 66-18	3700 15P-36 66-18	3900 15P-36 66-18	5000 18P-39 66-18	5200 18P-39 66-18	6100 20P-39 72-18	6400 20P-39 72-18	6600 18R-39 72-18	7000 18R-39 72-18	8300 20R-39 72-18	8800 20R-39 72-18
10	3700 15P-39 66-18	4400 18P-39 72-18	4700 18P-39 72-18	5400 20P-39 72-18	5700 20P-39 72-18	5900 18R-39 72-18	6400 18R-39 72-18	7200 20R-39 72-18	7700 20R-39 72-18	8400 20R-39 72-18	.....

Capacity given is the net safe load that can be handled, as the weight of the trolley as well as the hoist has been absorbed. Weight given is the net shipping weight of simple crane and trolley without the hoist or pendant hand chains for propelling.

Referring to the line drawing above, the dimensions in the order given are: Weight of crane in pounds; "Beam" depth given in inches. Letters C, CR, P, or PR after beam signifies: C is plain channel and CR denotes reinforced channel; P indicates plain I beam and R means reinforced I beam; A is dimension over hand chain wheel of geared trolley; B is wheelbase and D is diameter of wheels. Certified blue prints with exact dimensions furnished upon request.

Cold Rolled Steel Shafting



Standard Gauge and Straightened

Diameter	Weight per Ft.	Price per Lb.	Diameter	Weight per Ft.	Price per Lb.
$\frac{1}{8}$	.0414	\$0.09 $\frac{1}{2}$	$2\frac{1}{8}$	11.35	\$0.05
$\frac{3}{16}$	.066	.09 $\frac{1}{2}$	$2\frac{1}{4}$	12.07	.05
$\frac{1}{4}$	.095	.07 $\frac{1}{2}$	$2\frac{3}{8}$	12.80	.05
$\frac{5}{16}$	.168	.06 $\frac{1}{2}$	$2\frac{1}{2}$	13.52	.05
$\frac{3}{8}$	.260	.06 $\frac{1}{2}$	$2\frac{5}{8}$	14.35	.05
$\frac{7}{16}$	.375	.05 $\frac{1}{2}$	$2\frac{3}{4}$	15.07	.05
$\frac{1}{2}$	.511	.06	$2\frac{7}{8}$	15.90	.05
$\frac{9}{16}$	.667	.06	$2\frac{1}{2}$	16.70	.05
$\frac{5}{8}$	.845	.06	$2\frac{5}{8}$	17.55	.05
$\frac{3}{4}$	1.05	.05 $\frac{1}{2}$	$2\frac{3}{4}$	18.41	.05
$\frac{7}{8}$	1.26	.05 $\frac{1}{2}$	$2\frac{1}{4}$	19.31	.05
1	1.50	.05 $\frac{1}{2}$	$2\frac{1}{8}$	20.21	.05
$1\frac{1}{8}$	1.77	.05 $\frac{1}{2}$	$2\frac{3}{8}$	21.15	.05
$1\frac{1}{4}$	2.05	.05 $\frac{1}{2}$	$2\frac{1}{2}$	22.10	.05
$1\frac{1}{2}$	2.35	.05 $\frac{1}{2}$	$2\frac{5}{8}$	23.05	.05
$1\frac{3}{4}$	2.68	.05 $\frac{1}{2}$	$2\frac{3}{4}$	24.05	.05
$1\frac{1}{2}$	3.02	.05 $\frac{1}{2}$	$2\frac{7}{8}$	25.07	.05 $\frac{1}{2}$
$1\frac{3}{4}$	3.38	.05 $\frac{1}{2}$	$3\frac{1}{8}$	26.10	.05 $\frac{1}{2}$
$1\frac{1}{2}$	3.77	.05 $\frac{1}{2}$	$3\frac{1}{4}$	27.16	.05 $\frac{1}{2}$
$1\frac{3}{4}$	4.17	.05 $\frac{1}{2}$	$3\frac{3}{8}$	28.22	.05 $\frac{1}{2}$
$1\frac{1}{2}$	4.61	.05 $\frac{1}{2}$	$3\frac{1}{2}$	29.40	.05 $\frac{1}{2}$
$1\frac{3}{4}$	5.05	.05 $\frac{1}{2}$	$3\frac{3}{4}$	30.43	.05 $\frac{1}{2}$
$1\frac{1}{2}$	5.52	.05 $\frac{1}{2}$	$3\frac{5}{8}$	31.58	.05 $\frac{1}{2}$
$1\frac{3}{4}$	6.01	.05 $\frac{1}{2}$	$3\frac{1}{2}$	32.73	.05 $\frac{1}{2}$
$1\frac{1}{2}$	6.52	.05 $\frac{1}{2}$	$3\frac{3}{4}$	33.96	.05 $\frac{1}{2}$
$1\frac{3}{4}$	7.06	.05 $\frac{1}{2}$	$3\frac{5}{8}$	35.20	.05 $\frac{1}{2}$
$1\frac{1}{2}$	7.61	.05 $\frac{1}{2}$	$3\frac{3}{4}$	36.40	.05 $\frac{1}{2}$
$1\frac{3}{4}$	8.18	.05 $\frac{1}{2}$	$3\frac{1}{2}$	37.57	.05 $\frac{1}{2}$
$1\frac{1}{2}$	8.78	.05 $\frac{1}{2}$	$3\frac{3}{4}$	38.66	.05 $\frac{1}{2}$
$1\frac{3}{4}$	9.39	.05 $\frac{1}{2}$	$3\frac{5}{8}$	39.95	.05 $\frac{1}{2}$
$1\frac{1}{2}$	10.03	.05 $\frac{1}{2}$	$3\frac{1}{2}$	41.40	.05 $\frac{1}{2}$
2	10.70	.05	4	42.75	.05

Quantity Differentials

All specifications for less than 1,000 pounds of a size will be subject to the following extras, the total weight of a size ordered to determine the extra, regardless of length and regardless of the exact quantity actually shipped:

500 to 999 pounds.....	\$0.05 per 100 pounds net
100 to 499 pounds.....	.10 per 100 pounds net
Less than 100 pounds.....	.20 per 100 pounds net

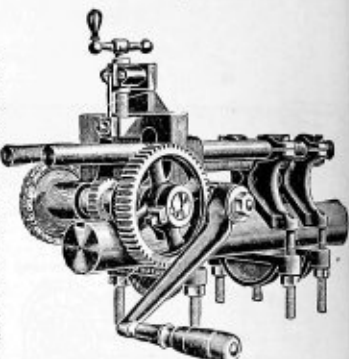
The above prices are for bars from 5 to 24 feet inclusive. Extras for short and long lengths.

Lengths—In.	Rounds	Squares	Flats	Hexagons
3 to 5 $\frac{1}{8}$	\$1.00	\$1.00	\$2.00	\$1.00
6 to 11 $\frac{1}{8}$	.50	.50	1.00	.50
12 to 23 $\frac{1}{8}$	.25	.50	.50	.25
24 to 50 $\frac{1}{8}$	.10	.25	.25	.10

24 feet long and less than 30 feet, \$0.50 per 100 lb. net extra.
 30 feet long and less than 35 feet, \$1.00 per 100 lb. net extra.
 35 feet long and less than 40 feet, \$1.50 per 100 lb. net extra.
 40 feet long and less than 45 feet, \$2.00 per 100 lb. net extra.
 45 feet and longer, \$2.00 per 100 lb. net extra.

Burr Portable Key Seater

No. 1
 Will mill key seats in the middle or on the ends of shafting, from $\frac{1}{4}$ to 5 inches in diameter, without removing it from its hangers or boxes. It will mill a key seat 12 inches long without resetting.



A set of five milling cutters is furnished with each machine, by using one or more of which on the spindle, key seats of any of the following sizes may be cut with one operation: $\frac{1}{4}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{5}{8}$, $\frac{3}{4}$, $\frac{7}{8}$, 1 , $1\frac{1}{4}$, $1\frac{1}{2}$, $1\frac{3}{4}$, 2 , $2\frac{1}{4}$, $2\frac{1}{2}$, $2\frac{3}{4}$, 3 , $3\frac{1}{4}$, $3\frac{1}{2}$, $3\frac{3}{4}$, 4 , $4\frac{1}{4}$, $4\frac{1}{2}$, $4\frac{3}{4}$, 5 .

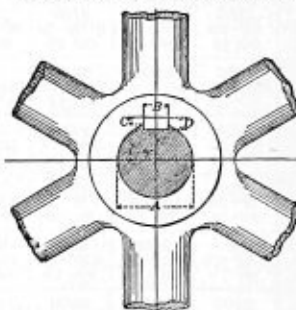
No. 1. Price each.....\$50.00
 Weight, net, 76 pounds.

No. 2 will mill key seats in the middle or on the ends of shafting from $\frac{1}{4}$ inches to 8 inches in diameter, without removing it from its hangers.

Five milling cutters are furnished with each machine. Will cut with one operation the same sizes as No. 1.

No. 2. Price each.....\$100.00
 Weight, net, 200 pounds.

For other key seating machines, see index.



Standard Key Seats

Where key seats are required in shafting, pulleys, wheels, etc., we will cut them according to the following standard list unless otherwise ordered:

Diameter of Shaft, Inches	Width of Key Seat "B," Inch	Diameter of Shaft, Inch	Width of Key Seat "B," inch
$\frac{5}{8}$ to $1\frac{1}{4}$	$\frac{1}{4}$	$3\frac{3}{4}$ to $4\frac{3}{4}$	1
$1\frac{1}{8}$ to $1\frac{3}{8}$	$\frac{3}{8}$	$4\frac{3}{4}$ to $4\frac{7}{8}$	$1\frac{1}{4}$
$1\frac{1}{4}$ to $1\frac{1}{2}$	$\frac{1}{2}$	$4\frac{7}{8}$ to $5\frac{1}{8}$	$1\frac{1}{4}$
$1\frac{1}{2}$ to $2\frac{1}{8}$	$\frac{3}{4}$	$5\frac{1}{8}$ to $5\frac{3}{8}$	$1\frac{1}{2}$
$2\frac{1}{8}$ to $2\frac{1}{4}$	$\frac{7}{8}$	$5\frac{3}{8}$ to $6\frac{1}{8}$	$1\frac{1}{2}$
$2\frac{1}{4}$ to $2\frac{3}{4}$	1	$6\frac{1}{8}$ to $6\frac{3}{4}$	$1\frac{3}{4}$
$2\frac{3}{4}$ to $3\frac{1}{8}$	$1\frac{1}{4}$	$6\frac{3}{4}$ to $7\frac{1}{8}$	$1\frac{3}{4}$

Price List for Key Seating Shafting

Diameter Shaft	Key Seat for Coupling Each End	Key Seats, One Foot Long or Less	Each Additional Foot or Fraction of Foot
$\frac{1}{2}$	\$1.06	\$1.36	\$0.50
$1\frac{1}{8}$	1.06	1.36	.50
$1\frac{1}{4}$	1.20	1.36	.60
$1\frac{1}{2}$	1.20	1.50	.70
$2\frac{1}{8}$	1.20	1.50	.70
$2\frac{1}{4}$	1.36	1.64	.90
$2\frac{3}{8}$	1.36	1.64	.90
$2\frac{1}{2}$	1.50	2.00	1.40
$3\frac{1}{8}$	1.64	2.50	1.50
$3\frac{1}{4}$	1.64	2.50	1.50
$3\frac{3}{8}$	2.14	2.50	1.50

Flange or Plate Couplings

Finished all over, key seated and keys furnished; they have finished bolts fitted to reamed holes. Reducing couplings charged at the rate of the larger size, plus 10%.

Price Each, Including Keys

Size shaft, inches	1 1/8	1 1/2	1 3/4	2	2 1/4	2 1/2	2 3/4	3
Price, not fitted	\$ 7.50	\$ 8.00	\$ 8.50	\$ 9.00	\$10.50	\$12.50	\$15.25	\$21.75
Price, fitted	11.25	12.00	12.75	13.50	15.25	17.75	21.00	27.75
Size shaft, inches	3 1/8	3 1/2	3 3/4	4	4 1/4	4 1/2	4 3/4	5 1/2
Price, not fitted	\$25.25	\$29.25	\$33.25	\$38.25	\$43.25	\$49.00	\$54.75	\$81.00
Price, fitted	33.00	37.75	42.75	48.25	53.75	60.00	66.25	96.50

Price fitted includes key-seating shafts, fitting and facing couplings on same.

Solid Sleeve Couplings For Light Shafting

Have countersunk set screws, and are finished over entire surface.

Size, inches	1 1/2	2	3	4	5	6	8
Price each	\$2.00	\$2.50	\$3.00	\$3.50	\$4.00	\$4.00	\$5.00

Ribbed Compression Couplings

Complies with all legal requirements as to safety by having bolt heads and nuts protected. This coupling, when securely clamped to the shaft without key, develops marked driving efficiency. Reducing couplings charged at the rate of the larger size, plus 10%.

Price Each, Including Keys

Size shaft, inches	1 1/8	1 1/2	1 3/4	2	2 1/4	2 1/2	2 3/4
Price each	\$3.05	\$4.30	\$6.30	\$7.40	\$9.00	\$10.00	\$11.00
Size shaft, inches	2 1/2	3	3 1/2	4	4 1/2	5	6
Price each	\$13.00	\$16.50	\$20.00	\$24.00	\$28.00	\$42.00	

Keyless Compression Flange Coupling

No keys or key seating necessary to attach these couplings.

Sizes 2 1/2-inch and Smaller

Size shaft, inches.....	$\frac{1}{2}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	$1\frac{3}{4}$	2	$2\frac{1}{4}$	$2\frac{1}{2}$	$2\frac{3}{4}$	3
Price each.....	\$4.75	\$4.75	\$4.75	\$5.50	\$5.50	\$6.25	\$8.00	\$9.00	\$10.75	\$12.00
Size shaft, inches.....	$2\frac{1}{2}$	3	$3\frac{1}{2}$	$3\frac{3}{4}$	4	$4\frac{1}{2}$	$4\frac{3}{4}$	5	$5\frac{1}{2}$	6
Price each.....	\$16.00	\$32.50	\$39.25	\$45.25	\$51.25	\$61.50	\$71.75	\$83.00	\$94.00	\$111.00

Reducing couplings, add 10 per cent to above prices.

Larger than 2 1/2 Inches

Safety Set Collars

Made in all sizes—solid and split. To comply with all legal requirements as to safety by having set screws and bolts protected. Finished and polished on periphery and faced on ends.

Solid

Split

Size, inches.....	1/2	1	1 1/4	1 1/2	1 3/4	2	2 1/4	2 1/2	2 3/4
Solid—Price each.....	\$0.65	\$0.80	\$0.80	\$1.00	\$1.20	\$1.40	\$1.60	\$1.80	\$2.10
Split—Price each.....	.95	1.20	1.20	1.50	1.80	2.10	2.40	2.80	3.15
Size, inches.....	2 1/2	3	3 1/2	4	4 1/2	5	6	8	10
Solid—Price each.....	\$2.40	\$2.70	\$3.00	\$3.30	\$3.60	\$4.15	\$4.70	\$5.20	\$5.90
Split—Price each.....	3.60	4.05	4.50	4.95	5.40	6.25	7.05	7.95	8.85

Prices given herein are net. All discounts have been deducted.

Power Transmission Equipment



Drop Hangers

Adjustable ball and socket type, with double braces.

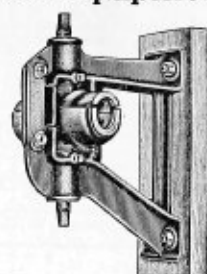
Standard babbitted bearings, reamed and faced.

All adjustments are full machined and shafting is easily lined up.

Price Each

Diameter Shaft	8 in. Drop	10 in. Drop	12 in. Drop	14 in. Drop	16 in. Drop	18 in. Drop	20 in. Drop	24 in. Drop
1/2"	\$3.85	\$4.00	\$4.20	\$4.45				
3/4"	3.95	4.10	4.30	4.55				
1"	4.90	5.05	5.25	5.50	\$5.60	\$6.00	\$6.45	
1 1/8"	5.00	5.15	5.35	5.60	5.70	6.10	6.55	
1 1/4"	6.85	7.35	7.50	7.80	8.05	8.30	8.80	\$9.65
1 1/2"	8.70	9.05	9.20	9.70	10.30	10.75	11.65	13.35
2"	9.35	9.70	9.85	10.35	10.95	11.40	12.30	14.00
2 1/2"	10.85	11.35	11.65	12.35	13.35	14.45	15.60	17.75
3"	12.80	13.30	13.60	14.30	15.30	16.40	17.45	19.70
3 1/2"		16.85	17.40	18.15	18.65	20.05	21.95	25.15

Capillary or ring-oiling bearings may be had at slight extra charge. Larger sizes on application.



Extension Wall Hangers

Complete with bearings.

This bracket gives maximum distance from walls and is more convenient, durable and considerably easier to install than the old style wall bracket.

Shaft Size, Inches	Distance Wall to Center of Shaft, Inches	With Bearings of	
		Standard Type	Ring Type
1 1/2"	12	\$5.15	\$ 6.35
1 1/4"	12	5.70	6.70
1 1/8"	12	5.80	7.00
1 1/2"	12	8.35	10.50
1 1/4"	18	6.20	7.40
1 1/8"	18	6.75	7.75
1 1/2"	18	6.85	8.00
1 1/4"	18	9.65	11.80

Pillow Blocks

Rigid type and heavy pattern. Babbitted bearings reamed to size, ends faced. Sizes smaller than 2 1/4" have only two bolts.

Diameter of shaft, inches.	1 1/2"	1 1/4"	1 1/8"	1"
Price each	\$1.30	\$1.60	\$2.10	\$2.70
Diameter of shaft, inches.	2"	2 1/4"	3"	3 1/2"
Price each	\$4.60	\$5.50	\$7.00	\$8.00



Common Flat Boxes

While low in price, these boxes are well made.

They are babbitted, bored and reamed to size.

Diameter of shaft, inches.	1 1/2"	1 1/4"	1 1/8"	1"
Price each	\$1.00	\$1.35	\$1.65	\$2.00
Diameter of shaft, inches.	2"	2 1/4"	3"	3 1/2"
Price each	\$2.80	\$3.40	\$4.10	\$5.00



Solid Journal Bearings

For use where lowest price is an object. Bearings are babbitted, bored and reamed. Oil pocket position permits use in vertical position when so desired.

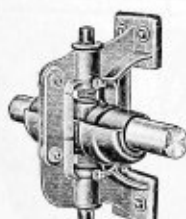
Diameter of shaft, inches.	1 1/2"	1 1/4"	1 1/8"	1"
Price each	\$0.95	\$1.20	\$1.50	\$1.80
Diameter of shaft, inches.	2"	2 1/4"	3"	3 1/2"
Price each	\$2.70	\$3.20	\$3.60	\$4.50



Adjustable Ball and Socket Pillow Blocks

In addition to the ball and socket connection of the bearing in the frame, this pillow block offers the additional advantage of a vertical adjustment of the bearing, which makes it possible to line up the shafting.

Size of shaft, inches.	1 1/2"	1 1/4"	1 1/8"	1"
Price, standard bearing	\$4.45	\$4.55	\$6.65	\$ 8.70
Price R. O. bearings	5.45	5.70	8.80	10.95
Size of shaft, inches.	2"	2 1/4"	3"	3 1/2"
Price, standard bearing	\$13.45	\$15.40	\$19.55	\$20.00
Price R. O. bearing	16.40	19.00	28.25	31.00



Post Hangers

Adjustable ball and socket type with double braces.

Bearings reamed and faced.

Bases are ground to a flat, even surface so that no shimming or wedging is necessary to get a firm stand on beams or posts.

Diameter of shaft, inches	1/2"	3/4"	1"	1 1/4"	1 1/2"
Price, standard bearings	\$4.40	\$4.50	\$5.50	\$5.60	\$7.15
Price, ring-oiling		5.70	6.50	6.75	9.30
Diameter of shaft, inches	2"	2 1/4"	3"	3 1/2"	4"
Price, standard bearings	\$9.75	\$10.40	\$13.00	\$15.00	\$19.45
Price, ring-oiling	12.00	12.65	16.00	18.70	27.70



Post Bearings

Rigid Type, Heavy Pattern

Distance from post to center of shaft, 6 inches.

Bearings are reamed, ends faced. Vertical adjustment by elongated slots in base. Ring-oiling type has four bolt holes.

Std. up to 3-inch

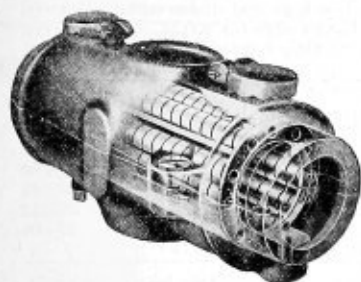
Diameter of shaft, inches	1 1/2"	1 1/4"	1 1/8"	1"
Price, standard bearings	\$3.60	\$4.10	\$5.45	\$ 7.35
Price, ring-oiling	4.70	5.35	7.00	9.10
Diameter of shaft, inches	2"	2 1/4"	3"	3 1/2"
Price, standard bearings	\$ 9.15	\$10.35	\$12.70	\$14.10
Price, ring-oiling	14.65	18.00	21.40	24.85

Hyatt Roller Line Shaft Bearings

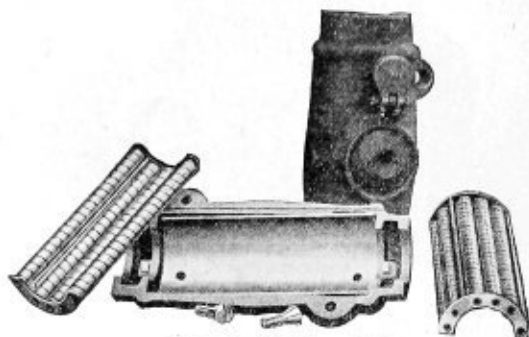
Hyatt roller bearing line shaft boxes are rapidly gaining favor in factories and shops where line shafting is used, owing to the great saving in power consumption.

Minimizing friction losses, durability and long life, certainty of operation, ease of assembly, and oil saving effected, are features that make the Hyatt line shaft bearings very desirable.

The Hyatt line shaft bearing is practically indestructible; saves 65 per cent overhead power loss, compared with plain bearings, and requires a minimum amount of attention.



Bearing as It Appears in Frame



Showing Its Four Parts

Price List Hyatt Standard Shafting Boxes

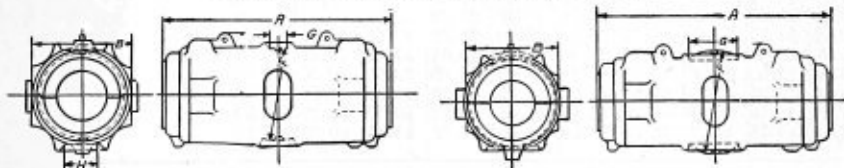
The following list prices are for boxes only, suitable for frames having four set screw adjustments, for ball and socket frames and for universal giant frames.

Line Shaft Bearings Only

Diameter of shaft, inches.....	1 7/8	1 1/2	1 1/4	1 1/8	1 1/16	3/4	5/8	3/8	1/2
List Price.....	\$9.65	\$11.50	\$13.70	\$18.00	\$22.40	\$26.85	\$31.70	\$37.25	\$43.00
Diameter of shaft, inches.....	3 7/8	3 1/2	3 1/4	3 1/8	3 1/16	2 3/4	2 5/8	2 3/8	2 1/2
List price.....	\$64.80	\$97.80	\$128.70	\$158.90	\$190.40	\$281.25	\$390.00		

Even inches and other fractions take list nearest sixteenth plus 10 per cent in sizes up to and including 3 3/8 inches. Above that list is the same.

Dimensions of Hyatt Standard Boxes



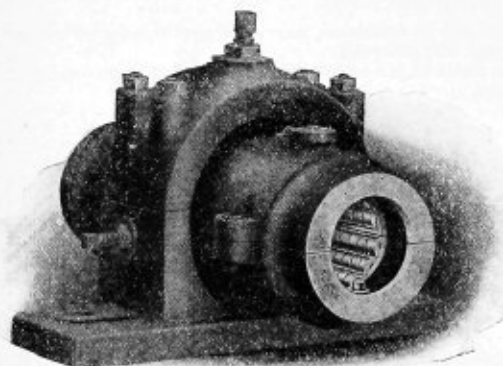
U. G.

B. & S.

Either U-G or B. & S. boxes may be used in four set screw hangers

Diam. of Shaft, Inches	Approx. Weight, Pounds	A		B		F		G		H
		BS	UG	BS	UG	BS	UG	BS	UG	UG
1 7/8	11	8 1/4	8 1/4	3 5/8	3 5/8	3 3/4	3 5/8	15 5/8	1 1/4	1 1/8
1 1/2	14	9 1/4	9 1/4	3 7/8	3 7/8	3 3/4	3 7/8	15 5/8	1 1/4	1 1/8
1 1/4	22	10 1/2	10 1/2	4 1/4	4 1/2	4 3/4	4 1/2	21 1/2	1 3/4	2 3/8
2 3/8	27	11 1/2	11 1/2	4 7/8	4 7/8	4 3/4	4 5/8	21 1/2	1 3/4	2 3/8
2 1/2	38	13	13	5 5/8	5 5/8	5 1/4	5 3/8	3	1 3/4	2 3/8
2 3/8	46	14	14	5 7/8	5 7/8	5 1/4	5 5/8	3	1 3/4	2 3/8
2 1/4	60	15 1/4	15 1/4	6 3/8	6 3/8	6 1/2	6 1/8	3 1/2	2 1/4	2 3/8
2 3/4	67	16 1/2	16 1/2	6 5/8	6 5/8	6 3/8	6 3/8	3 1/2	2 1/4	2 3/8
3 3/8	110	17 1/4	17 1/4	7 1/8	7 1/8	7 1/2	7 1/4	3 3/4	2 1/4	2 3/8
3 5/8	230	20	20	8 3/4	8 1/2	9 1/2	9	4 5/8	2 1/8	3 3/8
4 1/8	280	22 1/4	22 1/4	9 3/8	8 3/8	10 3/4	9 5/8	5 1/2	2 3/4	3
4 3/8	330	24 1/2		10		12 1/4		6 3/8		
5 1/8	380	27				13 3/8		6 7/8		
5 5/8	500	30		12		15 3/8		6 7/8		

Hyatt Roller Line Shaft Bearings



Pillow Block

Hyatt Roller Bearing

Ball and Socket

Pillow Blocks

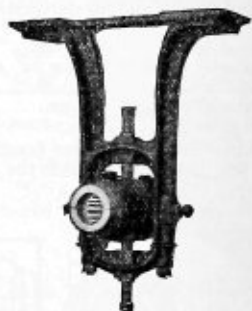
3 $\frac{3}{8}$ -inch bearings and under suitable for 600 R. P. M. Larger sizes for 400 R. P. M. Special quotations for higher speeds.

Diam. Shaft, Ins.	List Price	Diam. Shaft, Ins.	List Price	Diam. Shaft, Ins.	List Price
1 $\frac{3}{8}$	\$12.15	2 $\frac{3}{8}$	\$32.45	4 $\frac{7}{8}$	\$188.90
1 $\frac{1}{2}$	14.00	2 $\frac{1}{2}$	39.70	4 $\frac{5}{8}$	240.40
1 $\frac{5}{8}$	17.45	3 $\frac{1}{8}$	45.25	5 $\frac{1}{8}$	356.25
2 $\frac{1}{8}$	21.75	3 $\frac{3}{8}$	74.30	5 $\frac{3}{8}$	490.00
2 $\frac{1}{2}$	28.00	3 $\frac{5}{8}$	148.70		

Even inches and special fractions take list of nearest sixteenth plus 10 per cent.

Hyatt Roller Bearing Adjustable Drop Hanger Complete

For Speed up to 600 Revolutions



Drop Hanger

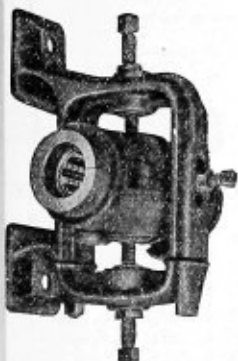
Diam. Shaft, Inches	Drop in Inches									
	6-8	9-11	12-14	15-17	18-20	21-23	24-26	27-29	30-32	33-35
1 $\frac{3}{8}$	\$14.30	\$14.80	\$16.00	\$16.65	\$17.15	\$17.65	\$18.15	.....	.....	.....
1 $\frac{1}{2}$	16.15	16.65	17.85	18.50	19.00	19.50	20.00	.....	.....	.....
1 $\frac{5}{8}$	20.70	21.20	22.20	22.95	24.70	25.20	25.70	\$27.45	\$29.45	.....
2 $\frac{1}{8}$	25.00	25.50	26.50	27.25	29.00	29.50	30.00	31.75	33.75	.....
2 $\frac{1}{2}$	32.00	32.50	34.00	35.75	37.25	38.00	38.75	39.50	40.50	\$42.00
2 $\frac{3}{4}$	36.45	36.95	38.45	40.20	41.70	42.45	43.20	43.95	44.95	46.45
2 $\frac{7}{8}$	43.20	44.70	46.20	48.20	49.45	51.45	52.20	53.20	55.20	56.20
3 $\frac{1}{8}$	48.75	50.25	51.75	53.75	55.00	57.00	57.75	58.75	60.75	61.75

Hyatt Roller Bearing

Adjustable Post Hanger Complete

3 $\frac{3}{8}$ -inch bearings and under, suitable for 600 revolutions. Larger sizes suitable for 400 revolutions.

Diameter of shaft, inches.....	1 $\frac{3}{8}$	1 $\frac{1}{2}$	1 $\frac{5}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{2}$	2 $\frac{3}{4}$	2 $\frac{7}{8}$
Price, list.....	\$13.90	\$15.75	\$20.20	\$24.50	\$31.00	\$35.45	\$44.95
Diameter of shaft, inches.....	3 $\frac{1}{8}$	3 $\frac{3}{8}$	3 $\frac{1}{2}$	3 $\frac{3}{4}$	4 $\frac{1}{8}$	4 $\frac{3}{8}$	5 $\frac{1}{8}$
Price, list.....	\$50.50	\$80.80	\$130.80	\$161.70	\$203.90	\$250.40	\$371.25



Post Hanger

Four Point Adjustment Bearings

Duplex Oiling

The four point bearings illustrated below are of the most modern and approved designs. The metal throughout is distributed to minimize shrinkage, strains and flaws, and points of greatest strain are heavily ribbed. All have liberal vertical and horizontal adjustments secured by four set screws.



Four point Duplex Oiling Bearing
—Ends Reamed.

Adjustable Four Power Drop Hangers

Duplex Oiling

Allow 2-inch vertical and
3-inch lateral adjustment.



Price List

Size of Shaft In.	6 to 8 Inches Drop	10 to 12-in. Drop	14 to 16-in. Drop	18 to 20-in. Drop	22 to 24-in. Drop	26 to 28-in. Drop	30 to 32-in. Drop	34 to 36-in. Drop
1/2"	\$ 3.50	\$ 4.00	\$ 4.75	\$ 5.25	\$ 6.25			
1 1/2"	4.50	5.00	5.75	6.50	7.50			
1 1/2"	5.00	5.50	6.25	7.00	8.00			
1 1/2"	6.00	6.50	7.25	7.75	8.50	\$10.75	\$11.50	\$12.50
1 1/2"	7.00	7.50	8.25	8.75	9.50	11.75	13.00	15.50
2 1/2"	8.75	9.50	10.50	11.25	12.25	14.00	16.00	19.00
2 1/2"	9.75	10.50	11.50	12.25	13.25	15.00	17.00	20.00
2 1/2"	11.50	13.50	15.00	17.00	18.50	20.00	23.00	26.00
2 1/2"	13.50	15.50	17.00	19.00	20.50	22.00	25.00	28.00
3 1/2"		22.00	24.50	27.50	28.50	30.50	32.50	35.50



Adjustable Four Point Pillow Block

Duplex Oiling

Sometimes used as short
drop hangers.

Price List

Size of Shaft Inches.....	1 1/2"	1 1/2"	1 1/2"	2 1/2"	2 1/2"
Price.....	\$5.00	\$6.00	\$ 7.00	\$ 8.75	\$ 9.75
Size of Shaft Inches.....	2 1/2"	2 1/2"	3 1/2"	3 1/2"	3 1/2"
Price.....	11.50	13.50	20.00	22.00	26.00

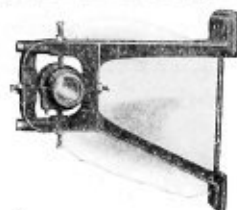
Wall Brackets

For supporting shafting
from the wall at a sufficient
distance away to permit use of
large pulleys.

Pillow blocks, flat boxes
and solid journal bearings can
be used on these brackets.

Extension given is from wall
to center of shaft.

Extension, inches.....	12	18	24	30	36
Price for 1 1/2 to 2 1/2 inch shaft.....	\$ 8.60	\$11.80	\$16.60	\$19.60	\$24.20
Price for 2 1/2 to 3 1/2 inch shaft.....	13.90	19.90	25.90	31.90	37.70



Adjustable Four Point Extension Post Hangers

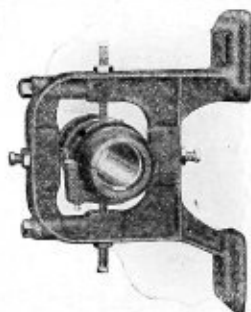
Duplex Oiling

Price List

Size of Shaft In.	10-In. Extension	12-In. Extension	14-In. Extension	16-In. Extension	18-In. Extension	20-In. Extension	24-In. Extension
1 1/2"	\$ 4.50	\$ 5.25	\$ 5.75	\$ 6.75			
1 1/2"	5.50	6.25	7.25	8.25			
1 1/2"	6.00	6.75	7.75	8.75			
1 1/2"	7.25	8.00		9.50		\$ 9.25	\$11.75
1 1/2"	8.25	9.00		12.25		10.50	13.00
2 1/2"	10.50	11.50		13.50		13.50	15.50
2 1/2"	11.50	12.50		18.75		14.75	16.50
2 1/2"	14.75	16.50		21.00		20.25	22.00
2 1/2"	17.00	18.75		30.25		22.50	24.25
3 1/2"	24.25	27.50					

Adjustable Four Point Post Hanger

Duplex Oiling



Price List

Size of Shaft, Inches.....	1 1/2"	1 1/2"	1 1/2"	1 1/2"	1 1/2"
Price.....	\$4.00	\$ 4.75	\$ 5.25	\$ 6.00	\$ 7.00
Size of Shaft, Inches.....	2 1/2"	2 1/2"	2 1/2"	2 1/2"	2 1/2"
Price.....	9.25	10.25	13.50	15.50	22.00

Jaw Clutch Couplings



Square Jaw



Spiral Jaw

Prices include bands, but are without levers and are not fitted to shaft.

Diameter of shaft, inches.....	1 1/2"	1 1/2"	1 1/2"	1 1/2"
Price each.....	\$10.00	\$11.95	\$13.80	\$15.25
Diameter of shaft, inches.....	2 1/2"	2 1/2"	2 1/2"	2 1/2"
Price each.....	17.40	19.05	21.25	25.15

When ordering spiral, state whether right or left.

Ball Bearings

Hardened Tool Steel Balls

Diameter	Per 1000	Diameter	Per 1000	Diameter	Per 1000	Diameter	Per 1000	Diameter	Per 1000
$\frac{1}{8}$	\$4.00	$\frac{1}{4}$	\$2.50	$\frac{3}{8}$	\$1.75	$\frac{1}{2}$	\$2.15	$\frac{5}{8}$	\$2.70
$\frac{3}{4}$	\$4.50	$\frac{7}{8}$	\$4.30	$1\frac{1}{8}$	\$5.00	$1\frac{1}{4}$	\$7.00	$1\frac{3}{8}$	\$8.75
$1\frac{1}{2}$	\$12.15	$1\frac{5}{8}$	\$19.00	$1\frac{7}{8}$	\$26.00	$2\frac{1}{8}$	\$31.00	$2\frac{1}{4}$	\$34.75
$2\frac{3}{8}$	\$43.40	$2\frac{1}{2}$	\$52.00	$2\frac{7}{8}$	\$70.00	$3\frac{1}{8}$	\$95.00	$3\frac{1}{4}$	\$104.00
$3\frac{3}{8}$	\$139.00	$3\frac{1}{2}$	\$156.00	$3\frac{7}{8}$	\$156.00	$4\frac{1}{8}$	\$200.00	$4\frac{1}{4}$	\$260.00
$4\frac{3}{8}$	\$260.00	$4\frac{1}{2}$	\$345.00	$4\frac{7}{8}$	\$355.00	$5\frac{1}{8}$	\$360.00	$5\frac{1}{4}$	\$520.00
$5\frac{3}{8}$	\$670.00	$5\frac{1}{2}$	\$680.00	$5\frac{7}{8}$	\$690.00	$6\frac{1}{8}$	\$1375.00	$6\frac{1}{4}$	\$1400.00



Made from high grade carbon crucible tool steel from special analysis, heat treated and oil tempered. They are free from flaws, accurate to size and are practically perfect spheres. They will withstand heavy pressure and high speed.

Ball Radial Bearings



The rings of these bearings are of the best chrome bearing steel and are hardened by a special process which renders the metal hard and tough. It is superior in every way to case hardening.

The balls are of the highest grade chrome steel and are accurate to .0001 inch.

Ball Thrust Collar Bearings



One Ball Thrust Cage, Two Hardened Steel Washers

Price List Bearings
Wide Series—Light

No. of Bearing	Shaft Diameter, Inches	Outside Diameter, Inches	Width, Inches	Size of Balls, Ins.	Price Each
200	0.3937	1.1811	0.3543	$\frac{3}{16}$	\$ 6.00
201	0.4724	1.2598	0.3937	$\frac{7}{32}$	6.40
202	0.5906	1.3780	0.4331	$\frac{1}{8}$	7.00
203	0.6693	1.5748	0.4724	$\frac{9}{32}$	8.00
204	0.7874	1.8504	0.5512	$\frac{3}{16}$	9.50
205	0.9843	2.0473	0.5905	$\frac{7}{16}$	10.50
206	1.1811	2.4410	0.6299	$\frac{1}{2}$	12.50
207	1.3780	2.8347	0.6693	$\frac{9}{16}$	13.70
208	1.5748	3.1496	0.7087	$\frac{5}{8}$	15.00
209	1.7717	3.3465	0.7480	$\frac{3}{4}$	18.00
210	1.9685	3.5433	0.7874	$\frac{7}{8}$	20.00
211	2.1654	3.9370	0.8268	$1\frac{1}{8}$	25.00
212	2.3622	4.3307	0.8661	$1\frac{1}{4}$	29.00
213	2.5591	4.7244	0.9055	$1\frac{3}{8}$	33.00
214	2.7559	4.9213	0.9449	$1\frac{1}{2}$	37.50
215	2.9528	5.1181	0.9843	$1\frac{3}{4}$	43.00
216	3.1496	5.5118	1.0236	$1\frac{7}{8}$	48.20
217	3.3465	5.9055	1.1024	$2\frac{1}{8}$	55.60
218	3.5433	6.2992	1.1811	$2\frac{1}{4}$	60.50
219	3.7402	6.6929	1.2598	$2\frac{3}{8}$	66.00
220	3.9370	7.0866	1.3386	$2\frac{1}{2}$	74.00
221	4.1339	7.4804	1.4173	$2\frac{7}{8}$	84.00
222	4.3307	7.8741	1.4961	$3\frac{1}{8}$	96.00

Wide Series—Medium

No. of Bearing	Shaft Diameter, Inches	Outside Diameter, Inches	Width, Inches	Size of Balls, Ins.	Price Each
300	0.3937	1.3780	0.4331	$\frac{1}{4}$	\$ 7.50
301	0.4724	1.4567	0.4724	$\frac{5}{16}$	8.00
302	0.5906	1.6536	0.5118	$\frac{3}{8}$	8.50
303	0.6693	1.8504	0.5512	$\frac{7}{16}$	10.00
304	0.7874	2.0473	0.5906	$\frac{1}{2}$	11.80
305	0.9843	2.4410	0.6693	$\frac{9}{16}$	13.80
306	1.1811	2.8347	0.7480	$\frac{5}{8}$	16.20
307	1.3780	3.1496	0.8268	$\frac{3}{4}$	19.00
308	1.5748	3.5433	0.9055	$\frac{7}{8}$	23.80
309	1.7717	3.9370	0.9843	$1\frac{1}{8}$	29.00
310	1.9685	4.3307	1.0630	$1\frac{1}{4}$	35.00
311	2.1654	4.7244	1.1417	$1\frac{3}{8}$	36.00
312	2.3622	5.1181	1.2205	$1\frac{1}{2}$	42.00
313	2.5591	5.5118	1.2992	$1\frac{3}{4}$	48.00
314	2.7559	5.9055	1.3780	$1\frac{7}{8}$	56.00
315	2.9528	6.2992	1.4567	$2\frac{1}{8}$	62.00
316	3.1496	6.6929	1.5354	$2\frac{1}{4}$	70.00
317	3.3465	7.0866	1.6142	$2\frac{3}{8}$	82.00
318	3.5433	7.4804	1.6929	$2\frac{1}{2}$	103.00
319	3.7402	7.8741	1.7717	$2\frac{7}{8}$	120.00
320	3.9370	8.4646	1.8504	$3\frac{1}{8}$	140.00
321	4.1339	8.8583	1.9291	$3\frac{1}{4}$	160.00
322	4.3307	9.4489	1.9685	$3\frac{3}{8}$	180.00

Price List Collars
Light Collars

No. of Bearing	Shaft Diameter, Inches	Outside Diameter, Inches	Width, Inches	Price Each
1-C	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{8}$	\$ 1.60
2-C	$\frac{3}{16}$	$\frac{1}{2}$	$\frac{1}{8}$	1.60
3-C	$\frac{1}{4}$	$\frac{3}{4}$	$\frac{1}{8}$	1.60
4-C	$\frac{5}{16}$	$1\frac{1}{8}$	$\frac{1}{8}$	1.60
5-C	$\frac{3}{8}$	$1\frac{1}{4}$	$\frac{1}{8}$	1.80
6-C	$\frac{7}{16}$	$1\frac{3}{8}$	$\frac{1}{8}$	1.80
7-C	$\frac{1}{2}$	$1\frac{5}{8}$	$\frac{1}{8}$	1.80
8-C	$\frac{9}{16}$	$1\frac{7}{8}$	$\frac{1}{8}$	1.80
9-C	$1\frac{1}{8}$	$2\frac{1}{8}$	$\frac{1}{8}$	1.80
10-C	$1\frac{1}{4}$	$2\frac{3}{8}$	$\frac{1}{8}$	1.80
11-C	$1\frac{3}{8}$	$2\frac{5}{8}$	$\frac{1}{8}$	2.00
12-C	$1\frac{1}{2}$	$2\frac{7}{8}$	$\frac{1}{8}$	2.00
13-C	$1\frac{3}{4}$	$3\frac{1}{8}$	$\frac{1}{8}$	2.00
14-C	$1\frac{7}{8}$	$3\frac{3}{8}$	$\frac{1}{8}$	2.00
15-C	$2\frac{1}{8}$	$3\frac{5}{8}$	$\frac{1}{8}$	2.60
16-C	$2\frac{1}{4}$	$3\frac{7}{8}$	$\frac{1}{8}$	2.60
17-C	$2\frac{3}{8}$	$4\frac{1}{8}$	$\frac{1}{8}$	2.60
18-C	$2\frac{1}{2}$	$4\frac{3}{8}$	$\frac{1}{8}$	2.60
19-C	$2\frac{7}{8}$	$4\frac{5}{8}$	$\frac{1}{8}$	3.50
20-C	$3\frac{1}{8}$	$4\frac{7}{8}$	$\frac{1}{8}$	3.50
21-C	$3\frac{1}{4}$	$5\frac{1}{8}$	$\frac{1}{8}$	3.50
22-C	$3\frac{3}{8}$	$5\frac{3}{8}$	$\frac{1}{8}$	3.50
23-C	$3\frac{7}{8}$	$5\frac{7}{8}$	$\frac{1}{8}$	4.50

Medium Loads

No. of Bearing	Shaft Diameter, Inches	Outside Diameter, Inches	Width, Inches	Price Each
1-D	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{4}$	\$10.00
2-D	$\frac{3}{16}$	$\frac{1}{2}$	$\frac{1}{4}$	13.00
3-D	$\frac{1}{4}$	$\frac{3}{4}$	$\frac{1}{4}$	14.00
4-D	$\frac{5}{16}$	$1\frac{1}{8}$	$\frac{1}{4}$	20.00
5-D	$\frac{3}{8}$	$1\frac{1}{4}$	$\frac{1}{4}$	18.00
6-D	$\frac{7}{16}$	$1\frac{3}{8}$	$\frac{1}{4}$	16.00
7-D	$\frac{1}{2}$	$1\frac{5}{8}$	$\frac{1}{4}$	16.00
8-D	$\frac{9}{16}$	$1\frac{7}{8}$	$\frac{1}{4}$	18.00
9-D	$1\frac{1}{8}$	$2\frac{1}{8}$	$\frac{1}{4}$	20.00
10-D	$1\frac{1}{4}$	$2\frac{3}{8}$	$\frac{1}{4}$	18.00
11-D	$1\frac{3}{8}$	$2\frac{5}{8}$	$\frac{1}{4}$	18.00
12-D	$1\frac{1}{2}$	$2\frac{7}{8}$	$\frac{1}{4}$	18.00
13-D	$1\frac{3}{4}$	$3\frac{1}{8}$	$\frac{1}{4}$	18.00
14-D	$1\frac{7}{8}$	$3\frac{3}{8}$	$\frac{1}{4}$	19.00
15-D	$2\frac{1}{8}$	$3\frac{5}{8}$	$\frac{1}{4}$	18.00
16-D	$2\frac{1}{4}$	$3\frac{7}{8}$	$\frac{1}{4}$	18.00
17-D	$2\frac{3}{8}$	$4\frac{1}{8}$	$\frac{1}{4}$	18.00
18-D	$2\frac{1}{2}$	$4\frac{3}{8}$	$\frac{1}{4}$	20.00
19-D	$2\frac{7}{8}$	$4\frac{5}{8}$	$\frac{1}{4}$	18.00
20-D	$3\frac{1}{8}$	$4\frac{7}{8}$	$\frac{1}{4}$	18.00
21-D	$3\frac{1}{4}$	$5\frac{1}{8}$	$\frac{1}{4}$	20.00
22-D	$3\frac{3}{8}$	$5\frac{3}{8}$	$\frac{1}{4}$	16.00
23-D	$3\frac{7}{8}$	$5\frac{7}{8}$	$\frac{1}{4}$	19.00

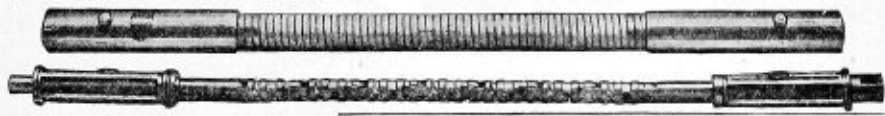
Plank Unit Flexible Shafting

These flexible shaft units are drop forged out of the best grade of Chrome Nickel Steel, accurately machined and heat treated.

A patented tenon and mortise interlock is the method used connecting the units of the flexible shaft together. This type of an interlock allows maximum flexibility and a given amount of longitudinal play, which will take care of the different curvatures the shaft is placed in. The units can be disconnected one from the other, by removing them from the casing and placing one unit at ninety degrees to its adjoining member. This shaft can be taken apart and put together again without the use of a single tool.

A guarantee covers this shaft in respect to material, workmanship and satisfaction, providing the simple instructions are properly followed.

We are in a position to furnish a large variety of different types of machines both electrically and mechanically driven to take care of practically all requirements, so if you do not happen to see what you may want on these pages, we will be very pleased to have you state your requirements and we will forward you complete specifications immediately, showing a large variety of different types of outfits.



The above illustrations show the flexible shafting both inside the casing and out, and also mechanical method by which the units are connected known as a mortise and tenon.

Size of Core, Inches	Standard Length	Price as per Above Cut	Emery Wheel Capacity, Inches	H. P. Transmitted at 1500 R. P. M.	Total Weight, Pounds
1/2	6	\$24.00	4 x 3/4	1/2 to 1	17
3/4	8	32.00	4 x 1	1/2 to 1	21
1	6	28.75	6 x 1	1/2 to 1	21
1 1/4	8	36.75	6 x 1 1/4	1/2 to 1	27
1 1/2	6	31.50	8 x 1 1/4	1/2 to 1	30
1 3/4	8	41.50	8 x 1 3/4	1/2 to 1	38
2	6	34.50	10 x 1 1/2	1 1/2 to 2	37
2 1/4	8	46.00	10 x 1 3/4	1 1/2 to 2	46



Portable Flexible Shaft Motor Driven Grinding and Drilling Outfit

No. 4. This outfit is a very practical one to be used in machine shops and foundries and numerous other places doing similar work. The motor is mounted on a turret, and the turret upon a four-wheel roller bearing truck. It has a two H. P. 60 cycle 3 phase, 1800 R. P. M. motor truck, reinforced cable and connections, 8 feet of 3/8-inch flexible shafting and an emery wheel with a capacity of 10 inches. Price complete.....\$162.75

Suspended Type

No. 1. This suspended type is an exceptionally convenient type in as much as it is always out of the way. It can be suspended from the ceiling on a trolley which can be easily directed to any part of the shop. 1/4 H. P. 60 cycle single phase, 110 volt 1200 R.P.M. motor, 6 feet 3/8-inch flexible shafting, clamp spindle emery wheel arbor and guard, clipper attachment, 20 feet lamp cord.

Price complete.....\$84.75

Equipped with 1/4 H. P. D.

C. 110 V. 1200 R.P.M. motor,

price complete.....\$77.25

Portable Grinding and Drilling Outfit

No. 3. A similar outfit to the one described above except that it is much smaller. It can, however, be used for the same purposes on a smaller scale. It has 1/4 H. P. 60 cycle single phase, 110 V. 1800 R. P. M. motor, 6 feet 3/8-inch flexible shafting, clamp spindle emery wheel arbor and guard, 20 feet lamp cord and stand. Price complete.....\$80.00

Same outfit equipped with 1/4 H. P. D. C. 110 V 1700 R. P. M. motor, price complete. 76.00



Plank Unit Flexible Shafting



Radial Arm Outfits

- No. 5. Balanced radial arm outfit with automatic friction engagement and 6 feet $\frac{3}{4}$ -inch flexible shafting with emery wheel capacity 8x1 $\frac{1}{4}$ inches, price complete. . . . \$79.25
Equipped with 8 feet $\frac{3}{4}$ -inch flexible shafting, price complete. . . . 89.25

Plank flexible shaft outfits are assembled in both electrical and mechanical driven types to handle heavy and light duty grinding, drilling, polishing, surfacing, clipping, nut and stud driving, screw driving and numerous other requirements.

Only the best grade of material and workmanship are used in their entire construction, making the simplest, strongest and most durable flexible shaft outfits manufactured, with an absolute guarantee covering material, workmanship and to give perfect satisfaction.

Heavy Duty Bench Arbor



- No. 7. Heavy duty bench arbor, 6 feet $\frac{3}{4}$ -inch flexible shafting, clamp spindle emery wheel arbor, 8x1 $\frac{1}{4}$ -inch emery wheel capacity, price complete. . . . \$50.00
Equipped with 6 feet $\frac{3}{4}$ -inch flexible shafting, emery wheel capacity 10x1 $\frac{1}{2}$ inches. . . . 53.00



- No. 9. Heavy duty counter shaft, 6 feet $\frac{1}{2}$ -inch flexible shafting, clamp spindle emery wheel arbor and guard, emery wheel capacity 4x1 $\frac{1}{4}$ inches, price complete. . . . \$39.00
Equipped with 6 feet $\frac{3}{4}$ -inch flexible shafting, emery wheel capacity 6x1 inch. . . . 43.75

Jack Shaft with Universal Joint

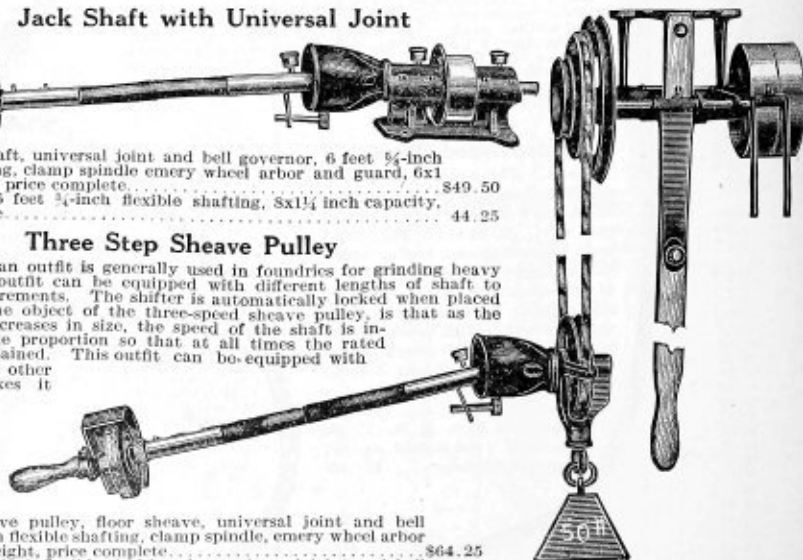


- No. 6. Jack shaft, universal joint and bell governor, 6 feet $\frac{3}{4}$ -inch flexible shafting, clamp spindle emery wheel arbor and guard, 6x1 inch capacity, price complete. . . . \$49.50
Equipped with 6 feet $\frac{3}{4}$ -inch flexible shafting, 8x1 $\frac{1}{4}$ inch capacity, price complete. . . . 44.25

Three Step Sheave Pulley

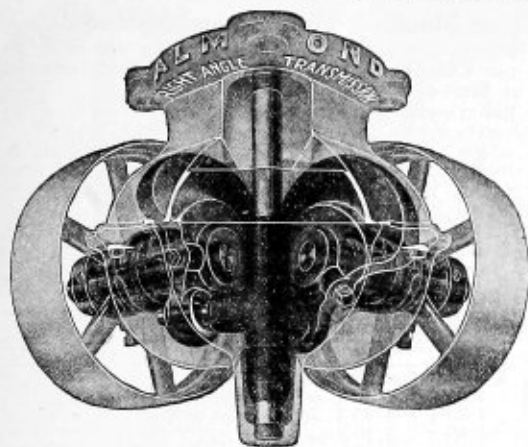
This type of an outfit is generally used in foundries for grinding heavy castings. The outfit can be equipped with different lengths of shaft to answer all requirements. The shifter is automatically locked when placed in position. The object of the three-speed sheave pulley, is that as the emery wheel decreases in size, the speed of the shaft is increased in a like proportion so that at all times the rated amount of speed is maintained. This outfit can be equipped with

breast drill and the other accessories, which makes it very complete.



- No. 8. Three-step sheave pulley, floor sheave, universal joint and bell governor 6 feet $\frac{3}{4}$ -inch flexible shafting, clamp spindle, emery wheel arbor and guard, counter weight, price complete. . . . \$64.25
Equipped with 6 feet $\frac{3}{4}$ -inch flexible shafting, less universal joint and bell governor. . . . 67.90

Right Angle Drives



A Means of Transmitting Power at Right Angles, Without the Use of Mule Stands or Bevel Gearing

This drive is simple and positive as well as absolutely uniform in its action.

Its mechanism consists of a bell-crank sliding on a vertical shaft and pivoted at either end to sleeve sliding on a crank pin; the transmission of motion may be easily understood by a study of the drawings.

All parts are made of suitable material and the crank shaft and pins of highest grade steel. All working parts are enclosed in an oil tight case and run in an oil bath, therefore every bearing must receive proper lubrication if the supply of oil is renewed at intervals of several months. Each drive is tested before shipping. The outfit is self-contained and shipped complete with pulleys, ready to be hung in position.

Sizes and Prices

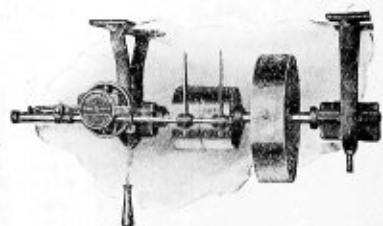
No.	Horse Power	Maximum Speed	Shaft Inches	Pulley		Drop, Inches	Weight, Pounds	List Price
				Diameter, Inches	Face, Inches			
1	5	500	1 3/8	12	4	7 1/2	160	\$110.00
2	10	400	1 7/8	16	6	9	320	166.00
3	20	350	1 5/8	20	9	13	650	330.00
4	40	225	2 7/8	30	12	18	1500	600.00

"Sim-Pull" Countershafts



To start or stop the countershaft simply pull.

The belt is locked in either position, it cannot creep from the loose pulley to the tight, or vice versa.



Single Hanger

No.	Size of Driving Pulley, Inches	Tight and Loose Pulleys, Inches	Approx. Weight, Pounds	Price Each
210	8 x 1 3/4	4 x 1 3/4	40	\$ 7.50
211	10 x 2 1/4	4 x 2 1/4	45	9.00
212	10 x 2 1/4	5 x 2 1/4	45	9.50
213	10 x 2 1/4	6 x 2 1/4	48	10.00
214	12 x 2 1/4	4 x 2 1/4	55	10.50
215	12 x 2 1/4	5 x 2 1/4	60	11.00
216	12 x 2 1/4	6 x 2 1/4	68	11.50
217	14 x 2 3/4	5 x 2 3/4	72	12.00

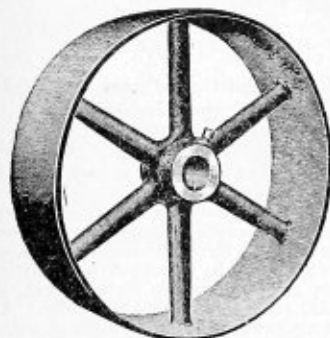
Double Hanger

No.	Size of Driving Pulley, Inches	Tight and Loose Pulleys, Inches	Approx. Weight, Pounds	Price Each
218	12 x 2 3/4	5 x 2 3/4	90	\$12.00
219	12 x 2 3/4	6 x 2 3/4	90	12.50
220	14 x 2 3/4	5 x 2 3/4	90	13.00
221	14 x 2 3/4	6 x 2 3/4	95	13.50
222	16 x 2 3/4	5 x 2 3/4	95	15.50
223	16 x 2 3/4	6 x 2 3/4	100	16.00

Crated individually. Other proportions up to 14-inch diameter driver and up to 2 3/4-inch width of face on T. & L.

These are shipped mounted on skids. Other proportions can be furnished to special order. Driving pulley up to 18-inch diameter by 2 3/4-inch face; tight and loose up to 2 3/4-inch face.

H.Channon Company Chicago



Solid Cast Iron Belt Pulleys Machine Moulded, Finished and Balanced

Cast iron pulleys are not carried in stock, but are made up to order only in our Chicago foundry and can be shipped promptly—usually three or four days.

Cast iron pulleys are not returnable, so be careful to give the following particulars when ordering:

Diameter, width of face and bore of pulley—whether crown or straight face, whether key-seated, set-screwed, or both, and whether for single or double belt. Unless otherwise specified, crown face pulleys are always furnished.

Pulleys, when both key-seated and set-screwed, tight and loose, split and flanged, are subject to an extra charge above prices given in table below.

Cast Iron Single Belt Pulleys—Price Each

Diameter, Inches	Width of Face, Inches											
	3	4	5	6	7	8	9	10	11	12		
6	\$ 2.20	\$ 2.50	\$ 2.85	\$ 3.20	\$ 3.60	\$ 4.05						
7	2.40	2.75	3.10	3.50	3.95	4.40						
8	2.65	3.00	3.40	3.80	4.25	4.75						
9	2.90	3.25	3.65	4.10	4.60	5.10						
10	3.10	3.50	3.95	4.40	4.90	5.45						
11	3.30	3.75	4.20	4.70	5.25	5.85						
12	3.60	4.05	4.55	5.10	5.70	6.30						
14	4.05	4.65	5.10	5.75	6.45	7.20	\$ 7.95					
16	4.65	5.20	5.80	6.50	7.30	8.20	9.20					
18	5.20	5.35	6.60	7.40	8.30	9.30	10.40					
20	5.75	6.65	7.55	8.50	9.45	10.45	11.55	\$12.70				
22	6.35	7.40	8.45	9.50	10.55	11.55	12.65	13.85				
24	7.05	8.20	9.35	10.50	11.65	12.80	14.00	15.20				
26	7.75	9.00	10.25	11.50	12.75	14.05	15.35	16.70				
28	8.55	9.95	11.35	12.75	14.15	15.55	17.00	18.50	\$20.10			
30	9.40	10.90	12.45	14.00	15.85	17.15	18.75	20.35	22.00			
36	12.40	14.20	16.05	18.00	20.05	22.10	24.15	26.20	28.30	\$30.45		
40		16.75	18.95	21.15	23.40	25.70	28.00	30.30	32.60	34.95		
48		22.40	25.05	27.75	30.45	33.20	35.95	38.75	41.60	43.90		

Cast Iron Double Belt Pulleys—Price Each

Diameter, Inches	Width of Face, Inches															
	3	4	5	6	7	8	9	10	11	12	14	16	18	20	24	
6	\$ 2.50	\$ 2.80	\$ 3.15	\$ 3.60	\$ 4.10	\$ 4.55	\$ 5.05	\$ 5.55	\$ 6.05	\$ 6.55						
7	2.70	3.05	3.50	3.95	4.40	4.90	5.35	5.85	6.35	6.85						
8	2.90	3.35	3.80	4.25	4.75	5.25	5.80	6.35	6.95	7.60						
9	3.20	3.65	4.15	4.65	5.20	5.75	6.30	6.90	7.50	8.15						
10	3.45	3.95	4.45	5.00	5.55	6.15	6.80	7.50	8.20	8.95						
11	3.70	4.25	4.80	5.40	6.00	6.65	7.30	8.00	8.75	9.55						
12	3.95	4.55	5.15	5.80	6.45	7.15	7.85	8.60	9.35	10.15	\$11.75					
14	4.50	5.20	5.95	6.70	7.50	8.30	9.10	9.95	10.80	11.70	13.50					
16	5.10	5.80	6.60	7.45	8.50	9.20	10.10	11.05	12.00	13.00	15.00	\$17.20				
18	5.70	6.65	7.60	8.55	9.55	10.55	11.60	12.65	13.75	14.85	17.05	19.45				
20	6.40	7.45	8.55	9.65	10.80	11.95	13.15	14.35	15.60	16.85	19.45	22.15	\$24.95			
22	7.10	8.30	9.50	10.75	12.00	13.30	14.60	15.95	17.30	18.70	21.55	24.50	27.55	\$30.70		
24	7.90	9.25	10.60	12.00	13.40	14.85	16.30	17.80	19.30	20.85	24.00	27.25	30.60	34.05		
26	8.80	10.30	11.80	13.35	14.90	16.50	18.10	19.75	21.40	23.10	26.55	30.10	33.75	37.50		
28	9.80	11.45	13.10	14.80	16.50	18.25	20.00	21.80	23.60	25.45	29.20	33.05	36.90	40.95		
30	10.85	12.65	14.45	16.30	18.15	20.05	21.95	23.90	25.85	27.85	31.90	36.00	40.25	44.60		
36	14.30	16.55	18.85	21.15	23.50	25.85	28.25	30.70	33.15	35.65	40.70	45.85	51.10	56.45	\$67.40	
40		19.50	22.15	24.80	27.45	30.10	32.80	35.50	38.20	40.95	46.45	52.05	57.75	63.60	75.35	
48		26.10	29.40	32.75	36.10	39.45	42.85	46.25	49.65	53.10	60.00	67.00	74.10	81.30	95.90	
60		38.20	42.65	47.65	51.85	56.50	61.20	65.90	70.65	75.45	85.15	95.00	105.05	115.20	136.00	
72				64.55	69.90	75.30	80.75	86.25	91.80	97.40	108.85	120.65	132.85	145.45	171.95	

Maximum Bores for Cast Iron Pulleys

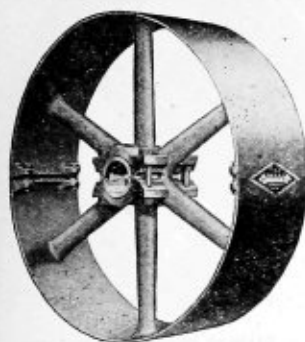
Diameters, inches	6 to 9	10 to 15	16 to 20	21 to 30	31 to 42	43 to 48	49 to 60
Maximum bores, inches	2 5/8	3 1/2	4 1/2	5 1/2	6 1/2	7 1/2	8 1/2
Extra for larger bores:	(10% for each 1/8 in. or fraction.)	(10% for each 1/8 in. or fraction.)	(10% for each 1/8 in. or fraction.)	(10% for each 1/8 in. or fraction.)	(5% for each 1/8 in. or fraction.)	(5% for each 1/8 in. or fraction.)	(5% for each 1/8 in. or fraction.)

Pulleys with bores larger than maximum furnished in double belt only.

Cast Iron Split Pulleys

Carried in stock for immediate shipment

Price Each



In these pulleys, rim is cast whole, then split by fracture at the parting line, thus when fractured edges are matched together and bolted they fit so as to form practically a solid rim pulley. There are no riveted joints to work loose or shear.

The Standard Bores Adopted for these Pulleys are as Follows:

6 to 9 in. (inclusive) . . . 2 1/2 in.
10 to 24 in. (inclusive) . . . 2 3/4 in.
25 to 36 in. (inclusive) . . . 3 1/2 in.
37 to 54 in. (inclusive) . . . 3 3/4 in.
Bushings for all other shaft sizes.

Diam. Inches	Width of Face, Inches										
	3	4	5	6	7	8	10	12	14	16	
6	\$3.25	\$ 3.85	\$ 4.05	\$ 4.30							
7	3.40	4.00	4.25	4.50							
8	3.55	4.20	4.45	4.70	\$ 5.35	\$ 5.60					
9	3.70	4.35	4.60	4.90	5.60	5.90					
10	3.85	4.50	4.80	5.15	5.85	6.20	\$ 6.90				
12	4.35	5.35	5.70	6.05	7.05	7.40	8.20				
14		5.75	6.10	6.55	7.55	8.05	8.95				
16		6.15	6.60	7.10	8.20	8.70	9.70	\$12.00			
18		6.65	7.15	7.70	8.90	9.45	10.60	13.10			
20		7.60	8.95	9.60	10.90	11.55	12.90	16.00	\$18.00		
22		8.20	9.55	10.30	11.70	12.45	14.00	17.30	19.65		
24		9.70	11.25	12.05	13.85	14.70	16.50	20.40	22.95		
26		10.50	12.05	13.00	14.85	15.95	18.00	22.25	24.90		
28		11.30	12.90	13.90	16.00	17.10	19.50	24.10	26.80		
30		12.15	13.85	14.95	17.15	18.40	21.15	25.85	28.80		
32		13.90	16.05	17.25	19.70	21.15	24.15	30.35	33.50		
34		14.90	17.10	18.50	21.10	22.60	25.85	32.30	35.70		
36		15.90	18.25	19.70	22.45	24.10	27.60	34.30	37.90		
38		19.05	21.45	23.10	27.85	28.95	32.70	40.15	44.00		
40		20.20	22.80	24.60	28.80	30.70	34.65	42.30	46.40		
42		21.40	24.20	26.10	30.45	32.45	36.60	44.50	48.80		
44		22.75	25.70	27.75	32.20	34.35	38.70	46.90	51.40		
46		24.15	27.20	29.35	33.95	36.25	40.85	49.30	54.10		
48		29.00	31.20	33.50	38.85	41.25	46.15	56.20	61.30		

Steel Split Pulleys—Price Each

Diam. Inches	Width of Face, Inches										
	2	3	4	5	6	8	10	12	14		
6	\$3.15	\$3.30	\$ 3.45	\$ 3.75	\$ 4.05						
7	3.22	3.38	3.60	3.90	4.20						
8	3.30	3.45	3.75	4.05	4.35	\$ 4.95	\$ 5.60				
9	3.38	3.60	3.90	4.20	4.50	5.10	5.75				
10	3.45	3.75	4.05	4.35	4.65	5.25	5.90	\$ 6.45			
12	3.90	4.20	4.63	4.80	5.33	5.78	6.45	7.65	\$ 9.00		
14	4.20	4.50	5.20	5.65	6.15	7.05	8.03	9.00	10.00		
16	4.50	4.95	5.75	6.10	6.90	8.25	9.45	10.50	11.50		
18		5.55	6.38	7.00	7.65	9.30	10.65	12.00	13.25		
20		6.00	7.50	8.10	9.00	10.73	12.00	14.25	15.30		
22		6.50	8.55	9.50	10.25	12.00	14.10	16.80	19.30		
24		7.50	8.90	10.00	10.95	13.20	15.68	19.05	22.65		
26			9.55	10.50	11.95	14.40	17.10	21.30	26.25		
28			10.80	11.70	12.90	15.45	18.15	22.90	28.50		
30			12.00	12.90	14.10	17.25	19.90	24.75	31.50		
32			13.20	14.10	15.45	19.35	22.50	26.85	34.15		
34			14.40	15.75	17.25	21.75	25.50	30.00	36.75		
36			15.90	17.85	19.50	24.00	28.65	33.75	39.75		
38			19.50	20.65	21.75	26.40	31.05	37.15	42.75		
40			21.00	22.75	24.00	28.50	33.75	40.15	46.50		
42			23.25	24.85	26.25	32.25	37.50	43.50	50.25		
44					29.25	35.62	41.25	47.25	54.00		
46					33.00	39.00	45.00	50.25	57.75		
48					36.75	42.00	48.75	54.00	61.50		
50					40.87	47.25	53.25	58.50	66.00		
52					46.50	51.00	57.00	63.00	69.00		
54					50.25	56.25	61.50	67.50	74.25		
56					54.00	60.75	66.75	72.75	80.25		
58					60.00	65.25	71.25	78.37	86.62		
60					63.75	70.50	77.25	84.00	93.00		
62						72.85	84.30	95.95	107.55		
64						76.50	88.20	100.10	111.95		
66						80.23	92.20	104.35	116.45		
68						84.15	96.35	108.75	121.10		
70						88.10	100.70	113.55	126.35		
72						92.15	105.05	118.15	131.30		
74						100.65	114.30	128.25	142.55		
76						109.60	124.25	139.35	154.65		
78						119.00	134.75	150.95	167.40		



American Pulley
Carried in Chicago Stock

American and Oneida Steel Pulleys same prices.

The American Pulley can be furnished from stock in all sizes up to 60-inch diameter by 16-inch face; the Oneida in all sizes up to 72-inch diameter by 16-inch face. Other standard sizes of either style can be furnished promptly from factory. Split loose bushings for all standard sizes can be furnished from stock.

H. Channon Company Chicago

Wood Split Pulleys

We offer the highest grade wood split pulley at the same price as you would have to pay for inferior makes and can give quick shipment from Chicago stock.

Every detail of the manufacture of this pulley has been developed to a high degree of mechanical and economical excellence. The lumber is thoroughly seasoned, dovetailed and glued together—not nailed—tests have proven that the wood itself will split before a glued joint will give way. The rim and arm joints are dovetailed, wedged, glued and bolt-anchored.

The flat arm bars, continuous from rim to rim diametrically across the pulley, form integral double levers of great strength, well adapted for carrying the driving load, at the same time affording ample support to the rim for resisting lateral pulls, due to belt tensions. Pulley faces are "case-hardened" by special process.

Price, Each

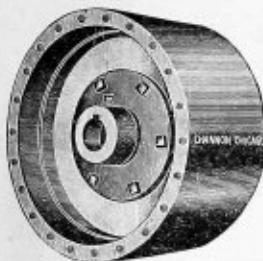
Width of Face, Inches

Diam., inches	3	4	5	6	8	10	12	14	16	18	20	22	24
4	\$2.80	\$ 2.90	\$ 3.10	\$ 3.30	\$ 3.70	\$ 4.10	\$ 4.50						
5	2.85	2.95	3.20	3.40	3.85	4.30	4.75						
6	2.90	3.00	3.25	3.50	4.00	4.50	5.00						
7	2.95	3.05	3.35	3.60	4.15	4.70	5.25	\$ 5.80					
8	3.00	3.10	3.40	3.70	4.30	4.90	5.50	6.10					
9	3.10	3.25	3.60	3.90	4.55	5.20	5.85	6.50					
10	3.25	3.40	3.75	4.10	4.80	5.50	6.20	6.90	\$ 7.60				
11	3.50	3.70	4.10	4.50	5.30	6.10	6.90	7.70	8.50				
12	3.75	4.00	4.45	4.90	5.80	6.70	7.60	8.50	9.40	\$ 10.30			
13		4.30	4.80	5.30	6.30	7.30	8.30	9.30	10.30	11.30			
14		4.60	5.15	5.70	6.80	7.90	9.00	10.10	11.20	12.30	\$ 13.40		
15		4.90	5.50	6.10	7.30	8.50	9.70	10.90	12.10	13.30	14.50		
16		5.20	5.85	6.50	7.80	9.10	10.40	11.70	13.00	14.30	15.60	\$ 16.90	
17		5.50	6.20	6.90	8.30	9.70	11.10	12.50	13.90	15.30	16.70	18.10	
18		5.80	6.55	7.30	8.80	10.30	11.80	13.30	14.80	16.30	17.80	19.30	\$ 20.80
19		6.10	6.90	7.70	9.30	10.90	12.50	14.10	15.70	17.30	18.90	20.50	22.10
20		6.40	7.25	8.10	9.80	11.50	13.20	14.90	16.60	18.30	20.00	21.70	23.40
22		7.00	7.95	8.90	10.80	12.70	14.60	16.50	18.40	20.30	22.20	24.10	26.00
24		7.70	8.80	9.90	12.10	14.30	16.50	18.70	20.90	23.10	25.30	27.50	29.70
26		8.40	9.65	10.90	13.40	15.90	18.40	20.90	23.40	25.90	28.40	30.90	33.40
28		9.10	10.50	11.90	14.70	17.50	20.30	23.10	25.90	28.70	31.50	34.30	37.10
30		9.80	11.35	12.90	16.00	19.10	22.20	25.30	28.40	31.50	34.60	37.70	40.80
32		10.50	12.20	13.90	17.30	20.70	24.10	27.50	30.90	34.30	37.70	41.10	44.50
34		11.30	13.15	15.00	18.70	22.40	26.10	29.80	33.50	37.20	40.90	44.60	48.30
36		12.10	14.10	16.10	20.10	24.10	28.10	32.10	36.10	40.10	44.10	48.10	52.10
38				17.20	21.50	25.80	30.10	34.40	38.70	43.00	47.30	51.60	55.90
40				18.30	22.90	27.50	32.10	36.70	41.30	45.90	50.50	55.10	59.70
42				19.60	24.60	29.60	34.60	39.60	44.60	49.60	54.60	59.60	64.60
44				20.90	26.30	31.70	37.10	42.50	47.90	53.30	58.70	64.10	69.50
46				22.30	28.10	33.90	39.70	45.50	51.30	57.10	62.90	68.70	74.50
48				23.80	30.00	36.20	42.40	48.60	54.80	61.00	67.20	73.40	79.60
50				25.40	32.00	38.60	45.20	51.80	58.40	65.00	71.60	78.20	84.80
52				27.10	34.10	41.10	48.10	55.10	62.10	69.10	76.10	83.10	90.10
54				28.90	36.30	43.70	51.10	58.50	65.90	73.30	80.70	88.10	95.50
56				30.80	38.60	46.40	54.20	62.00	69.80	77.60	85.40	93.20	101.00
58				32.80	41.00	49.20	57.40	65.60	73.80	82.00	90.20	98.40	106.60
60				34.90	43.50	52.10	60.70	69.30	77.90	86.50	95.10	103.70	112.30
62				37.10	46.10	55.10	64.10	73.10	82.10	91.10	100.10	109.10	118.10
64				39.40	48.80	58.20	67.60	77.00	86.40	95.80	105.20	114.60	124.00
66				41.90	51.80	61.70	71.60	81.50	91.40	101.30	111.20	121.10	131.00
68				44.50	54.90	65.30	75.70	86.10	96.50	106.90	117.30	127.70	138.10
70				47.20	58.10	69.00	79.90	90.80	101.70	112.60	123.50	134.40	145.30
72				50.00	61.40	72.80	84.20	95.60	107.00	118.40	129.80	141.20	152.60
74					71.90	84.80	97.70	110.60	123.50	136.40	149.30	162.20	175.10
76					83.30	97.70	112.10	126.50	140.90	155.30	169.70	184.10	198.50
78					95.60	111.50	127.40	143.30	159.20	175.10	191.00	206.90	222.80
80					109.00	126.50	144.00	161.50	179.00	196.50	214.00	231.50	249.00
82					123.70	143.00	162.30	181.60	200.90	220.20	239.50	258.80	278.10
84					139.30	160.40	181.50	202.60	223.70	244.80	265.90	287.00	308.10
86					155.80	178.70	201.60	224.50	247.40	270.30	293.20	316.10	339.00
88					173.20	197.90	222.60	247.30	272.00	296.70	321.40	346.10	370.80

All other sizes at proportionate prices.

All Pulleys are carefully balanced and inspected and are guaranteed to transmit more power with the same belt than any iron pulley made with like belt tension.

The compression fastening is guaranteed to hold perfectly and to be a better fastening than set screws.

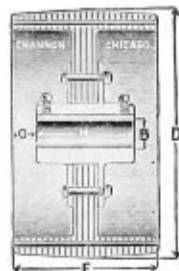


Paper Pulleys

The advantages of paper pulleys are: 1. Reduced Slippage; 2. Decreased Belt Tension; 3. More Power Transmitted; 4. Lower Total Cost of Pulleys and Belting.

The lighter tension on the belt reduces all strains, permitting lighter shafting, hangers, etc.; reduces consumption of oil and annoyance and loss from hot bearings. There being minimum slipping of the belt, wear is decreased and the item of belts in the expense account is materially reduced.

There being no shrinkage strains as in cast iron, or numerous pieces as in wood pulleys, they may be run at very high rates of speed with safety, and are not easily damaged in handling. Another point of merit is that they are not injured by steam or atmospheric conditions.



Paper pulleys may be relied upon to transmit all the power a belt will carry without tightener, the belt, not the pulley, being the limit. Paper is of uniform density and, being turned inside and out, the pulleys are perfectly balanced.

Being non-breakable, paper pulleys take a low freight classification and on account of their light weight the cost of transportation is small. They are fully one-half lighter than similar cast iron pulleys, admitting of lighter shaiting and hangers, decreasing the cost of plant and maintenance, and being correspondingly easy to put up.

When Ordering Paper Pulleys the Following Specifications Should be Given

1. Number of pulleys wanted.
2. Diameter (D).
3. Total width of face (F).
4. Width of belt.
5. Exact bore or shaft diameter (B).
6. Width of keyway.
7. Depth of keyway in pulley.
8. Length of hub.
9. Distance from end of hub to edge of rim (O).

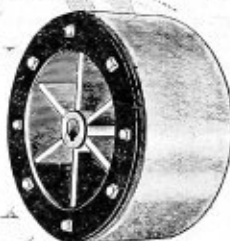
Diam., Inches	Face, Inches	Double Belt	Double Arm or Web	Pitch Diam.	Face, Inches	Double Belt	Double Arm or Web	Pitch Diam.	Face, Inches	Double Belt	Double Arm or Web	Pitch Diam.	Face, Inches	Double Belt	Double Arm or Web	Pitch Diam.	Face, Inches	Double Belt	Double Arm or Web
2	2	\$2.00			8	\$4.30			8	\$ 5.80			4	\$ 6.45			7	\$11.45	
2	2	2.05			8	4.70			8	6.20			4	7.00			7	12.45	
3	3	3.10			10	5.10			10	6.90			5	7.60			9	13.50	
3	3	3.20			11	5.60			11	7.50			7	8.30			10	14.60	
6	6	6.35			12	6.20			12	8.20			8	9.05			11	15.80	
					13	6.80			13		10.75		9	9.90			12	17.50	\$20.45
3	2	2.10		9	3	3.55			14		11.70		10	10.75			13	18.40	22.05
	2	2.15			4	3.65			15		12.75		11	11.70	\$14.05		14	19.75	23.70
	4	2.20			5	3.75			16		13.85		12	12.70	15.25		15	21.20	25.45
	5	2.30			6	3.95			17		15.10		13	13.75	16.50		16	22.70	27.25
	6	2.45			7	4.20			18		16.35		14	14.90	17.90		17	24.25	29.10
	7	2.65			8	4.50							15		19.30		18		31.05
					9	4.90		14	3	4.75			16		20.75		19		33.10
4	2	2.20			10	5.30			4	5.00			17		22.35		20		35.20
	3	2.25			11	5.80			5	5.30			18		24.00		21		37.35
	4	2.30			12	6.40			6	5.70			19		25.75		22		39.60
	5	2.40			13	7.00			7	6.10			20		27.50		23		41.95
	6	2.55							8	6.60			21		29.40		24		44.30
	7	2.75		10	3	3.75			9	7.20			22		31.25		25		46.80
	8	3.00			4	3.80			10	7.80	9.35		23		33.40		26		49.35
					5	3.95			11	8.50	10.20		24		35.50		27		52.00
5	2	2.30			6	4.15			12	9.25	11.10		25		37.65		28		54.70
	3	2.35			7	4.40			13	10.05	12.10		26		39.90		29		57.45
	4	2.40			8	4.70			14		13.15		27		42.25		30		60.30
	5	2.50			9	5.05	\$6.05		15		14.25	20	4	7.15			31		63.20
	6	2.65			10	5.50	6.60		16		15.50		5	7.75			5	12.80	
	7	2.85			11	6.00	7.20		17		16.75		6	8.45			6	14.00	
	8	3.10			12	6.55	7.85		18		17.75		7	9.20			7	15.25	
	9	3.40			13		8.65		19		19.50		8	10.00			8	16.55	
	10				14		9.45		20		21.00		9	10.90			9	17.95	
		3.75			15		10.35		21		22.60		10	11.85			10	19.40	
					16		11.35						11	12.80	15.35		11	20.90	
6	3	3.05						16	3	5.30			12	13.90	16.70		12	22.45	
	4	3.15		11	3	4.00			4	5.70			13	15.00	18.00		13	24.05	28.90
	5	3.25			4	4.15			5	6.10			14	16.20	19.45		14	25.75	30.90
	6	3.45			5	4.30			6	6.60			15	17.45	20.95		15	27.50	33.00
	7	3.70			6	4.55			7	7.20			16		22.50		16	29.30	35.15
	8	4.00			7	4.90			8	7.80			17		24.15		17	31.15	37.35
	9	4.40			8	5.25			9	8.50			18		25.90		18	33.15	39.75
	10	4.80			9	5.70	6.85		10	9.25	11.10		19		27.70		19	35.15	42.15
7	3	3.20			10	6.20	9.45		11	10.05	12.05		20		29.55		20		44.65
	4	3.25			11	6.75	8.10		12	10.95	13.15		21		31.50		21		47.20
	5	3.40			12	7.40	8.90		13	11.90	14.25		22		33.55		22		49.80
	6	3.55			13		9.70		14	12.90	15.50		23		35.65		23		52.50
	7	3.80			14		10.55		15		16.75		24		37.80		24		55.30
	8	4.15			15		11.55		16		18.05		25		40.05		25		58.15
	9	4.50			16		12.60		17		19.50		26		42.40		26		61.05
	10	4.95			17		13.75		18		21.00		27		44.80		27		64.05
	11	5.45			18		14.95		19		22.60		28		47.25		28		67.15
	12	6.00							20		24.20		29		49.80				
8	3	3.40		12	3	4.25			21		25.95		30		52.45		29		70.30
	4	3.45			4	4.45			22		27.75		31		55.10		30		73.50
	5	3.55			5	4.70			23		29.65	24	4	8.80			31		76.75
	6	3.75			6	5.00			24		31.60		5	9.60			32		80.05
	7	4.00			7	5.40		18	3	5.95			6	10.50			33		83.45

H. Channon Company Chicago

Power Transmission Equipment

Spur Paper Friction Wheel

Paper wheels must always be used on friction gearing where machinery is frequently thrown in and out of gear and for reverse motion, which is engaged and disengaged by a slight movement of the lever attached to the eccentric or end thrust box which forms one of the journal bearings thus dispensing with a clutch. When ordering give diameter and face of friction bore and size of key seat.



Diam., Inches	Face, Inches	Price, Each	Diam., Inches	Face, Inches	Price, Each
4	4	\$2.60	8	10	\$ 9.00
4	6	3.50	10	6	9.00
4	8	4.40	10	8	11.00
6	4	3.40	10	10	13.00
6	6	4.50	10	12	15.00
6	8	5.50	10	14	17.00
8	4	4.75	12	6	11.00
8	6	6.25	12	8	13.50
8	8	7.75	12	10	16.00
			12	12	18.50

Stationary Mule Stand

Complete with ceiling plate, guy rods, tension turn-buckles, etc., and all iron pulleys.

As regularly made the pulleys on this mule stand should never run faster than 300 R. P. M.

Stand No.	Belt Width, Inches	Size Pulley, Inches	Length of Standard Ft., In.	Price Each
2	2	10x 3	4	\$22.50
3	3	10x 4	4	25.00
4	4	12x 5	4	30.00
5	5	12x 6	5	32.00
6	6	12x 7	5	37.50
7	7	16x 8	5	40.00
8	8	24x10	6	45.00
10	10	24x12	6	55.00
12	12	30x14	6	65.00

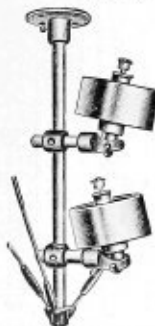


Adjustable Mule Stand

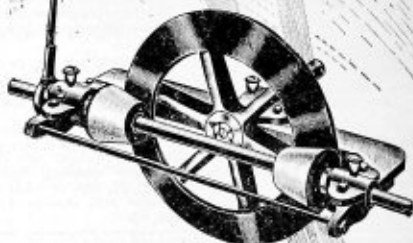
Adjustable in every direction, fitted with self-oiling bearings and oil drip reservoirs, all iron pulleys complete with ceiling plate, guy rods and turnbuckles.

As regularly made the pulleys on this mule stand should never run faster than 300 R. P. M.

Width Belt, Inches	Size Pulley, Inches	Length of Standard Ft., In.	Price Each
2	10x 3	4	\$ 55.00
3	10x 4	4	57.50
4	12x 5	4	60.00
5	12x 6	5	62.00
6	12x 7	5	75.00
7	16x 8	5	78.00
8	24x10	6	85.00
10	24x12	6	112.00
12	30x14	6	160.00



Bevel Friction Drive



Cut shows iron frame with two paper and one iron frictions for reversing motion. Frames are fitted with quick acting end thrust boxes for securing contact pressure. When ordering give width of face and degree of angle. Prices on application.

Prices of Spur Iron Friction

Diam., Inches	Face, Inches	Price Each	Diam., Inches	Face, Inches	Price Each
12	4	\$ 6.00	20	8	\$15.00
12	6	7.50	20	10	18.00
12	8	9.00	20	12	21.00
12	10	11.00	20	14	24.50
16	4	7.50	24	6	15.00
16	6	9.50	24	8	19.00
16	8	12.00	24	10	23.00

Swinging Belt Tightener

Desirable where a little flexibility is necessary in cases of undue strain.



Motion, Feet	Size Pulley, Inches	Price Each
3	12x 8	\$30.00
3	12x10	35.00
4	20x14	40.00
4	24x16	45.00
5	28x20	50.00
5	30x26	55.00

Belt Tightener

With rack and pinion adjustment for procuring uniform belt tension.

Number	Length of Adjustment, Ft.	Size Pulley Diam., Inches	Face, Inches	Diam. Shaft, Inches	Price Each with Iron Side Frames	Price Each without Iron Side Frames
00	1 1/2	12x9	1 1/2	1 1/2	\$37.50	\$30.00
0	1 3/4	18x12	1 1/2	1 1/2	50.00	40.00
1	2	24x14	1 1/2	1 1/2	70.00	55.00
2	3 1/2	28x20	2 1/2	2 1/2	100.00	82.00
3	4	30x26	2 1/2	2 1/2	160.00	120.00
4	5	42x38	2 1/2	2 1/2	200.00	250.00



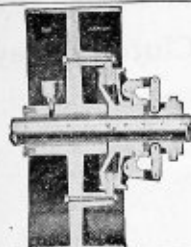
Style B Friction Clutch Pulleys

This clutch is simple, compact, easy to adjust—with maximum power—as a large friction surface is obtained within a small space, on a disc between two plates, which are connected with powerful toggles.

The movement of one part adjusts all toggles and gives equal pressure on the friction surface.

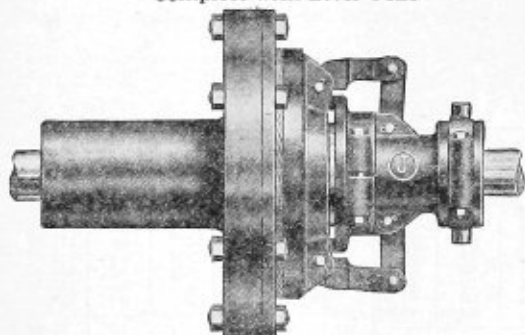
Friction blocks are of hard maple riveted to friction plate with copper rivets—the blocks are also supported on both sides by flanges on the friction plate—which is finished all around as are the wooden friction blocks.

This clutch can be fitted to sheaves, gears or sprockets in the same manner as to pulley shown in illustration.



Dia. In.	Face In.	H. P. 100 Rev.	Largest Bore	Total Shaft Space	Price Each	Dia. In.	Face In.	H. P. 100 Rev.	Largest Bore	Total Shaft Space	Price Each	Dia. In.	Face In.	H. P. 100 Rev.	Largest Bore	Total Shaft Space	Price Each
8	4	1.7	1 1/4	14	\$33.35	22	4	4.9	2 1/4	14	\$ 42.50	36	9	18.0	3 1/2	22	\$ 89.25
	5	2.2	1 3/4	15	34.50		5	6.1	2 1/2	16	48.00		10	20.0	3 3/4	23	110.70
	6	2.6	1 3/4	16	35.55		6	7.3	2 3/4	17	49.00		12	24.0	4	25	115.00
	7	3.1	2 1/4	17	38.90		7	8.5	3	18	51.00		14	28.0	4 1/2	28	135.00
	8	3.5	2 1/4	18	39.35		8	9.7	3 1/4	19	52.00		16	32.0	4 3/4	30	143.00
							9	10.0	3 1/4	21	55.00		18	36.0	5	32	158.00
							10	12.2	3 3/4	22	57.00		20	40.0	5	34	174.00
							12	14.0	3 3/4	24	70.00						
9	4	2.0	1 1/4	14	33.65							38	6	12.6	3 3/4	18	73.50
	5	2.5	1 3/4	15	34.85								7	14.7	3 3/4	19	76.00
	6	3.0	2	16	37.75								8	16.8	3 3/4	21	89.00
	7	3.5	2	17	39.35								9	19.1	3 3/4	22	110.00
	8	4.0	2 1/4	18	40.15								10	21.1	4	23	114.00
10	4	2.2	1 1/4	14	33.95								12	25.3	4 1/2	26	136.00
	5	2.7	1 3/4	15	35.15								14	29.5	4 3/4	28	146.00
	6	3.3	2	16	39.10								16	33.7	4 3/4	30	160.00
	7	3.8	2	17	39.65								18	38.0	5	33	174.00
	8	4.4	2 1/4	18	40.60								20	42.2	5	35	178.00
	9	5.0	2 1/4	19	40.95												
	10	5.5	2 1/4	20	41.60												
11	4	2.4	1 1/4	14	34.25							40	6	14.3	3 3/4	18	75.00
	5	3.1	1 3/4	15	38.90								7	15.5	3 3/4	20	88.00
	6	3.6	1 3/4	16	39.50								8	18.7	3 3/4	21	91.00
	7	4.2	2 1/4	17	40.10								10	22.4	4	23	116.00
	8	4.8	2 1/4	18	40.80								12	27.9	4 1/2	26	138.00
	9	5.5	2 1/4	19	41.40								14	31.6	4 3/4	28	144.00
	10	6.1	2 1/2	21	42.10								16	37.4	5	31	170.00
12	4	2.6	1 1/4	14	38.15								18	42.1	5	33	175.00
	5	3.3	1 3/4	15	39.30								20	44.8	5	35	185.00
	6	4.0	1 3/4	16	39.95								22	51.5	5 1/2	39	234.00
	7	4.6	2 1/4	17	40.55								24	59.8	5 1/2	41	240.00
	8	5.3	2 1/4	18	41.30												
	9	6.0	2 1/4	20	41.40												
	10	6.6	2 1/2	21	42.15												
13	4	2.8	2	14	38.45							42	6	14.0	3 3/4	18	77.00
	5	3.6	2 1/4	15	39.65								8	18.0	3 3/4	21	94.00
	6	4.3	2 1/4	16	40.35								10	23.8	4	23	118.00
	7	5.1	2 1/4	17	41.00								12	28.0	4 1/2	26	140.00
	8	5.7	2 1/4	18	41.75								14	32.6	4 3/4	28	147.00
	9	6.5	2 1/4	20	42.50								16	37.3	5	31	173.00
	10	7.2	2 1/2	21	43.30								18	42.0	5	33	179.00
14	4	3.1	2 1/4	14	39.35								20	46.6	5 1/2	37	230.00
	5	3.8	2 1/4	15	40.10								22	51.8	5 1/2	39	235.00
	6	4.6	2 1/4	16	40.85								24	56.0	5 1/2	41	245.00
	7	5.4	2 1/4	17	41.60												
	8	6.2	2 1/4	19	43.75												
	9	7.0	2 1/4	20	44.35												
	10	7.7	2 1/2	21	51.80												
16	4	3.5	2 1/4	14	39.95							44	6	14.6	3 3/4	18	80.00
	5	4.4	2 1/4	15	40.70								8	19.5	3 3/4	21	94.00
	6	5.3	2 1/4	16	41.40								10	24.4	4	23	120.00
	7	6.2	2 1/4	18	46.95								12	28.3	4 1/2	26	144.00
	8	7.1	2 1/4	19	47.55								14	34.2	5	29	170.00
	9	8.0	2 1/4	20	48.45								16	39.1	5	31	177.00
	10	8.8	2 1/2	21	52.85								18	44.0	5	32	183.00
18	4	4.0	2 1/4	14	40.75								20	48.8	5 1/2	37	236.00
	5	5.0	2 1/4	15	41.75								22	54.4	5 1/2	39	242.00
	6	6.0	2 1/4	16	42.65								24	60.0	5 1/2	41	250.00
	7	7.0	2 1/4	18	48.00												
	8	8.0	2 1/4	19	49.00												
	9	9.0	2 1/4	20	50.00												
	10	10.0	3 1/4	22	54.80												
20	4	4.4	2 1/4	14	41.45							46	6	15.6	3 3/4	19	92.00
	5	5.5	2 1/4	15	42.65								8	20.4	4	24	117.00
	6	6.6	2 1/4	17	48.10								10	25.5	4 1/2	24	140.00
	7	7.7	2 1/4	18	49.25								12	31.2	4 3/4	26	147.00
	8	8.8	2 1/4	19	50.40								14	35.7	5	29	173.00
	9	10.0	3 1/4	21	64.85								16	40.4	5	31	180.00
	10	11.0	3 1/4	22	65.40								18	46.0	5 1/2	35	235.00
	12	13.1	3 1/4	24	68.35								20	51.1	5 1/2	37	240.00
													22	57.8	5 1/2	39	248.00
													24	61.3	5 1/2	41	255.00
													26	69.0	6	44	365.00
												48	6	16.0	3 3/4	19	94.00
													8	21.3	4	24	120.00
													10	26.6	4 1/2	24	144.00
													12	32.0	4 3/4	26	150.00
													14	37.3	5	29	177.00
													16	42.6	5	31	183.00
													18	48.0	5 1/2	35	238.00
													20	53.3	5 1/2	37	245.00
													22	58.6	5 1/2	39	252.00
													24	64.0	5 1/2	41	260.00
													26	69.8	6 1/4	44	370.00

Style "B" Clutch With Standard Sleeve Complete with Lever Yoke



Used as above either as a shaft coupling or to drive pulley mounted on sleeve.

Price List

Size of Clutch	Largest Bore	H-P at 100 R-P-M	Length of Standard Sleeve	Price
6	2	3	6	\$ 29.00
8	2½	6	7	38.00
10	2½	10	8	50.00
12	3	15	8	60.00
14	3	20	10	75.00
16	3½	25	10	92.00
18	4	35	12	100.00
20	4½	45	12	124.00
24	5	65	14	170.00
30	6	100	16	264.00

For split Clutches add 20%.

Shifter Yokes

Furnished with Above Clutches



Style A

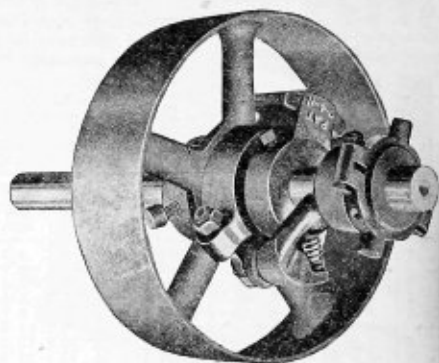


Style B

Price Yoke Only

For size clutch...	6	8	10	12	14	16
Price.....	\$4.00	\$4.50	\$5.00	\$5.00	\$5.50	\$6.00
For size clutch.....	18	20	24	30	36	
Price.....	6.00	8.00	11.00	14.00	18.00	

The Master Band Clutch Pulley



This clutch is extremely simple and easy to adjust and requires very little space on the shaft.

It is a good clutch pulley for line shaft and counter-shaft work.

No. 2 Clutch Pulleys Single Belt,
4½ H. P. Bore to 2½ Inches

Size	Price	Size	Price	Size	Price
6x3	\$19.20	14x3	\$21.20	14x9	\$42.90
4	19.50	4	21.80	10	43.90
5	20.30	6	22.70	16x8	42.50
6	20.70	15x3	21.50	9	43.60
7x3	19.40	4	22.10	10	45.40
4	19.80	6	23.10	18x7	42.90
6	21.00	16x3	22.20	8	44.00
8x3	19.50	4	22.80	9	46.00
4	19.90	6	23.90	20x6	42.40
6	20.40	18x3	22.80	7	44.30
8	22.40	4	23.50	8	45.50
9x3	19.80	6	24.90	22x4	41.10
4	20.20	20x3	23.40	5	42.90
6	20.70	4	24.40	6	44.20
8	22.40	22x3	24.70	7	46.30
10x3	20.10	4	25.90	24x4	42.10
4	20.60	24x3	27.20	5	44.10
6	21.20	4	28.40	6	49.00
8	23.00	26x3	28.10	26x4	43.30
12x3	20.70	4	29.30	5	45.40
4	21.20			6	47.10
6	22.00			28x4	44.60
				5	46.90
				30x4	45.90
				5	48.40

Master Gasoline Engine Clutch Pulleys

Compact, Simple and Inexpensive

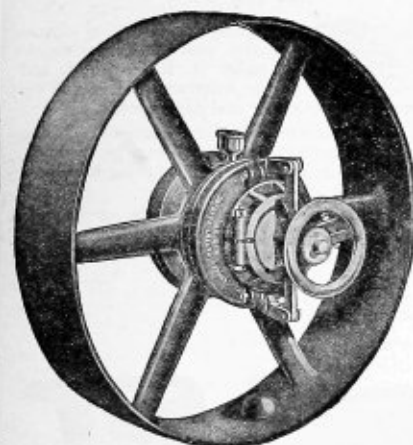


Diams. Ins.	Face	H. P.	Price	Diams. Ins.	Face	H. P.	Price	Diams. Ins.	Face	H. P.	Price	Diams. Ins.	Face	H. P.	Price
6	4-6	To 2½	\$10.60	14	4-6	To 6	\$13.00	18	6-8	To 8	\$22.00	22	8-10	To 12	\$26.00
8	4-6	To 6	11.70	16	4-6	To 6	17.00	20	4-6	To 6	17.00	24	6-8	To 8	25.00
10	4-6	To 8	12.10					20	6-8	To 8	23.00	24	8-10	To 12	28.00
12	4-6	To 6	12.50	18	4-6	To 6	19.00	22	6-8	To 8	24.00	26	6-8	To 8	27.00

Give size of shaft and keyseat. Add 40% if clutch is bolted to arms and end sketch.

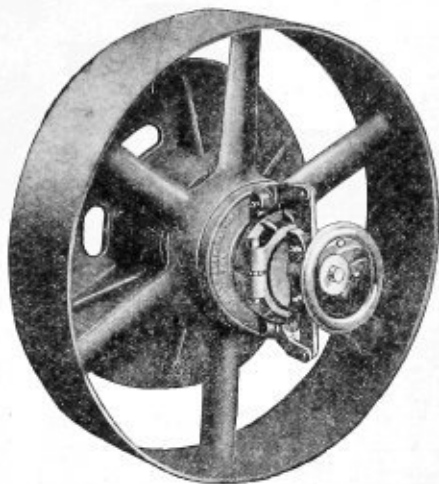
Avoid wasting your oil, by storing it in Channon's Steel Barrels.

Gasoline Engine Clutch Pulley



No. 1 Clutch Key Seated to Shaft

These
Clutches
can be
furnished
with lever
in place
of hand
wheel
when
desired.



No. 2 Clutch with Spider Bolted to Arms of Flywheel

This friction clutch pulley has been adopted after a great many years experimenting with various styles of friction clutches.

The toggle arrangement is very powerful, also has a positive release. The friction is fibre to iron. The fibre takes all the wear, is easily replaced at small cost, making the clutch as good as new. All parts are in plain view and are readily accessible. Adjustments are easily made by means of a threaded ring and clamping bolt, making the pressure on all toggles uniform.

In ordering, send sketch showing diameter and length of shaft, size of key seat and when No. 2 clutch is required, give also diameter of hub, diameter of bolt circle, number and size of bolts. Always state horse power and speed of engine.

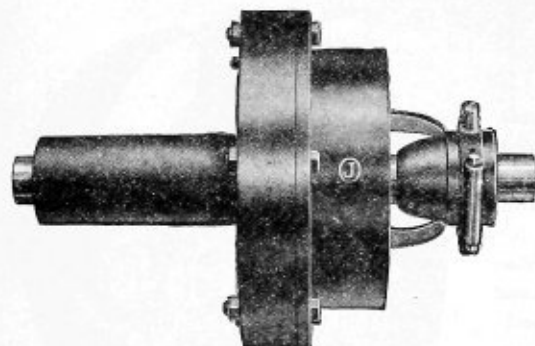
Price of No. 1 Clutch

Price of No. 2 Clutch

Diam. of Pulley	Face of Pulleys in Inches				H. P. of Engine	Largest Bore	Longest Shaft Clutch Will Take	Diam. of Pulley	Face of Pulleys in Inches				H. P. of Engine
	6	8	10	12					6	8	10	12	
6	\$11.00	\$11.45			4	1 1/2	5 1/2	6	\$12.80	\$13.20			4
8	11.35	11.70			4	1 1/2	5 1/2	8	13.05	13.50			4
8	12.75	13.00			8	2 1/4	6 1/4	8	14.10	14.65			8
10	11.65	12.10			4	1 1/2	5 1/2	10	13.40	13.90			4
10	12.95	13.40	\$14.00		8	2 1/4	6 1/4	10	14.40	14.85	\$15.45		8
12	12.00	12.55	13.20		4	1 1/2	5 1/2	12	13.70	14.40	14.95		4
12	13.25	13.85	14.60		8	2 1/4	6 1/4	12	14.80	15.30	15.95		8
12	15.10	15.70	16.35	\$17.00	14	2 3/4	6 3/4	12	16.70	17.25	17.90	\$18.55	14
12	17.10	17.70	18.35	18.95	4	1 1/2	5 1/2	12	18.95	19.55	20.20	20.85	16
14	13.65	14.30	15.10		8	2 1/4	6 1/4	14	14.10	14.80	15.60		4
14	15.50	16.15	16.95	17.65	14	2 3/4	6 3/4	14	15.00	15.50	16.40		8
14	17.50	18.15	18.90	19.65	16	3 1/4	8 1/4	14	17.10	17.70	8.50	19.20	14
16	12.70				4	1 1/2	5 1/2	14	19.30	20.00	20.80	21.50	16
16	13.95	14.75	15.60		8	2 1/4	6 1/4	16	14.50				4
16	15.85	16.60	17.40	18.20	14	2 3/4	6 3/4	16	16.35	16.10	16.85		8
16	17.80	18.60	19.35	20.20	16	3 1/4	8 1/4	16	17.40	18.15	18.90	19.80	14
16	21.80	22.25	23.05	23.85	20	4	8 1/4	16	19.70	20.45	21.20	22.05	16
18	14.40	15.30			8	2 1/4	6 1/4	16	23.20	24.00	24.80	25.60	20
18	16.30	17.20	18.10		14	2 3/4	6 3/4	18	16.05	16.95			8
18	18.30	19.20	20.05	21.00	16	3 1/4	8 1/4	18	17.80	18.70	19.65		14
18	21.95	22.85	23.80	24.65	20	4	8 1/4	18	21.65	22.60	23.50	24.40	16
20	14.95	15.90			8	2 1/4	6 1/4	18	24.95	25.80	26.70	27.60	20
20	16.80	17.80	18.80		14	2 3/4	6 3/4	20	16.55	17.60			8
20	18.80	19.75	20.80	21.85	16	3 1/4	8 1/4	20	18.35	19.30	20.40		14
20	22.45	23.40	24.45	25.55	20	4	8 1/4	20	22.20	23.15	24.20	25.25	16
22	15.40				8	2 1/4	6 1/4	20	25.40	26.40	27.40	28.50	20
22	17.25	18.35	19.50		14	2 3/4	6 3/4	22	17.00	18.25			8
22	19.25	20.35	21.50	22.65	16	3 1/4	8 1/4	22	18.80	19.90	21.05		14
22	22.90	24.00	25.15	26.35	20	4	8 1/4	22	22.65	23.75	24.90	26.05	16
22	28.20	29.30	30.45	31.60	30	4	9 1/4	22	25.85	27.00	28.10	29.30	20
24	17.80	19.00	20.25		14	2 3/4	6 3/4	22	31.05	32.15	33.30	34.50	30
24	19.80	21.00	22.25	23.55	16	3 1/4	8 1/4	24	19.30	21.20	22.45		14
24	23.40	24.65	25.95	27.25	20	4	8 1/4	24	23.20	24.40	25.65	26.95	16
24	28.70	29.95	31.20	32.45	30	4	9 1/4	24	26.40	27.60	28.90	30.15	20
								24	31.60	32.80	34.10	35.40	30

Larger sizes quoted on request.

Style D Friction Clutch



This cut illustrates our style D friction clutch. Because of the few parts and unusually simple design. Do not mistake it for a light and delicate clutch, as on the contrary it is made for hard service at both low and high speeds.

They are made with standard sleeves to which a pulley, gear, sprocket, or sheave can be fastened, and are also made as clutch pulleys using the clutch mechanism without the sleeve.

We use this type for countershaft service and make them in duplex for any condition requiring duplex clutches.

Price with Standard Sleeve

Size of Clutch	Largest Bore, Inches	Length of Std. Sleeve, Inches	Horse Power at 100 R. P. M.	Price
5	1 1/2	5	1 1/2	\$21.00
6	1 3/4	6	2 1/2	25.00
8	2 1/8	7	5	30.00
10	2 3/8	8	8	40.00

Davis Ring Oiling Loose Pulleys

This pulley will run for months without attention. Reasonable care should be taken to see that they are kept filled with oil. It has proven the most efficient loose pulley after thorough and severe tests.



Style B



Style A

Price List

Size	Price	Size	Price	Size	Price	Size	Price	Size	Price
5x2	\$2.60	9x 8	\$4.60	13x 3	\$4.65	16x 6	\$6.25	22x 9	\$11.00
5x3	2.75	9x 9	5.00	13x 4	4.80	16x 7	6.50	22x10	11.25
5x4	2.85	9x10	5.60	13x 5	4.90	16x 8	6.75	24x 3	7.00
5x5	3.00	10x 3	3.75	13x 6	5.45	16x 9	8.40	24x 4	7.25
6x3	3.00	10x 4	3.85	13x 7	5.75	16x10	8.75	24x 5	7.70
6x4	3.20	10x 5	4.00	13x 8	6.00	18x 3	6.00	24x 6	7.80
6x5	3.30	10x 6	4.10	13x 9	7.20	18x 4	6.15	24x 7	9.00
6x6	3.50	10x 7	4.35	13x10	7.50	18x 5	6.25	24x 8	9.25
6x7	3.70	10x 8	5.00	14x 3	4.75	18x 6	6.55	24x 9	11.25
6x8	4.15	10x 9	5.60	14x 4	4.95	18x 7	6.85	24x10	11.75
7x3	3.20	10x10	6.00	14x 5	5.30	18x 8	7.00	24x12	12.50
7x4	3.30	11x 3	4.00	14x 6	5.55	18x 9	8.90		
7x5	3.40	11x 4	4.35	14x 7	6.00	18x10	9.15		
7x6	3.60	11x 5	4.45	14x 8	6.25	20x 3	6.25		
7x7	3.80	11x 6	4.60	14x 9	7.50	20x 4	6.50		
7x8	4.35	11x 7	5.00	14x10	8.00	20x 5	6.75		
8x3	3.30	11x 8	5.25	15x 3	4.85	20x 6	6.95		
8x4	3.40	11x 9	5.60	15x 4	5.10	20x 7	7.15		
8x5	3.60	11x10	6.80	15x 5	5.50	20x 8	7.60		
8x6	3.80	12x 3	4.25	15x 6	5.75	20x 9	9.50		
8x7	4.00	12x 4	4.65	15x 7	6.25	20x10	10.00		
8x8	4.50	12x 5	4.75	15x 8	6.50	22x 3	6.75		
9x3	3.40	12x 6	4.85	15x 9	7.75	22x 4	6.95		
9x4	3.75	12x 7	5.20	15x10	8.25	22x 5	7.15		
9x5	3.80	12x 8	5.40	16x 3	5.50	22x 6	7.60		
9x6	4.00	12x 9	6.75	16x 4	6.00	22x 7	8.10		
9x7	4.20	12x10	7.20	16x 5	6.15	22x 8	8.75		

Style B

Extra to be added to above list for "Style B" pulleys.

Size	Price
6 to 8	\$1.40
9 to 10	1.60
11 to 12	1.75
13 to 14	2.00
15 to 16	2.20
17 to 18	2.45
20 to 22	2.80
23 to 24	3.00

Ring Oiling Loose Pulley Sleeves for Wood and Steel Pulleys on Application.

Spur Gearing



No. of Pattern	No. of Teeth	Pitch Diam.	Face	Pitch, inches	Price	No. of Pattern	No. of Teeth	Pitch Diam.	Face	Pitch, inches	Price	No. of Pattern	No. of Teeth	Pitch Diam.	Face	Pitch, inches	Price	No. of Pattern	No. of Teeth	Pitch Diam.	Face	Pitch, inches	Price
4071	15	2.44	1/4	1/2	\$ 1.75	206	10	3.18	1/2	1	\$ 3.00	82	11	4.88	3/2	1 1/2	\$ 7.10	177	13	8.29	6	\$ 15.75	
139	16	2.55	1/4	1/2	1.85	226	11	3.50	1/2	1	3.20	202	14	6.13	3/2	1 1/2	8.70	115	14	8.91	6	17.00	
161	18	2.86	1/4	1/2	2.05	109	12	3.82	1/2	1	3.40	83	68	29.26	3/2	1 1/2	30.30	185	16	10.19	6	19.50	
21	24	3.82	1/4	1/2	2.65	144	13	4.13	1/2	1	3.60	203	98	42.90	3/2	1 1/2	42.30	538	17	10.88	6	20.75	
135	12	2.39	1/2	3/4	1.45	151	14	4.46	1/2	1	3.80	162	10	4.77	1/2	1	6.00	187	19	12.10	6	23.25	
22	13	2.59	1/2	3/4	1.75	16	15	4.77	1/2	1	4.00	163	12	5.73	1/2	1	7.10	249	22	14.05	6	27.00	
153	15	2.98	1/2	3/4	1.95	129	16	5.09	1/2	1	4.20	126	13	6.21	1/2	1	8.20	178	24	15.28	6	29.50	
23	16	3.18	1/2	3/4	2.05	107	18	5.73	1/2	1	4.60	138	14	6.68	1/2	1	8.20	244	26	16.55	6	30.75	
141	20	3.98	1/2	3/4	2.45	140	21	6.68	1/2	1	5.00	101	15	7.16	1/2	1	8.75	241	28	17.82	6	32.00	
198	24	4.77	1/2	3/4	2.85	14	25	7.96	1/2	1	5.20	117	16	7.64	1/2	1	9.30	191	30	19.10	6	34.50	
24	28	5.59	1/2	3/4	3.25	230	26	8.28	1/2	1	6.00	525	17	8.16	1/2	1	9.85	188	33	22.28	6	43.20	
500	30	5.98	1/2	3/4	3.45	207	30	9.55	1/2	1	6.20	102	18	8.59	1/2	1	10.40	355	38	24.22	6	47.00	
234	37	7.36	1/2	3/4	4.15	110	37	11.46	1/2	1	7.00	526	19	9.11	1/2	1	10.95	376	41	26.18	6	50.75	
221	38	7.56	1/2	3/4	4.25	137	37	11.78	1/2	1	8.20	164	20	9.55	1/2	1	11.50	540	44	28.04	6	54.50	
111	45	8.95	1/2	3/4	4.95	15	50	15.92	1/2	1	8.40	528	22	10.54	1/2	1	12.60	179	48	30.56	6	59.50	
219	65	12.93	1/2	3/4	6.95	504	55	17.51	1/2	1	12.00	165	24	11.46	1/2	1	13.15	293	52	33.11	6	64.50	
644	10	2.43	1/4	3/4	1.50	505	56	17.82	1/2	1	12.20	216	26	12.44	1/2	1	13.70	186	59	37.56	6	73.25	
209	13	3.10	1/4	3/4	1.95	507	60	19.11	1/2	1	13.00	237	28	13.37	1/2	1	14.80	539	63	40.12	6	78.25	
108	14	3.34	1/4	3/4	2.10	120	63	20.05	1/2	1	13.60	166	29	13.85	1/2	1	15.90	195	64	40.74	6	85.75	
262	15	3.58	1/4	3/4	2.25	4038	65	20.70	1/2	1	14.00	104	36	17.19	1/2	1	16.45	114	69	43.93	6	93.00	
25	16	3.82	1/4	3/4	2.40	508	66	21.00	1/2	1	14.20	533	44	21.01	1/2	1	24.70	541	74	47.12	6	98.25	
26	17	4.06	1/4	3/4	2.55	509	72	22.92	1/2	1	15.40	167	45	21.49	1/2	1	25.25	189	75	47.75	6	102.00	
27	18	4.27	1/4	3/4	2.70	509	76	24.20	1/2	1	16.00	116	46	21.96	1/2	1	25.80	296	10	7.16	6 1/2	12.00	
263	21	5.01	1/4	3/4	3.00	509	76	24.20	1/2	1	16.20	103	50	23.87	1/2	1	28.00	227	12	8.69	6 1/2	15.75	
154	24	5.73	1/4	3/4	3.15	47	88	28.01	1/2	1	18.60	215	53	25.30	1/2	1	29.65	180	14	10.03	6 1/2	19.00	
153	25	5.93	1/4	3/4	3.60	148	100	31.83	1/2	1	21.00	217	56	26.74	1/2	1	31.30	200	16	11.46	6 1/2	22.50	
28	28	6.70	1/4	3/4	3.75	511	114	36.30	1/2	1	23.80	530	60	28.63	1/2	1	33.50	374	24	34.33	6 1/2	54.00	
264	33	7.88	1/4	3/4	4.20	78	9	3.22	3/4	1 1/4	4.00	129	63	30.25	1/2	1	35.15	228	26	25.78	6 1/2	57.50	
501	37	8.83	1/4	3/4	4.95	79	11	3.99	3/4	1 1/4	4.50	530	65	31.05	1/2	1	36.25	368	42	30.09	6 1/2	68.00	
152	39	9.31	1/4	3/4	5.55	127	14	5.03	3/4	1 1/4	5.25	131	72	34.38	1/2	1	40.10	211	50	35.81	6 1/2	82.00	
19	40	9.55	1/4	3/4	5.85	81	15	5.37	3/4	1 1/4	5.50	128	83	39.63	1/2	1	46.15	354	56	40.11	6 1/2	92.50	
660	41	9.80	1/4	3/4	6.15	512	22	7.88	3/4	1 1/4	7.25	248	86	41.08	1/2	1	47.80	201	64	45.84	6 1/2	106.50	
29	42	10.04	1/4	3/4	6.30	513	96	34.38	3/4	1 1/4	25.75	210	96	45.88	1/2	1	53.30	369	83	59.47	6 1/2	139.75	
156	46	10.98	1/4	3/4	6.90	366	122	43.69	3/4	1 1/4	32.25	531	100	47.75	1/2	1	55.60	543	92	65.90	6 1/2	155.50	
70	48	11.47	1/4	3/4	7.20	245	10	4.04	3/4	1 1/4	4.00	532	105	50.14	1/2	1	58.25	232	12	9.66	7 1/2	27.00	
134	60	14.33	1/4	3/4	9.00	122	12	4.77	3/4	1 1/4	4.70	199	113	53.00	1/2	1	61.55	90	14	11.14	7 1/2	31.00	
265	72	17.19	1/4	3/4	10.80	160	13	5.17	3/4	1 1/4	4.70	252	10	5.66	5/8	1 1/4	8.00	243	15	11.94	7 1/2	33.00	
257	84	20.05	1/4	3/4	12.60	142	14	5.57	3/4	1 1/4	5.05	168	12	6.68	5/8	1 1/4	9.60	89	16	12.74	7 1/2	35.00	
224	11	3.06	2 1/4	7/8	2.15	113	15	5.97	3/4	1 1/4	5.40	169	13	7.24	5/8	1 1/4	10.40	544	17	13.60	7 1/2	37.00	
342	12	3.25	2 1/4	7/8	2.30	136	16	6.37	3/4	1 1/4	5.75	149	14	7.80	5/8	1 1/4	11.20	358	20	15.98	7 1/2	43.00	
123	13	3.62	2 1/4	7/8	2.45	204	17	6.76	3/4	1 1/4	6.10	170	15	8.36	5/8	1 1/4	12.00	545	24	19.07	7 1/2	51.00	
157	14	3.90	2 1/4	7/8	2.60	516	18	7.20	3/4	1 1/4	6.45	171	16	8.91	5/8	1 1/4	12.80	123	30	23.87	7 1/2	63.00	
143	15	4.18	2 1/4	7/8	2.75	517	19	7.59	3/4	1 1/4	6.80	172	18	10.03	5/8	1 1/4	14.40	242	37	29.44	7 1/2	77.00	
192	16	4.46	2 1/4	7/8	2.90	106	20	7.96	3/4	1 1/4	7.15	285	20	11.17	5/8	1 1/4	16.00	371	39	31.05	7 1/2	81.00	
145	18	5.01	2 1/4	7/8	3.20	250	22	8.76	3/4	1 1/4	7.85	86	21	11.70	5/8	1 1/4	16.80	223	42	33.45	7 1/2	87.00	
11	20	5.57	2 1/4	7/8	3.50	519	25	9.77	3/4	1 1/4	8.20	173	24	13.37	5/8	1 1/4	19.20	372	43	34.24	7 1/2	89.00	
123	22	6.13	2 1/4	7/8	3.80	239	27	10.74	3/4	1 1/4	9.25	254	30	16.60	5/8	1 1/4	20.80	359	53	42.20	7 1/2	109.00	
687	27	7.53	2 1/4	7/8	4.55	520	28	11.16	3/4	1 1/4	9.95	174	36	20.05	5/8	1 1/4	24.00	374	74	58.90	7 1/2	151.00	
196	31	8.36	2 1/4	7/8	5.00	118	30	11.94	3/4	1 1/4	10.30	205	40	22.28	5/8	1 1/4	32.00	621	76	60.50	7 1/2	155.00	
181	33	8.63	2 1/4	7/8	5.15	218	35	13.94	3/4	1 1/4	11.00	175	52	28.97	5/8	1 1/4	41.60	547	98	78.00	7 1/2	199.00	
197	33	9.19	2 1/4	7/8	5.45	121	40	15.95	3/4	1 1/4	12.75	534	54	30.10	5/8	1 1/4	43.20	375	100	79.60	7 1/2	203.00	
134	40	11.04	2 1/4	7/8	6.50	521	50	19.90	3/4	1 1/4	14.50	255	71	39.57	5/8	1 1/4	56.80	235	12	10.50	8 1/2	36.00	
146	50	13.93	2 1/4	7/8	7.40	105	60	23.87	3/4	1 1/4	18.00	616	75	41.70	5/8	1 1/4	68.80	238	13	11.38	8 1/2	35.50	
184	73	20.40	2 1/4	7/8	8.00	522	62	24.80	3/4	1 1/4	21.50	150	86	47.91	5/8	1 1/4	74.40	213	26	22.76	8 1/2	71.00	
13	75	20.89	2 1/4	7/8	11.45	523	66	26.27	3/4	1 1/4	23.60	367	93	51.80	5/8	1 1/4	84.40	212	76	66.52	8 1/2	176.00	
220	78	21.72	2 1/4	7/8	11.75	194	75	29.84	3/4	1 1/4	26.75	253	108	60.19	5/8	1 1/4	96.00	208	14	13.37	9 1/2	54.00	
258	86	23.95	2 1/4	7/8	13.40	112	80	31.84	3/4	1 1/4	28.50	232	120	66.85	5/8	1 1/4	97.60	229	20	19.12	9 1/2	72.00	
158	94	26.18	2 1/4	7/8	14.60	133	90	35.81	3/4	1 1/4	32.00	536	122	67.95	5/8	1 1/4	132	25	23.87	9 1/2	87.00		
190	102	28.41	2 1/4	7/8	15.80	246	92	36.61	3/4	1 1/4	32.70	87	10	6.47	2	12.00	385	84	80.23	9 1/2	264.00		
132	114	31.75	2 1/4	7/8	17.60	524	115	45.50	3/4	1 1/4	40.75	176	12	7.64	2	14.50	240	101	96.45	9 1/2	315.00		

Bevel Gearing

A pair of Bevel Gears consists of two gears of different diameters running together at right angles, the smaller being called the pinion.

The "backing" is the distance the hub extends back of the pitch circle. Pitch for bevel gears is measured at large end of teeth.



No. of Pat.	Price each	No. of Teeth	Pitch Diam.	Face	Pitch, inch	Backing	Proportion	No. of Pat.	Price each	No. of Teeth	Pitch Diam.	Face	Pitch, inch	Backing	Proportion
388	\$ 2.65	24	3.83	1 1/4	3/4	3/4	1.14 to 1	476	\$ 27.10	76	30.40	3	1 1/4	3	4 to 1
387	2.35	21	3.25	1 1/4	3/4	3/4		475	7.15	19	7.60	3	1 1/4	3 1/2	
390	3.55	30	5.98	1 1/4	3/4	3/4	1.7 to 1	470	27.10	76	30.24	3 1/4	1 1/4	3 1/2	4.47 to 1
389	2.25	18	3.60	1 1/4	3/4	3/4		469	6.45	17	6.76				
398	9.00	60	14.33	2	3/4	1 1/2	1.5 to 1	412	22.30	48	20.01	3 1/2	1 1/4	2 1/2	1.13 to 1
397	6.00	40	9.56	2	3/4	3/4		411	19.90	42	18.38			2	
424	3.15	21	5.01	1 1/2	3/4	3/4	1.6 to 1	474	25.10	55	24.07	3 1/2	1 1/4	2 1/2	1.23 to 1
423	1.95	13	3.10			3/4		473	20.70	44	19.26			1 1/2	
422	5.10	34	8.12	2	3/4	3/4	1.7 to 1	410	46.70	109	47.71	3 1/2	1 1/4	6	6.06 to 1
421	3.00	20	4.47			3/4		409	10.30	18	7.88			1 1/4	
42	6.30	42	10.03	2	3/4	1 1/2	2 to 1	466	37.10	85	37.20	3 1/2	1 1/4	4 1/2	7.09 to 1
41	3.15	21	5.01			3/4		465	7.90	12	5.25			1 1/4	
450	6.75	45	10.74	1 1/4	3/4	1 1/4	3 to 1	478	22.50	40	19.10	4	1 1/2	2 1/4	1.33 to 1
449	2.25	15	3.58			3/4		477	17.00	30	14.32			1 1/4	
400	7.20	48	12.00	2	3/4	1 1/4	3 to 1	414	29.10	52	24.83	4	1 1/2	2 1/2	1.33 to 1
399	2.40	16	4.00	2	3/4	3/4		413	21.95	39	18.60			1 1/4	
444	8.40	56	13.37	2	3/4	1 1/4	4 to 1	488	20.30	36	17.19	4	1 1/2	1 1/4	1.62 to 1
443	2.10	14	3.34			3/4		487	12.60	22	10.50			1 1/4	
464	10.00	45	14.32	2 1/2	1	1 1/2	1.18 to 1	446	35.70	64	30.57	4	1 1/2	4	5.33 to 1
463	8.60	38	12.10			1 1/4		445	7.10	12	5.79			3/4	
468	14.40	67	21.33	2 1/2	1	1 1/4	1.34 to 1	452	25.25	45	21.49	4	1 1/2	2 1/4	3 to 1
467	11.00	50	15.92			1 1/4		451	8.75	15	7.16			3/4	
489	7.20	31	9.87	2 1/4	1	1	1.48 to 1	4002	35.15	63	30.08	4	1 1/2	4 1/4	3 to 1
490	5.20	21	6.68			3/4		4001	12.05	21	10.03			1	
448	8.60	38	12.10	2 1/2	1	1 1/4	1.52 to 1	498	41.75	75	35.81	4	1 1/2	5	3 to 1
447	6.00	25	7.96			3/4		497	14.25	25	11.98			1	
428	12.40	57	18.14	2 1/2	1	1 1/4	1.5 to 1	462	33.50	60	28.65	4	1 1/2	3 1/2	3.75 to 1
427	8.60	38	12.10			1		461	9.30	16	7.64			1 1/4	
456	7.40	32	10.19	2 1/2	1	1 1/4	2 to 1	4006	38.45	69	32.94	4	1 1/2	6 1/4	4.6 to 1
455	4.20	16	5.09			3/4		4005	8.75	15	7.16			1 1/4	
442	10.60	48	15.28	2 1/2	1	2 1/4	2 to 1	480	51.10	92	43.93	4	1 1/2	6	7.01 to 1
441	5.80	24	7.64			3/4		479	7.65	13	6.21			3/4	
454	13.00	60	19.10	2 1/2	1	2	2 to 1	39	40.00	50	28.12	5 1/2	1 1/4	4	1.43 to 1
453	7.00	30	9.55	2 1/2	1	3/4		40	28.00	35	19.75	5 1/2	1 1/4	4 1/2	
394	9.00	40	12.75	2 1/2	1	1 1/2	2.65 to 1	432	43.20	54	30.10	4	1 1/4	4	1.8 to 1
393	4.00	15	4.81			3/4		431	24.00	30	16.75	4	1 1/4	1 1/2	
402	12.00	35	17.51	2 1/2	1	2 1/4	2.75 to 1	440	48.00	60	33.48	4	1 1/4	3 1/2	3 to 1
401	5.00	20	6.37			1		439	16.00	20	11.14	4	1 1/4	1	
430	10.60	48	15.28	2 1/2	1	2 1/4	3 to 1	4319	25.60	32	17.85	5	1 1/4	3 1/4	1.33 to 1
429	4.20	16	5.09			3/4		4318	19.20	24	13.37	5	1 1/4	1 1/2	
44	16.20	75	23.89	2 1/2	1	3	4 to 1	496	31.20	39	21.72	5	1 1/4	3 1/4	2.05 to 1
43	4.80	19	6.05			3/4		495	15.20	19	10.58			1	
482	9.60	26	10.35	3	1 1/4	1 1/4	1.37 to 1	460	36.00	45	25.07	5	1 1/4	3 1/2	2.25 to 1
481	7.15	19	7.56			3/4		459	16.00	20	11.14			1	
486	11.70	32	12.73	3 1/4	1 1/4	2	1.33 to 1	458	49.60	62	34.55	5	1 1/4	3 1/2	3.10 to 1
485	8.90	24	9.55			1 1/2		457	16.00	20	11.14			1	
396	11.00	30	12.00	3	1 1/4	2	1.5 to 1	4008	82.00	66	42.02	7	2	6 1/4	3 to 1
395	7.50	20	8.00	3	1 1/4	3/4		4007	27.00	22	14.05			2 1/2	
436	9.95	27	10.74	3	1 1/4	1 1/2	2.07 to 1	4010	89.50	72	45.85	6	2	7 1/4	5.53 to 1
435	3.05	13	5.17			3/4		4009	15.75	13	8.36	6	2	2	
420	14.50	40	15.92	3	1 1/4	2 1/2	2 to 1	492	68.00	42	30.10	6 1/2	2 1/4	6	1.2 to 1
419	7.50	20	7.96			3/4		491	55.75	35	25.08	6 1/2	2 1/4	2 1/2	
46	21.50	60	23.87	3	1 1/4	2 1/2	1.97 to 1	416	92.50	56	40.11	6 1/2	2 1/4	6 1/2	4 to 1
45	11.35	31	12.33			1 1/4		415	19.00	14	10.43			1	
472	24.65	69	27.45	3 1/4	1 1/4	2 1/4	2.03 to 1	404	111.70	67	48.00	5	2 1/4	6 1/4	4.47 to 1
471	12.40	34	13.53			1 1/4		403	20.75	15	10.82			1	
48	27.10	76	30.24	3 1/4	1 1/4	2 1/4	2 to 1	408	57.00	27	21.49	7	2 1/4	5	1.8 to 1
47	13.80	38	15.12			1		407	37.00	15	11.94			1 1/4	
418	27.10	76	30.24	3 1/4	1 1/4	3	2.53 to 1	438	87.00	42	33.42	8	2 1/2	6 1/2	3 to 1
417	11.00	30	11.94			1		437	31.00	14	11.14			1	
484	14.60	40	15.92	3 1/4	1 1/4	1 1/4	2.67 to 1	4004	126.00	48	42.02	7 1/2	2 1/4	5 1/4	1.87 to 1
483	5.75	15	5.97			3/4		4003	71.00	26	22.76			2 1/2	
392	16.25	45	17.91	3	1 1/4	1 1/4	3 to 1	494	156.00	48	45.84	8 1/2	3	5 1/2	3.69 to 1
391	5.75	15	6.00	3	1 1/4	3/4		493	51.00	13	12.41			3/4	
426	26.40	74	29.44	3 1/4	1 1/4	3	2.96 to 1	406	198.50	53	59.04	9	3 1/2	9	3.33 to 1
425	9.25	25	9.95			3/4		405	69.00	16	17.88			3 1/4	
434	21.50	60	23.87	3	1 1/4	2 1/4	4 to 1								
433	5.75	15	5.97			3/4									

Other sizes, also Cut Gears, quoted upon request.

Mitre Gearing

A pair of mitre gears consists of two gears of the same diameter running at right angles to each other.



No. of Patt.	No. of Teeth	Pitch Diam.	Face	Pitch in.	Back-ing	Price each
601	18	4.30	1 3/4	3/4	1 1/2	\$ 2.70
603	42	10.03	2	3/4	1 1/2	6.30
612	30	8.36	2	3/4	1 1/2	5.00
602	19	6.05	2 1/4	1	3/4	4.80
61	25	7.96	2 1/4	1	1	6.00
67	37	11.78	2 1/4	1	1	8.40
64	44	14.01	2 1/4	1	1 1/4	9.80
62	30	10.74	2 1/2	1 1/4	1	9.25
608	55	19.70	3	1 1/4	1 1/2	15.50
609	25	9.95	3 1/4	1 1/4	1	9.25
63	36	14.32	3	1 1/4	2	13.10
614	39	15.52	3 1/2	1 1/4	1 1/4	14.15
65	40	15.92	3	1 1/4	1 1/2	14.50
605	48	19.10	3 1/4	1 1/4	1 3/4	17.30
69	66	26.26	3 1/4	1 1/4	2	23.60
68	85	33.82	3 1/4	1 1/4	2	30.20
604	42	20.05	4	1 1/2	2	23.60
66	55	26.26	4	1 1/2	2	30.70
613	24	13.37	5	1 3/4	2 1/2	19.20
615	29	18.46	6	2	2 1/2	35.70
606	38	24.19	6	2	2 1/2	47.00
610	50	31.83	6	2	2 1/2	62.00
607	54	42.97	7	2 1/2	3	110.00
611	25	23.87	9	3	4	87.00

Spur Racks and Pinions



Price List

Pitch	Face	Price per Foot Rack
1 1/4	1 1/4	\$0.60
1 1/2	1 1/2	.80
1 3/4	1 3/4	.90
2	2	1.00
2 1/4	2 1/4	1.35
2 1/2	2 1/2	1.60
3	3	2.00
4	4	2.50
5	5	3.00
6	6	

For pinions to run on racks see plain spur gears. Any plain spur gear will mesh with a rack of corresponding pitch.

In ordering spur racks state the number of teeth, pitch and face, also number of lugs on a side as well as the backing, if desired otherwise than shown in the catalogue.

Worms and Worm Gears



No. of Pattern	No. of Teeth	Pitch Diam.	Face	Pitch, Inches	Price each	Additional Price for Housings	Remarks
307	28	5.57	1	3/8	\$ 6.20		Right
308	Worm	2 1/2	—	—	5.75		
317	24	5.73	1 1/4	3/4	6.75		Right
318	Worm	2.50	—	—	6.60		
319	24	5.73	1 1/4	3/4	6.75		Left
320	Worm	2.50	—	—	6.60		
321	24	6.67	1 3/8	3/4	7.50		Right
32	Worm	3.00	—	—	7.50		
31	36	10.03	1 3/8	3/4	8.00	\$70.00	Right
32	Worm	3.00	—	—	7.50		
305	36	10.03	1 3/8	3/4	8.00	70.00	Left
306	Worm	3.00	—	—	7.50		
33	62	19.74	2	1	20.10		Right
34	Worm	4.50	—	—	12.25		
311	20	9.60	2 1/2	1 1/2	14.00		Right
312	Worm	4.50	—	—	13.50		
301	30	14.35	3 1/4	1 1/2	27.00	90.00	Right
302	Worm	6.00	—	—	25.00		
315	30	14.35	3 1/4	1 1/2	27.00	90.00	Left
316	Worm	6.00	—	—	25.00		
303	30	14.35	3 1/4	1 1/2	31.50	90.00	Dbl. Thrd. Worm
304	Worm	6.00	—	—	31.00		
35	50	27.87	4	1 3/4	61.00	140.00	Right
36	Worm	7.50	—	—	30.00		
309	50	27.87	4	1 3/4	67.50	140.00	Dbl. Thrd. Worm
310	Worm	7.50	—	—	33.00		
37	60	38.21	5	2	95.00	240.00	Right
38	Worm	9.00	—	—	40.00		
313	48	38.21	5	2 1/2	105.00	240.00	Dbl. Thrd. Worm
314	Worm	9.00	—	—	45.00		

Horse-Power of Gearing

At a periphery speed of 100 feet per minute on pitch line

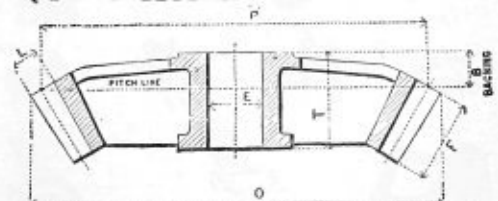
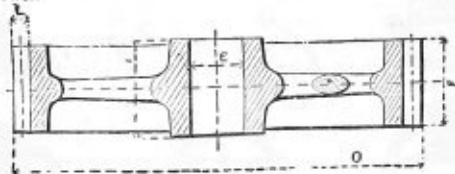
Spur Gearing

Pitch	1	1 1/4	1 1/2	1 3/4	2	2 1/4	2 1/2	3
Face	2 1/2	3	4	5	6	7	8 1/2	9
H. P.	1.6	2.33	3.7	5.5	7.4	10.4	11.6	16.8

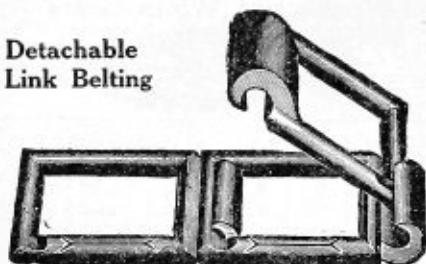
Mitre and Bevel Gearing

Pitch	1	1 1/4	1 1/2	1 3/4	2	2 1/4	2 1/2	3
Face	2 1/2	3	4	5	5 1/2	6 1/2	7	8 1/2
H. P.	1.5	2	3.3	4.8	6.4	8	9.6	15.7

Gears of different face transmit proportionate horse-power.

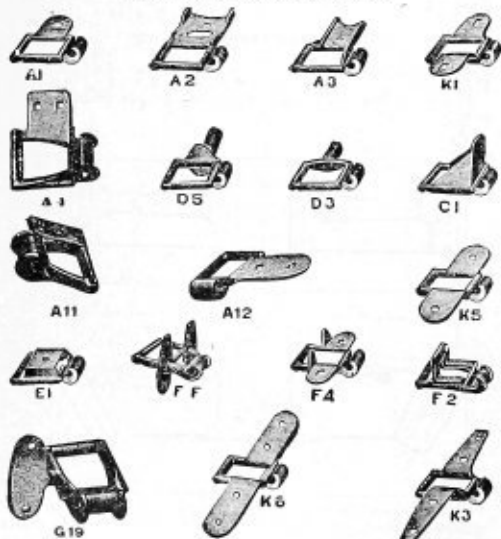


On all orders for gears to replace old or broken gears give number of teeth, also dimension indicated by letters in above diagrams.

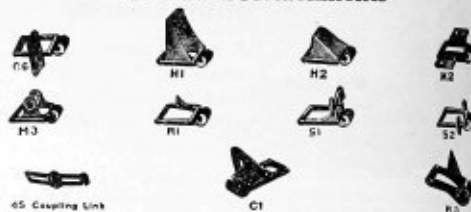
Detachable
Link Belting

No.	Price Plain Chain per Foot	Price Cou- plers per Foot	Approx. Links in 10 Feet	Average Pitch of Standard Chain Inches	Average Ultimate Strength Pounds
25	\$0.15	\$0.15	133	.902	700
32	.15	.18	104	1.154	1,100
33	.15	.17	86	1.394	1,190
34	.15	.17	86	1.398	1,300
35	.15	.20	74	1.630	1,200
42	.17	.21	88	1.375	1,600
45	.15	.20	74	1.630	1,600
51	.21	.20	104	1.155	1,900
52	.20	.18	80	1.506	2,300
55	.18	.21	74	1.631	2,200
57	.20	.21	52	2.308	2,800
62	.25	.25	73	1.654	3,100
66	.26	.25	60	2.013	2,600
67	.26	.25	52	2.308	3,300
75	.27	.21	46	2.609	4,000
77	.28	.25	52	2.293	3,600
78	.38	.28	46	2.609	4,900
83	.39	.36	30	4.000	4,950
85	.49	.49	30	4.000	7,600
88	.48	.34	46	2.609	7,750
93	.54	.49	30	4.033	7,500
95	.59	.60	39	3.967	8,700
103	.74	.64	39	3.075	9,600
108	.70	.87	25 1/2	4.720	9,900
110	.82	1.02	25 1/2	4.720	12,700
114	.94	.93	37	3.250	11,000
122	1.25	1.74	20	6.050	15,000
124	1.14	1.31	30	4.063	12,700
146	1.13	1.42	20	6.150	14,000

Standard Attachments



Standard Attachments



Link Belt Attachments

Price Per Foot.

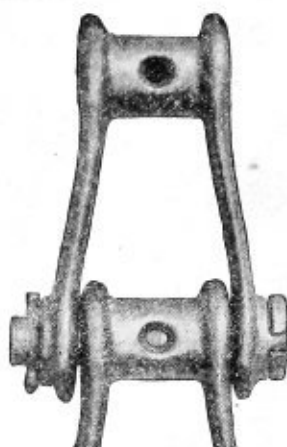
No. 25		D5	\$0.40	A11	\$0.42	A7	\$0.77
A1	\$0.27	R1	.27	D5	.53	A11	.73
A3	.28	F2	.33	E1	.46	C1	.94
C1	.36	G1	.29	F2	.59	D5	.82
C5	.63	H1	.43	FF	.60	E1	.79
D1	.32	K1	.32	G1	.61	F2	.97
E1	.27	K3	.42	H1	.61	FF	1.08
G1	.35	K5	.31	K1	.49	FF	.92
H2	.35	K6	.44	82	.43	G1	.81
K1	.32	M1	.31	No. 75		G6	.80
K5	.29	S1	.29	E1	.44	G19	.80
K6	.36	No. 51		F2	.44	H1	.83
M1	.33	A1	.31	H1	.55	H2	.75
S1	.33	C1	.42	H2	.55	K1	.75
No. 32		D4	.84	K1	.48	K5	1.12
A1	.30	D5	.53	M3	.80	R1	.43
A2	.31	K1	.40	R1	.36	82	.76
A3	.27	K5	.41	No. 77		No. 93	
C1	.40	M1	.52	A1	.46	G15	1.66
C5	.47	S1	.35	A12	.68	No. 95	1.66
D3	.33	No. 52		D5	.52	F2	1.34
E1	.27	A1	.35	E1	.47	H1	1.66
G1	.31	A3	.42	F2	.79	K2	1.66
K1	.37	C1	.41	G1	.59	No. 103	
K3	.48	D4	.77	G6	.63	A1	1.12
K5	.47	D5	.55	G19	.63	A3	1.25
K6	.49	E1	.41	H1	.59	A4	1.15
M1	.40	F2	.53	H2	.63	A5	1.20
S1	.32	G1	.40	K1	.52	A11	.12
No. 33		K1	.43	R1	.40	D5	1.25
A1	.21	K5	.40	R3	.44	DD	.170
D3	.48	No. 55		82	.48	F2	1.11
E1	.22	A1	.31	No. 78		E1	1.36
H2	.32	A2	.40	A3	.72	FF	1.53
K1	.31	A3	.40	A7	.68	G6	1.38
K3	.48	C1	.39	A11	.61	G19	1.32
K5	.31	C5	.53	D5	.80	H2	1.25
K6	.43	E1	.31	E1	.58	K1	1.16
M1	.36	F2	.43	F2	.85	K2	1.20
S1	.31	K1	.35	F4	.87	M3	1.41
No. 34		K5	.37	FF	.90	R1	1.61
A1	.27	M1	.36	G1	.72	R3	1.10
C1	.41	S1	.31	G6	.83	No. 108	
E1	.30	No. 57		G19	.81	F2	1.43
K1	.36	A1	.37	H1	.81	FF	1.37
No. 35		A3	.41	H2	.85	G1	1.18
A1	.29	A7	.37	K1	.58	K2	1.25
A2	.40	C1	.37	K3	.81	F2	1.54
C1	.40	D5	.46	M3	.85	K2	1.37
E1	.31	E1	.33	R3	.61	No. 114	
K1	.40	H2	.54	S2	.64	A11	1.29
K5	.37	K1	.43	No. 83		C1	1.49
S1	.33	S2	.40	A1	.99	D5	1.78
No. 42		No. 62		D5	.82	FF	1.89
A1	.29	A1	.40	E1	.70	G6	2.02
A3	.43	A2	.41	FF	.91	K1	1.48
C1	.39	A3	.42	G1	.91	K2	1.54
E1	.27	A12	.48	M3	.92	M3	1.32
K1	.36	C1	.48	No. 85		No. 122	
K3	.50	C5	.71	D5	.91	F2	1.02
K5	.32	D5	.55	F2	1.13	K2	2.02
K6	.50	G1	.57	FF	1.29	No. 124	
S1	.33	K1	.43	FF	.99	A4	1.76
No. 45		S1	.40	G6	.87	A11	1.76
A1	.25	No. 66		H1	.88	F8	2.24
A2	.31	C1	.49	K2	.88	G1	1.79
A3	.35	K1	.52	82	.95	G19	1.92
A12	.31	No. 67		A1	.85	M3	1.98
C1	.33	A1	.40	A3	.85	M3	1.98
D1	.71	A1	.40	A3	.85	M3	1.98
D3	.42	A7	.46	A3	.85	M3	1.98

Closed End Pintle Chains

400 Class



Riveted



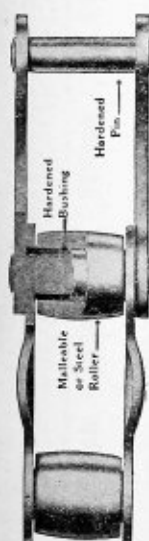
Detachable

A very strong and serviceable chain for conveying or power transmission work.

It is designed to fit standard link belt sprocket wheels and to replace that form of chain when greater strength is required, or when a closed joint chain is preferable owing to the presence of grit which rapidly wears out chain of the open hook form.

In ordering state whether riveted or detachable chain is required.

No.	At- t'm't	Price per Foot		Links in 10 ft.	Pitch of Link	Ult. Str'h. Lbs.	No.	At- t'm't	Price per Foot		Links in 10 ft.	Pitch of Link	Ult. Str'h. Lbs.	No.	At- t'm't	Price per Foot		Links in 10 ft.	Pitch of Link	Ult. Str'h. Lbs.	
		Riv'd	Det'h						Riv'd	Det'h						Riv'd	Det'h				
434	.....	\$0.28	\$0.32	86	1.398	3600	462	K	\$0.42	\$0.45	.....	.....	.....	488	K1	\$0.50	\$0.54	.....	.....	.....
442	.....	.28	.32	88	1.375	5900	467	.....	.25	.38	52	2.308	6200	.....	K2	.55	.59	.....	.....	.....
445	.....	.28	.40	74	1.630	5900	467	K1	.32	.35	.....	.....	.....	.....	M1	.59	.63	.....	.....	.....
445	A1	.36	.32	47730	.33	52	2.293	10000	410360	.65	39	3.075	20000
445	F2	.42	.46	.....	.....	.....	477	A12	.35	.38	.....	.....	.....	.....	A11	.76	.81	.....	.....	.....
452	.....	.30	.34	80	1.506	7000	477	F2	.53	.56	.....	.....	.....	.....	D5	.95	1.00	.....	.....	.....
452	E1	.33	.37	.....	.....	.....	477	K1	.38	.41	.....	.....	.....	.....	F2	.93	.98	.....	.....	.....
452	K1	.36	.40	.....	.....	.....	483	.....	.40	.43	30	4.000	15000	.....	G6	.93	.98	.....	.....	.....
455	.....	.28	.32	74	1.630	7300	483	D5	.47	.50	.....	.....	.....	.....	K1	.77	.82	.....	.....	.....
455	A3	.....	.51	.....	.....	.....	483	G1	.66	.69	.....	.....	.....	.....	K2	.90	.95	.....	.....	.....
455	A11	.38	.42	.....	.....	.....	483	K1	.52	.55	.....	.....	.....	.....	M1	.82	.87	.....	.....	.....
455	F2	.44	.48	.....	.....	.....	488	.....	.35	.38	46	2.609	12000	.....	.....	.....	.....	.....	.....	.....
455	K1	.33	.37	.....	.....	.....	488	A3	.58	.62	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
462	.....	.33	.36	73	1.634	9000	488	F2	.63	.67	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
462	G1	.51	.54	.....	.....	.....	488	G6	.63	.67	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....



Steel Bushed Roller Chains

E. C. Class



A high grade low priced steel roller chain with case hardened steel pins and bushings. It is designed for power transmission only and to replace standard link-belt when the speed is too high for that type of chain or when greater strength is required. It fits standard link-belt sprocket wheels of sizes indicated by numerals in the size number.

Furnished with either malleable iron or steel rollers.

Size	Approx. Links in 10 Feet	Average Pitch of Standard Link-Belt in Inches	*Standard Length, Links	Average Ultimate Strength, Pounds	Runs on Wheels No.	Price per Foot with Malleable Iron Rollers	Price per Foot with C. H. Steel Rollers	Price of Couplers, Each
EC-62	73	1.654	72	7000	62	\$0.50	\$0.67	\$0.14
EC-88	46	2.609	70	11000	88	.48	.61	.15
EC-103	39	3.075	60	11500	103	.55	.85	.23
EC-114	37	3.250	40	20000	114	1.05	1.31	.42

Malleable Iron and Steel Combination Chain

Attachment
Links

F2



K1



K2



G1

Right and Left

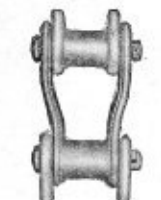


G6

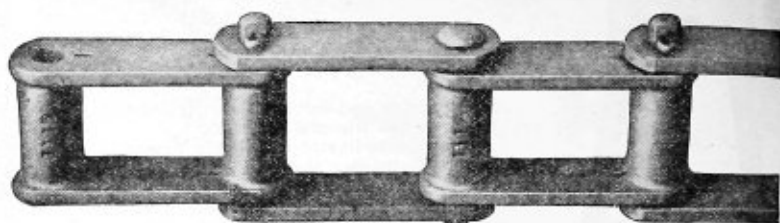
Right and Left



D. D.



Coupler



Owing to its great strength, durability and moderate price, this has become the most popular chain used for elevating and conveying heavy materials, such as broken stone, sand, gravel, coal, etc. The closed joints render it the most economical chain for handling gritty materials when first cost is considered.

Price List

Size	Prices					
	102	111	131	132	141	188
Approximate links in 10 feet.....	30	25½	39	20	20	46
Average pitch, inches.....	3.950	4.720	3.075	6.050	6.000	2.609
Ultimate strength, pounds.....	18000	36000	27000	51000	28000	13000
Corresponding size link-belt.....	85	110	103	122		88
Plain link-belt, per foot.....	\$0.70	\$1.00	\$0.80	\$1.40	\$0.70	\$0.45
Plain links, malleable, each.....	.25	.43	.20	.78	.40	.12
DD links, malleable, each.....		.87				
F2 links, malleable, each.....		.62	.45			.18
G1 links, malleable, each.....		.64	.35		.62	.22
G6 links, malleable, each.....		.64	.35		.62	.22
K1 links, malleable, each.....	.34	.68	.28			.17
K2 links, malleable, each.....	.34	.68	.28	1.10	.63	.17
Couplers, malleable, each.....	.30	.53	.30	.95	.45	.15
Side bars, steel, each.....	.09	.11	.06	.20	.11	.04
K1 side bars, steel, each.....	.24	.26	.20			.15
K2 side bars, steel, each.....	.24	.26	.20	.55	.25	.15
Pins (with cotters), steel, each.....	.04	.09	.06	.16	.06	.04
Rivets, steel, each.....	.03	.08	.05	.14	.05	.03
DD every 2nd pitch, per foot.....		1.18				
DD every 4th pitch, per foot.....		1.09				
DD every 6th pitch, per foot.....		1.06				
F2 every 2nd pitch, per foot.....		1.25	1.25			.76
F2 every 4th pitch, per foot.....		1.15	1.10			.63
F2 every 6th pitch, per foot.....		1.10	1.00			.60
G1 every 2nd pitch, per foot.....		1.25	1.10			.95
G1 every 4th pitch, per foot.....		1.15	.95			.83
G1 every 6th pitch, per foot.....		1.10	.90			.78
G6 every 2nd pitch, per foot.....		1.25	1.10			.95
G6 every 4th pitch, per foot.....		1.15	.95			.83
G6 every 6th pitch, per foot.....		1.10	.90			.78
K1 every link, per foot.....	1.30	1.60	1.50			1.25
K1 every 2nd pitch, per foot.....	.85	1.20	.97			.75
K1 every 3rd pitch, per foot.....	.90	1.20	1.05			.80
K1 every 4th pitch, per foot.....	.78	1.10	.89			.65
K1 every 5th pitch, per foot.....	.82	1.12	.95			.70
K1 every 6th pitch, per foot.....	.75	1.08	.86			.62
K2 every link, per foot.....	1.30	1.60	1.50	2.35	1.10	1.25
K2 every 2nd pitch, per foot.....	.85	1.20	.97	1.75	.82	.75
K2 every 3rd pitch, per foot.....	.90	1.20	1.05	1.75	.95	.80
K2 every 4th pitch, per foot.....	.78	1.10	.89	1.65	.78	.65
K2 every 5th pitch, per foot.....	.82	1.12	.95	1.65	.83	.70
K2 every 6th pitch, per foot.....	.75	1.08	.86	1.55	.75	.62
K1 steel every 2nd pitch, per foot.....	1.05	1.40	1.35			1.05
K1 steel every 4th pitch, per foot.....	.90	1.20	1.10			.80
K1 steel every 6th pitch, per foot.....	.85	1.15	1.00			.73
K2 steel every 2nd pitch, per foot.....	1.05	1.40	1.35	2.30	.98	1.05
K2 steel every 4th pitch, per foot.....	.90	1.20	1.10	1.85	.85	.80
K2 steel every 6th pitch, per foot.....	.85	1.15	1.00	1.70	.80	.73

Note.—Prices each on couplers and attachment links do not include pins and cotters.



Sprocket Wheels

For Detachable Link Belt, Malleable Iron and Steel Combination Chains,
"400" Class Chains

and

"E. C." Steel Bushed Roller Chains

Price List

Wheels bored and keyseated or set screwed.

An extra charge is made for wheels having special hubs or bored larger than specified in list. For larger bores see tables on next page.

No. 25				Nos. 33, 34 and 434				Nos. 42 and 442 —Continued				Nos 52 and 452. —Continued			
Pitch Diam- eter, Ins.	No. of Teeth	Price Each	Largest Bore at Regular Prices	Pitch Diam- eter, Ins.	No. of Teeth	Price Each	Largest Bore at Regular Prices	Pitch Diam- eter, Ins.	No. of Teeth	Price Each	Largest Bore at Regular Prices	Pitch Diam- eter, Ins.	No. of Teeth	Price Each	Largest Bore at Regular Prices
1 3/4	6	\$1.60	5/8	2	4	\$1.70	5/8	4 1/2	10	\$2.05	1 1/8	16 1/4	34	\$5.30	1 1/8
2	7	1.60	5/8	3	7	1.75	1 1/8	4 1/2	11	2.10	1 1/8	17 1/4	36	5.60	1 1/8
2 1/4	8	1.60	1 1/4	3 1/2	8	1.80	1 1/8	5 1/4	12	2.15	1 1/8	18	38	6.95	1 1/8
2 1/2	9	1.65	1 1/4	4	9	1.85	1 1/8	5 1/4	13	2.25	1 1/8	19 1/4	40	6.30	1 1/8
3	10	1.70	1 1/4	4 1/2	10	1.90	1 1/8	6 1/4	14	2.30	1 1/8	20 1/4	42	6.60	1 1/8
3 1/4	11	1.70	1 1/4	5	11	2.00	1 1/8	6 1/2	15	2.35	1 1/8	21 1/4	44	6.95	1 1/8
3 1/2	12	1.75	1 1/4	5 1/2	12	2.05	1 1/8	8	18	2.70	1 1/8	22	46	7.30	1 1/8
3 3/4	13	1.75	1 1/4	6 1/4	14	2.20	1 1/8	8 1/4	19	2.80	1 1/8	23	48	7.65	1 1/8
4	14	1.80	1 1/4	6 1/2	15	2.30	1 1/8	9 1/2	22	3.10	1 1/8	23 1/2	49	7.80	1 1/8
4 1/4	15	1.80	1 1/4	7 1/4	16	2.40	1 1/8	10 1/2	24	3.35	1 1/8	24	50	8.00	1 1/8
4 1/2	16	1.85	1 1/4	8	18	2.50	1 1/8	11 1/4	27	3.70	1 1/8	24 1/2	51	8.15	1 1/8
5	17	1.90	1 1/4	8 1/2	19	2.60	1 1/8	14	32	4.25	1 1/8	26	54	8.65	1 1/8
5 1/4	18	1.90	1 1/4	9 1/4	22	2.90	1 1/8	15 1/4	36	4.80	1 1/8	26 1/2	55	8.80	1 1/8
5 1/2	19	1.95	1 1/4	12	27	3.45	1 1/8	17 1/4	41	5.45	1 1/8	28 1/2	60	9.65	1 1/8
5 3/4	20	2.00	1 1/4	14 1/2	32	4.00	1 1/8	20	46	6.15	1 1/8				
6	21	2.05	1 1/4	15 3/4	34	4.20	1 1/8	24	55	7.40	1 1/8				
6 1/4	22	2.10	1 1/4	17	36	4.45	1 1/8								
6 1/2	23	2.15	1 1/4	18 1/2	38	4.70	1 1/8								
7	24	2.20	1 1/4	19 1/2	41	5.05	1 1/8								
7 1/4	25	2.25	1 1/4	24	54	6.50	1 1/8								
7 1/2	26	2.30	1 1/4												
7 3/4	27	2.35	1 1/4												
8	28	2.40	1 1/4												
8 1/4	30	2.50	1 1/4												
8 1/2	31	2.55	1 1/4												
9	32	2.60	1 1/4												
9 1/4	33	2.70	1 1/4												
9 1/2	34	2.75	1 1/4												
10	35	2.80	1 1/4												
10 1/4	36	2.90	1 1/4												
11 1/4	40	3.20	1 1/4												
12 1/4	42	3.35	1 1/4												
12 1/2	44	3.45	1 1/4												
13	45	3.55	1 1/4												
13 1/4	48	3.75	1 1/4												
15	52	4.05	1 1/4												
15 1/4	54	4.20	1 1/4												
16	56	4.35	1 1/4												
17 1/4	60	4.70	1 1/4												

No. 32				Nos. 35, 45, 55, 445 and 455				Nos. 57, 67, 77 and 477			
Pitch Diam- eter, Ins.	No. of Teeth	Price Each	Largest Bore at Regular Prices	Pitch Diam- eter, Ins.	No. of Teeth	Price Each	Largest Bore at Regular Prices	Pitch Diam- eter, Ins.	No. of Teeth	Price Each	Largest Bore at Regular Prices
2 1/4	6	\$1.65	1 1/4	3 1/2	7	\$2.10	1 1/8	5 1/4	7	\$2.40	1 1/8
2 1/2	7	1.65	1 1/4	4 1/4	8	2.15	1 1/8	6 1/4	8	2.55	1 1/8
3	8	1.70	1 1/4	4 1/2	9	2.20	1 1/8	7 1/4	9	2.70	1 1/8
3 1/4	9	1.75	1 1/4	5 1/4	10	2.25	1 1/8	8 1/4	10	2.90	1 1/8
3 3/4	10	1.80	1 1/4	5 1/2	11	2.35	1 1/8	9 1/4	11	3.10	1 1/8
4	11	1.85	1 1/4	6 1/4	12	2.40	1 1/8	10 1/4	12	3.30	1 1/8
4 1/4	12	1.90	1 1/4	6 1/2	13	2.50	1 1/8	11 1/4	13	3.50	1 1/8
4 1/2	13	1.95	1 1/4	7 1/4	14	2.65	1 1/8	12 1/4	14	3.75	1 1/8
5 1/4	14	2.00	1 1/4	7 1/2	15	2.75	1 1/8	13 1/4	15	4.00	1 1/8
5 1/2	15	2.05	1 1/4	8 1/4	16	2.85	1 1/8	14 1/4	16	4.25	1 1/8
5 3/4	16	2.10	1 1/4	8 1/2	17	3.00	1 1/8	15 1/4	17	4.50	1 1/8
6 1/4	18	2.20	1 1/4	9 1/4	18	3.15	1 1/8	16 1/4	18	4.75	1 1/8
6 1/2	19	2.25	1 1/4	9 1/2	19	3.30	1 1/8	17 1/4	19	5.00	1 1/8
8	22	2.45	1 1/4	10 1/4	20	3.40	1 1/8	18 1/4	20	5.25	1 1/8
8 1/4	23	2.55	1 1/4	11 1/4	21	3.60	1 1/8	19 1/4	21	5.50	1 1/8
8 1/2	24	2.60	1 1/4	12 1/2	22	3.80	1 1/8	20 1/4	22	5.75	1 1/8
9 1/4	25	2.70	1 1/4	12 1/4	23	3.95	1 1/8	21 1/4	23	6.00	1 1/8
9 1/2	26	2.80	1 1/4	12 1/2	24	4.15	1 1/8	22 1/4	24	6.25	1 1/8
10	27	2.85	1 1/4	13	25	4.30	1 1/8	23 1/4	25	6.50	1 1/8
11 1/4	32	3.30	1 1/4	14 1/2	26	4.45	1 1/8	24 1/4	26	6.80	1 1/8
12	33	3.40	1 1/4	15	29	5.00	1 1/8	25 1/4	27	7.10	1 1/8
14	38	3.90	1 1/4	15 1/2	30	5.20	1 1/8	26 1/4	28	7.35	1 1/8
16 1/4	44	4.45	1 1/4	16	31	5.35	1 1/8	27 1/4	29	7.60	1 1/8
16 1/2	45	4.55	1 1/4	16 1/2	32	5.55	1 1/8	28 1/4	30	7.90	1 1/8
				17	33	5.70	1 1/8	29 1/4	31	8.15	1 1/8
				18	35	6.05	1 1/8	30 1/4	32	8.40	1 1/8
				18 1/2	36	6.25	1 1/8	31 1/4	33	8.65	1 1/8
				20 1/2	39	6.80	1 1/8	32 1/4	34	8.90	1 1/8
				21 1/2	40	6.95	1 1/8	33 1/4	35	9.15	1 1/8
				22 1/2	42	7.30	1 1/8	34 1/4	36	9.40	1 1/8
				23 1/2	44	7.65	1 1/8	35 1/4	37	9.65	1 1/8
				24 1/2	45	7.85	1 1/8	36 1/4	38	9.90	1 1/8
				25 1/2	46	8.00	1 1/8	37 1/4	39	10.15	1 1/8
				26 1/2	48	8.35	1 1/8	38 1/4	40	10.40	1 1/8
				28	54	9.60	1 1/8	39 1/4	41	10.65	1 1/8
				30	58	10.35	1 1/8	40 1/4	42	10.90	1 1/8
				31	60	10.75	1 1/8	41 1/4	43	11.15	1 1/8

Nos. 42 and 442				Nos. 62, EC 62 and 462			
Pitch Diam- eter, Ins.	No. of Teeth	Price Each	Largest Bore at Regular Prices	Pitch Diam- eter, Ins.	No. of Teeth	Price Each	Largest Bore at Regular Prices
2	5	\$1.85	3/4	3 1/4	7	\$2.15	1 1/8
2 1/4	6	1.85	7/8	4 1/4	8	2.20	1 1/8
2 1/2	7	1.90	1 1/8	5 1/4	9	2.25	1 1/8
2 3/4	8	1.95	1 1/8	6 1/4	10	2.30	1 1/8
3	9	2.00	1 1/8	7 1/4	11	2.35	1 1/8
3 1/4	10	2.05	1 1/8	8 1/4	12	2.40	1 1/8
3 1/2	11	2.10	1 1/8	9 1/4	13	2.45	1 1/8
3 3/4	12	2.15	1 1/8	10 1/4	14	2.50	1 1/8
4	13	2.20	1 1/8	11 1/4	15	2.55	1 1/8
4 1/4	14	2.25	1 1/8	12 1/4	16	2.60	1 1/8
4 1/2	15	2.30	1 1/8	13 1/4	17	2.65	1 1/8
4 3/4	16	2.35	1 1/8	14 1/4	18	2.70	1 1/8
5	17	2.40	1 1/8	15 1/4	19	2.75	1 1/8
5 1/4	18	2.45	1 1/8	16 1/4	20	2.80	1 1/8
5 1/2	19	2.50	1 1/8	17 1/4	21	2.85	1 1/8
5 3/4	20	2.55	1 1/8	18 1/4	22	2.90	1 1/8
6	21	2.60	1 1/8	19 1/4	23	2.95	1 1/8
6 1/4	22	2.65	1 1/8	20 1/4	24	3.00	1 1/8
6 1/2	23	2.70	1 1/8	21 1/4	25	3.05	1 1/8
6 3/4	24	2.75	1 1/8	22 1/4	26	3.10	1 1/8
7	25	2.80	1 1/8	23 1/4	27	3.15	1 1/8
7 1/4	26	2.85	1 1/8	24 1/4	28	3.20	1 1/8
7 1/2	27	2.90	1 1/8	25 1/4	29	3.25	1 1/8
7 3/4	28	2.95	1 1/8	26 1/4	30	3.30	1 1/8
8	29	3.00	1 1/8	27 1/4	31	3.35	1 1/8
8 1/4	30	3.05	1 1/8	28 1/4	32	3.40	1 1/8
8 1/2	31	3.10	1 1/8	29 1/4	33	3.45	1 1/8
9	32	3.15	1 1/8	30 1/4	34	3.50	1 1/8
9 1/4	33	3.20	1 1/8	31 1/4	35	3.55	1 1/8
9 1/2	34	3.25	1 1/8	32 1/4	36	3.60	1 1/8
10	35	3.30	1 1/8	33 1/4	37	3.65	1 1/8
10 1/4	36	3.35	1 1/8	34 1/4	38	3.70	1 1/8
10 1/2	37	3.40	1 1/8	35 1/4	39	3.75	1 1/8
10 3/4	38	3.45	1 1/8	36 1/4	40	3.80	1 1/8
11 1/4	40	3.55	1 1/8	37 1/4	41	3.85	1 1/8
11 1/2	41	3.60	1 1/8	38 1/4	42	3.9.	

Sprocket Wheels—Continued

An extra charge is made for wheels having special hubs or bored larger than specified.
For larger bores see table below.

No. 62—Continued				Nos. 75, 78, 88, EC88, 188 and 488—Continued				Nos. 103, EC103, 131 and 4103—Continued				Nos. 114 and EC114			
Pitch Diam., Ins.	No. of Teeth	Price Each	Largest Bore at Regular Prices	Pitch Diam., Ins.	No. of Teeth	Price Each	Largest Bore at Regular Prices	Pitch Diam., Ins.	No. of Teeth	Price Each	Largest Bore at Regular Prices	Pitch Diam., Ins.	No. of Teeth	Price Each	Largest Bore at Regular Prices
9	17	\$3.20	2 1/8	32 1/2	39	14.10	2 3/4	16 1/2	17	\$8.05	3 3/8	8 1/2	8	\$ 5.00	2 1/8
9 1/2	18	3.35	2 1/8	33 1/2	40	14.60	2 3/4	17 1/2	18	8.45	3 3/8	9 1/2	9	5.40	2 1/8
10	19	3.50	2 1/8	35	42	15.70	2 3/4	18 1/2	19	8.90	3 3/8	10 1/2	10	5.80	2 1/8
10 1/2	20	3.65	2 1/8	36	43	16.20	2 3/4	19 1/2	20	9.30	3 3/8	11 1/2	11	6.20	2 1/8
11	21	3.80	2 1/8	36 3/4	44	16.75	2 3/4	20 1/2	21	9.70	3 3/8	12 1/2	12	6.70	2 1/8
11 1/2	22	3.95	2 1/8	38 1/2	46	17.85	2 3/4	21 1/2	22	10.35	3 3/8	13 1/2	13	7.20	2 1/8
12	23	4.10	2 1/8	40 1/2	48	18.95	2 3/4	22 1/2	23	10.80	3 3/8	14 1/2	14	7.70	2 1/8
12 1/2	24	4.25	2 1/8	41	49	19.50	2 3/4	23 1/2	24	11.20	3 3/8	15 1/2	15	8.20	2 1/8
13 1/2	25	4.40	2 1/8	41 3/4	50	20.00	2 3/4	24 1/2	25	11.70	3 3/8	16 1/2	16	8.70	2 1/8
13 1/2	26	4.55	2 1/8	43 1/4	52	21.10	2 3/4	25 1/2	26	12.25	3 3/8	17 1/2	17	9.20	2 1/8
14 1/2	27	4.70	2 1/8	45	54	22.50	2 3/4	26 1/2	27	12.75	3 3/8	18 1/2	18	9.70	2 1/8
14 1/2	28	4.90	2 1/8	47 1/4	57	24.25	2 3/4	27 1/2	28	13.30	3 3/8	20	19	10.20	2 1/8
15 1/2	30	5.30	2 1/8	48 1/2	58	24.80	2 3/4	28 1/2	29	13.85	3 3/8	21	20	10.90	2 1/8
16 1/2	32	5.70	2 1/8	50	60	26.00	2 3/4	29 1/2	30	14.40	3 3/8	22	21	11.50	2 1/8
18	34	6.10	2 1/8	Nos. 83 and 483				30 1/2	31	15.20	3 3/8	23	22	12.10	2 1/8
18	36	6.50	2 1/8	11 1/2	9	\$5.70	2 1/8	31 1/2	32	15.80	3 3/8	24	23	12.70	2 1/8
20	38	6.90	2 1/8	15 1/2	12	7.20	2 1/8	32 1/2	33	16.50	3 3/8	25	24	13.20	2 1/8
23	43	7.90	2 1/8	16 1/2	13	7.60	2 1/8	33 1/2	34	17.60	3 3/8	31 1/2	30	17.50	2 1/8
23 1/2	45	8.35	2 1/8	18	14	8.20	2 1/8	34 1/2	35	18.40	3 3/8	33	32	19.30	2 1/8
25 1/2	48	9.00	2 1/8	20 1/2	16	9.30	2 1/8	35 1/2	36	19.25	3 3/8	35	34	21.10	2 1/8
25 1/2	49	9.25	2 1/8	23	18	10.50	2 1/8	37 1/2	38	21.20	3 3/8	36	35	22.00	2 1/8
28 1/2	54	10.65	2 1/8	24 1/2	19	11.10	2 1/8	39 1/2	40	23.10	3 3/8	37 1/2	36	23.00	2 1/8
30 1/2	58	11.80	2 1/8	28 1/2	22	13.30	2 1/8	40 1/2	41	24.00	3 3/8	42 1/2	41	28.10	2 1/8
No. 66				30 3/8	24	14.90	2 1/8	41	42	24.80	3 3/8	48 1/2	47	34.90	2 1/8
5	8	\$2.30	1 1/8	34 1/2	27	17.50	2 1/8	43	44	26.50	3 3/8	49 1/2	48	36.00	2 1/8
7	11	2.70	1 1/8	40 1/2	32	23.10	2 1/8	45	46	28.20	3 3/8	62	60	52.00	2 1/8
7 1/2	12	2.85	1 1/8	51	40	31.70	2 1/8	47	48	29.90	3 3/8	Nos. 122 and 132			
8 1/2	13	3.00	1 1/8	Nos. 85, 95 and *102				47 1/2	49	30.75	3 3/8	16	8	\$ 9.75	3 3/8
10 1/2	16	3.60	1 1/8	10 1/2	8	\$5.70	2 1/8	52 1/2	54	34.90	3 3/8	17 1/2	9	10.80	3 3/8
12	19	4.20	1 1/8	11 1/2	9	6.30	2 1/8	58 1/2	60	40.00	3 3/8	19 1/2	10	12.80	3 3/8
16 1/2	25	5.60	1 1/8	13	10	6.80	2 1/8	Nos. 108 and 110				21 1/2	11	14.60	3 3/8
Nos. 75, 78, 88, EC88, 188 and 488				14 1/2	11	7.30	2 1/8	12 1/2	8	\$6.80	3 3/8	23 1/2	12	16.50	3 3/8
6 1/2	8	\$3.30	1 1/8	15 1/2	12	7.80	2 1/8	13 1/2	9	7.50	3 3/8	27 1/2	14	20.00	3 3/8
7 1/2	9	3.50	1 1/8	16 1/2	13	8.40	2 1/8	13 1/2	10	8.30	3 3/8	29 1/2	15	21.80	3 3/8
8 1/2	10	3.75	1 1/8	18	14	9.00	2 1/8	15 1/2	11	9.10	3 3/8	31 1/2	16	23.60	3 3/8
9 1/2	11	4.00	1 1/8	20 1/2	16	10.40	2 1/8	16 1/2	12	9.90	3 3/8	35 1/2	18	27.80	3 3/8
10	12	4.30	1 1/8	23	18	11.70	2 1/8	18 1/2	13	10.90	3 3/8	37	19	30.00	3 3/8
10 1/2	13	4.60	1 1/8	24 1/2	19	12.40	2 1/8	21 1/2	14	12.00	3 3/8	42 1/2	22	36.00	3 3/8
11 1/2	14	4.90	1 1/8	25 1/2	20	13.00	2 1/8	19 1/2	15	13.00	3 3/8	No. 131—See No. 103			
12 1/2	15	5.20	1 1/8	28 1/2	22	14.50	2 1/8	21 1/2	16	14.00	3 3/8	No. 132—See No. 122			
13 1/2	16	5.55	1 1/8	30 3/8	24	16.50	2 1/8	23 1/2	18	16.25	3 3/8	No. C-141			
14 1/2	17	5.90	1 1/8	31 7/8	25	17.60	2 1/8	30 1/2	20	18.50	3 3/8	15 1/2	8	\$ 8.80	3 3/8
15	18	6.25	1 1/8	34 1/2	27	19.70	2 1/8	36	24	24.00	3 3/8	17 1/2	9	9.00	3 3/8
15 1/2	19	6.60	1 1/8	35 1/2	28	20.90	2 1/8	42	28	29.30	3 3/8	19 1/2	10	9.40	3 3/8
16 1/2	20	6.95	1 1/8	40 1/2	32	26.30	2 1/8	45	30	32.00	3 3/8	23 1/2	12	11.20	3 3/8
17 1/2	21	7.30	1 1/8	43 1/2	34	28.90	2 1/8	48	32	37.00	3 3/8	25	13	12.00	3 3/8
18 1/2	22	7.65	1 1/8	48 1/2	38	34.00	2 1/8	No. 111				27	14	13.00	3 3/8
19 1/2	23	8.00	1 1/8	60	47	45.50	2 1/8	12 1/2	8	\$ 7.50	3 3/8	30 1/2	16	15.20	3 3/8
20	24	8.35	1 1/8	E. C. 88—See No. 78				15 1/2	10	9.15	3 3/8	32 1/2	17	16.40	3 3/8
20 1/2	25	8.70	1 1/8	No. 102—See No. 85				16 1/2	11	10.00	3 3/8	34 1/2	18	17.60	3 3/8
21 1/2	26	9.05	1 1/8	Nos. 103, EC103, 131 and 4103				18 1/2	12	10.90	3 3/8	No. 188—See No. 75.			
22 1/2	27	9.40	1 1/8	8	8	\$4.40	2 1/8	19 1/2	13	12.00	3 3/8	No. 442—See No. 42.			
23 1/2	28	9.75	1 1/8	9	9	4.80	2 1/8	21 1/2	14	13.20	3 3/8	No. 445—See No. 35.			
24 1/2	29	10.10	1 1/8	9 1/2	10	5.20	2 1/8	24 1/2	16	15.40	3 3/8	No. 452—See No. 52.			
25	30	10.45	1 1/8	10 1/2	11	5.65	2 1/8	25 1/2	17	16.50	3 3/8	No. 455—See No. 35.			
25 1/2	32	11.15	1 1/8	10 3/4	12	6.05	2 1/8	28 1/2	18	17.90	3 3/8	No. 462—See No. 62.			
27 1/2	33	11.55	1 1/8	11 1/2	12	6.45	2 1/8	29 1/2	19	19.20	3 3/8	No. 467—See No. 57.			
28 1/2	34	11.95	1 1/8	12 1/2	13	6.85	2 1/8	30 1/2	20	20.35	3 3/8	No. 477—See No. 57.			
29 1/2	35	12.35	1 1/8	13 1/2	14	7.25	2 1/8	36	24	26.40	3 3/8	No. 483—See No. 83.			
30	36	12.75	1 1/8	14 1/2	15	7.65	2 1/8	42	28	32.25	3 3/8	No. 488—See No. 75.			
31	37	13.20	1 1/8	15 1/2	16	8.05	2 1/8	48 1/2	32	40.70	3 3/8	No. 4103—See No. 103.			
31 1/2	38	13.65	1 1/8									No. 4124—See No. 124.			

*Use for 102 chains, No. 85 wheels not larger than 30 3/8-inch diameter, 24 teeth.

Add to the List Price for Larger Bore than Listed as Below

When Listed Bore is	1 1/8"	1 3/8"	2 1/8"	2 3/8"	2 5/8"	3 1/8"	3 3/8"	4 1/8"	4 3/8"	5 1/8"	5 3/8"	6 1/8"	6 3/8"
1 1/8-inch.....	\$0.20	\$0.25	\$0.50	\$0.62	\$0.80	\$1.12	\$1.75	\$2.50					
1 3/8-inch.....		.25	.40	.50	.80	1.00	1.62	2.37	\$2.90				
1 5/8-inch.....			.25	.37	.60	.90	1.55	2.30	3.12	\$4.00			
2 1/8-inch.....				.25	.50	.80	1.60	2.45	3.30	4.30	\$5.70		
2 3/8-inch.....					.30	.50	1.40	2.40	3.40	4.50	6.00	\$7.30	
2 5/8-inch.....						.50	1.35	2.40	3.50	4.70	6.35	7.70	\$10.00
3 1/8-inch.....							.75	1.95	3.30	4.80	6.30	7.70	10.30
3 3/8-inch.....								1.05	2.70	4.40	6.30	8.50	10.95
3 5/8-inch.....									1.35	3.50	5.70	8.20	10.80
4 1/8-inch.....										1.60	3.80	6.30	9.00
4 3/8-inch.....											1.80	4.70	7.80
5 1/8-inch.....												2.80	7.00
5 3/8-inch.....													5.75

Wheel prices are based on hub length not exceeding twice the diameter of bore. An extra charge will be made when longer.

Standard "Salem" Steel Elevator Buckets



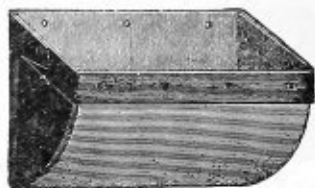
Made from one sheet of steel, with round corners and bottom. The side pieces are bent around the back and riveted as shown. The seams at the lower corners are bent under and hammered tight.

6 8 10 12 14 16 18 19 20 21 22 23 24 25	Size of Bucket Inches		Capacity in Bushels per Hour at Speed of 250 feet per Minute Buckets 12 in. apart	Suitable for Ordinary Mill and Elevator Work		Suitable for Ear Corn, Corn and Cob and Similar Heavy Substances	
	Width	Projection		Gauge	Price each	Gauge	Price each
	2 1/2	2 1/2	40	24	\$0.10	18	\$0.20
	3	3	59	24	.10	18	.90
	3 1/2	3 1/2	69	24	.10	18	.23
	4	4	87	23	.10	16	.29
	4 1/2	4 1/2	102	23	.10	16	.31
	5	5	116	22	.15	16	.35
	5 1/2	5 1/2	131	22	.15	16	.39
	6	6	159	22	.15	16	.40
	6 1/2	6 1/2	179	22	.19	16	.44
	7	7	199	22	.19	16	.48
	7 1/2	7 1/2	229	21	.22	16	.49
	8	8	251	21	.22	16	.50
	8 1/2	8 1/2	274	20	.30	16	.56
	9	9	300	19	.38	16	.63
	9 1/2	9 1/2	329	19	.40	16	.75
	10	10	354	19	.48	16	.86
	10 1/2	10 1/2	379	18	.55	16	.91
	11	11	404	18	.63	16	.98
	11 1/2	11 1/2	429	18	.70	16	1.03
	12	12	454	18	.80	16	1.05
	12 1/2	12 1/2	479	18	.90	16	1.10
	13	13	504	18	1.00	16	1.15
	13 1/2	13 1/2	529	18	1.10	16	1.20
	14	14	554	18	.75	16	1.16
	14 1/2	14 1/2	579	18	.85	16	1.23
	15	15	604	18	.90	16	1.28
	15 1/2	15 1/2	629	18	.95	16	1.30
	16	16	654	18	1.33	16	1.35
	16 1/2	16 1/2	679	18	1.38	16	1.40
	17	17	704	18	1.40	16	1.45

Heavy "Salem" Steel Elevator Buckets

Size of Bucket		Suitable for Ores, Coal, Broken Stone and Extra Heavy Substances				
Width	Projection	Gauge No. 14 Price, Each	Gauge No. 12 Price, Each	Gauge No. 10 Price, Each	Gauge No. 8 Price, Each	Gauge No. 6 Price, Each
4	4 1/2	\$0.41	.....	.....	.....	.....
4 1/2	5	.43	.....	.....	.....	.....
5	5 1/2	.47	.....	.....	.....	.....
5 1/2	6	.51	\$0.71	.....	.....	.....
6	6 1/2	.53	.73	.....	.....	.....
6 1/2	7	.54	.75	.....	.....	.....
7	7 1/2	.60	.83	\$1.03	.....	.....
7 1/2	8	.68	.93	1.15	\$1.36	\$1.56
8	8 1/2	.81	1.12	1.38	1.63	1.88
8 1/2	9	.93	1.28	1.58	1.87	2.15
9	9 1/2	.98	1.36	1.67	1.98	2.28
9 1/2	10	1.05	1.45	1.79	2.12	2.44
10	10 1/2	1.11	1.53	1.89	2.22	2.56
10 1/2	11	1.13	1.56	1.93	2.28	2.63
11	11 1/2	1.19	1.64	2.02	2.39	2.75
11 1/2	12	1.24	1.71	2.12	2.50	2.88
12	12 1/2	1.30	1.79	2.21	2.60	3.00
12 1/2	13	1.32	1.83	2.25	2.66	3.06
13	13 1/2	1.38	1.90	2.35	2.77	3.19
13 1/2	14	1.40	1.94	2.39	2.82	3.25
14	14 1/2	1.46	2.01	2.48	2.93	3.38
14 1/2	15	1.51	2.09	2.58	3.04	3.50
15	15 1/2	1.57	2.16	2.67	3.15	3.63

Sterling Riveted Elevator Buckets



The smaller sizes are made of tin and the larger of smooth refined steel. The ends are double seamed to the body and guarded with band iron firmly riveted, making the bucket light and firm. The shape is adapted to a quick and easy discharge of contents.

Tin Mill Buckets

Width, inches.....	2	2½	3	3½	4
Projection, inches...	2	2½	3	3	3
Price, each.....	\$0.10	\$0.10	\$0.10	\$0.10	\$0.12

Width, inches...	4	4½	5	5½	6
Projection, in.....	3½	3½	4	4	4
Price, each.....	\$0.13	\$0.14	\$0.16	\$0.17	\$0.18

Steel Grain Buckets

Width, inches...	5	5½	6	7	8
Projection, inches...	4	4	4	4½	5
No. of bolt holes	2	2	2	2	3
Price, each.....	\$0.16	\$0.17	\$0.18	\$0.22	\$0.25

Width, inches.....	9	10	11	12	14
Projection, inches...	5	5½	6	6	6
No. of bolt holes...	3	3	4	4	4
Price, each.....	\$0.28	\$0.35	\$0.40	\$0.44	\$0.50

Heavy Steel Ear Corn Buckets

Similar to the Steel Grain Buckets but made of much heavier materials.

Length, Bucket, in..	3	10	11	12	13
Projection, inches...	6	6½	7	7	7
Capacity, cubic in..	176	240	288	320	352
No. of bolt holes...	3	3	3	3	4
Price, each.....	\$0.40	\$0.50	\$0.56	\$0.59	\$0.62

Length, Bucket, in..	14	15	16	18	19
Projection, inches...	7	7	7	7	7
Capacity, cubic in..	384	416	448	480	512
No. of bolt holes...	4	5	5	5	5
Price, each.....	\$0.65	\$0.70	\$0.76	\$0.82	\$0.87

For larger sizes see "Warehouse" Buckets.

Galvanized Steel Buckets

For Malt Houses, Breweries, Distilleries, etc. These buckets are galvanized after being made.

Width, inches.....	5	5½	6	7	8
Projection, inches...	4	4	4	4½	5
No. of bolt holes...	2	2	2	2	3
Price, each.....	\$0.27	\$0.28	\$0.30	\$0.35	\$0.40

Width, inches.....	9	10	11	12	14
Projection, inches...	5	5½	6	6	6
No. of bolt holes...	3	3	4	4	4
Price, each.....	\$0.45	\$0.55	\$0.60	\$0.65	\$0.70

Sterling Warehouse Buckets



Concave Back—rounded bottom

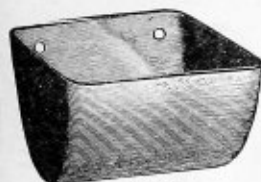
Made of cold rolled steel and reinforced with 1½-inch No. 12 steel bands.

Width on Belts, inches	Projection, inches	Depth, inches	No. 24 Steel, with Malleable "I" Brace	No. 24 Steel, with "Z" Brace
16	6	6	\$0.66	\$0.62
18	6	6	.78	.74
20	6	6	.86	.80
12	7	7	.60	.....
14	7	7	.68	.....
16	7	7	.80	.76
18	7	7	.88	.84
20	7	7	.94	.90
12	7	7½	.64	.....
14	7	7½	.72	.....
16	7	7½	.86	.82
18	7	7½	.94	.90
20	7	7½	1.00	.96
14	7½	7½	.78	.....
16	7½	7½	.92	.88
18	7½	7½	1.00	.96
20	7½	7½	1.10	1.06
14	7½	8	.82	.....
16	7½	8	.96	.92
18	7½	8	1.04	1.00
20	7½	8	1.16	1.12
14	8	8	.88	.....
16	8	8	1.04	1.00
18	8	8	1.12	1.08
20	8	8	1.20	1.16

Table Showing Carrying Capacity of the Steel Grain Bucket

Size	12 inches apart, Speed 200 feet per minute, No. Bushels per Hour.	12 inches apart, Speed 300 feet per minute, No. Bushels per Hour.	12 inches apart, Speed 350 feet per minute, No. Bushels per Hour.
5 x 4	250	371	625
6 x 4	275	412	687
7 x 4½	500	637	1062
8 x 5	600	900	1500
9 x 5	650	1012	1687
10 x 5½	850	1275	2125
11 x 6	1105	1725	2875
12 x 6	1300	1950	3250
14 x 6	1600	2400	4000
20 x 6	2275	3412	5687

Malleable Iron Elevator Buckets



Style "A"
For cement, coal, chemicals,
pulp, etc.



Style "B"
For ores, stones, etc., in
inclined elevators.



Style "C"
For sugar, clay and
sticky materials.

These buckets are cast in one piece and carefully annealed, they are seamless, strong and smooth and their rounded corners guarantee free delivery of the material handled. Punched as directed at no extra charge.

Style "A"

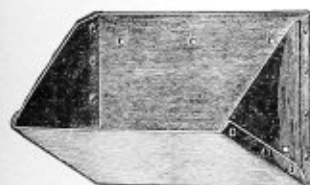
Length, inches	Width or Projection	Depth, inches	Cap. Cu. inches	Cap. Quart.	Price each
4	2 1/2	3	16	.27	\$0.21
5	3 1/2	3 1/2	26	.62	.34
6	4 1/2	4 1/2	55	.95	.48
7	5 1/2	5 1/2	85	1.47	.62
8	6 1/2	6 1/2	115	1.99	.78
10	6	6 1/2	204	3.53	1.20
11	6	6 1/2	223	3.86	1.30
12	6	6 1/2	246	4.25	1.40
12	7	7 1/2	332	5.74	1.85
14	7	7 1/2	391	6.77	2.10
15	7	7 1/2	425	7.35	2.20
16	7	7 1/2	467	8.08	2.30
14	8	8 1/2	509	8.81	2.75
16	8	8 1/2	593	10.26	3.10
18	8	8 1/2	668	11.56	3.50
18	10	10 1/2	1,053	18.23	4.75

Style "B"

Length, inches	Width or Projection	Depth, inches	Cap. Cu. inches	Cap. Quart.	Price each
4	1 1/2	2 1/4	6	.10	\$0.12
7	3 1/2	5	55	.95	.48
8	3 1/2	5	65	1.12	.50
10	4	5 1/2	107	1.85	.90
12	5 1/2	7 1/2	233	4.03	1.44
16	6 1/2	9	412	7.13	2.30

Style "C"

Length, inches	Width or Projection	Depth, inches	Cap. Cu. inches	Cap. Quart.	Price each
8	4 1/2	4	50	1.	\$0.63
10	5	4	80	1.5	.95
12	5	4	100	2.	1.05
16	7	5 1/2	250	6.5	2.20



Style "A"



Style "B"

Heavy Steel Elevator Buckets

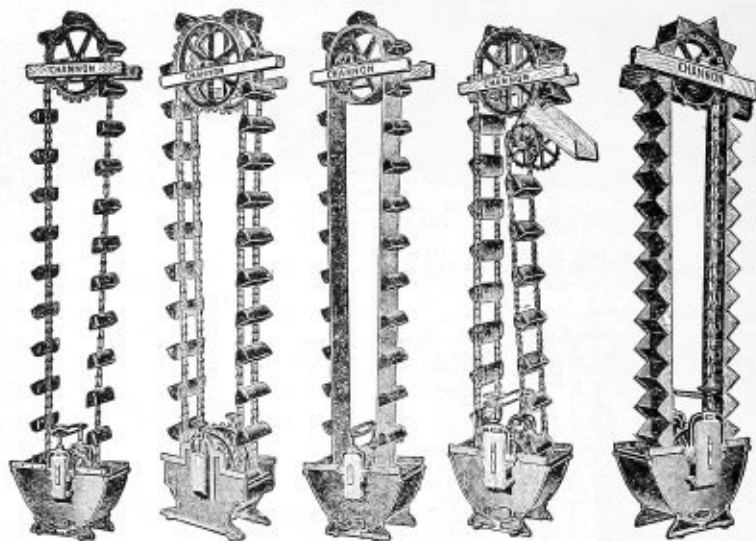
For Broken Stone, Ore, Coal, Sand, Gravel, etc. Price List below covers Style "A" Buckets only. Prices on Style "B" and special sizes and shapes quoted upon request.

Size of Bucket			No. 18 Gauge	No. 16 Gauge	No. 14 Gauge	No. 12 Gauge	No. 10 Gauge	S Gauge
Width Across Belt in Inches	Projection from Belt in Inches	Length on Belt in Inches						
5	3	4	\$0.36	\$0.42	\$0.50	\$0.60		
6	3 1/2	5	.45	.54	.65	.85		
7	4	6	.50	.60	.75	.95		
8	4 1/2	7	.60	.75	.90	1.15		
9	5	8	.85	1.05	1.25	1.55	\$1.45	
10	5 1/2	9	.90	1.15	1.35	1.75	1.55	
11	6	10	1.00	1.25	1.55	1.95	1.75	\$2.05
12	6	10	1.10	1.35	1.65	2.05	1.95	2.35
13	7	10	1.30	1.65	1.75	2.15	2.15	2.75
14	7	12		1.85	2.05	2.25	2.25	3.15
15	7	12		1.95	2.15	2.35	2.35	3.45
16	8	13		2.00	2.45	2.65	2.65	3.75
17	8	13		2.10	2.55	2.75	2.75	4.15
18	9	14		2.30	2.85	3.05	3.05	4.50
20	9	14		2.40	2.95	3.25	3.25	4.85
22	10	14		2.60	3.15	3.45	3.45	5.25
24	10	14		3.00	3.45	3.85	3.85	5.75
30	10	15			3.60	4.35	4.85	6.85



Elevator Bolts priced elsewhere in this Catalog.

Bucket Elevators for All Classes of Work



No. 1
Single
Strand

No. 2
Double
Strand

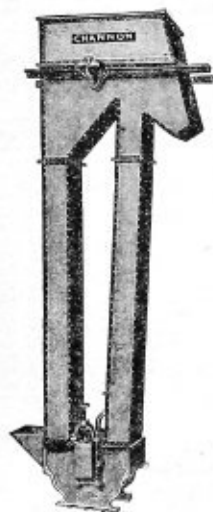
No. 3
Belt
Type

No. 4
Deflecting Wheel—
Perfect Discharge

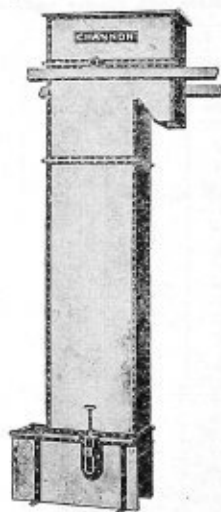
No. 5
Continuous
Bucket

Before we can quote intelligently, we must know: 1.—Nature of material to be handled. 2.—Quantity in pounds, or bushels or cubic feet per hour. 3.—Height material is to be elevated and whether perpendicular, or at what incline. 4.—Speed and diameter of shaft from which power to drive elevator is taken. 5.—State whether elevator is to be driven from top or bottom. 6.—What type is wanted, see cuts above.

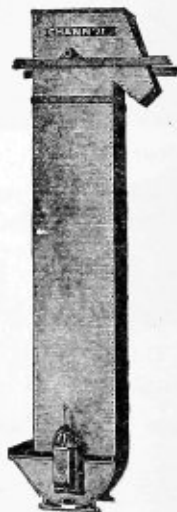
Elevator Legs



Double Leg Steel Casing
Style No. 6



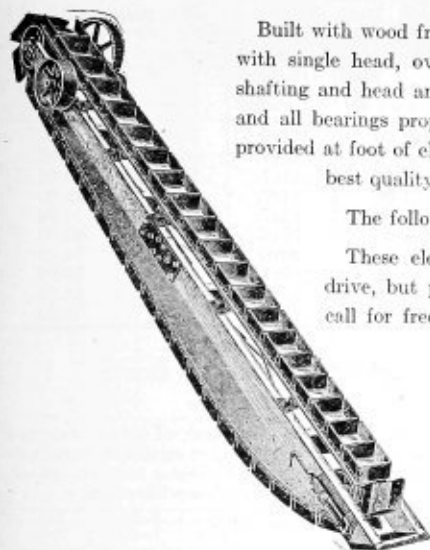
Single Leg Steel Casing
Style No. 7



Single Leg Wood Casing
Style No. 8

Steel Elevator Legs are now used extensively where hot, dusty or damp materials are handled. No. 6 style is made with either square or round casings. Legs can be made any style or of any gauge of metal desired.

Standard Portable Crushed Stone and Ore Elevators



Built with wood frames in lengths up to 100 feet. Lengths less than 31 feet built with single head, over 30 feet with geared head, unless otherwise specified. The shafting and head and boot pulleys are of liberal dimensions, the idler rolls of steel and all bearings proportioned for strength and long service. Suitable take-ups are provided at foot of elevator to take up slack of the belt and the belts used are of the best quality, thickness of belt varying with length of same.

The following table gives sizes and dimensions of our standard elevators.

These elevators are furnished complete with geared countershaft head drive, but prices below do not include the belt, as purchaser's preferences call for freedom of selection in this regard. We prefer to furnish Balata Belts and guarantee them to give better results than canvas or rubber.

The number of buckets supplied in each case is suitable for the approximate length of belt as given in the table.

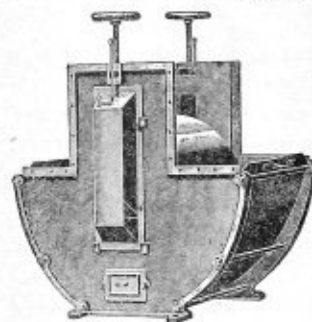
Prices and Specifications

No. of Elevator	Height Center to Center, Feet	Capacity, Cu. Ft. per Hour	SIZE OF BUCKETS			DRIVE PULLEY		Approximate Length of Belt Required, Feet	PRICE, EACH		EXTRA PER FOOT FOR INTERMEDIATE HEIGHTS	
			A	B	C	Size, Inches	Speed R. P. M.		Complete Without Belt	Extra for Attaching Buckets to Belt	Elevator Complete Without Belt	Attaching Buckets
2	30	450	9	9	6	16x 4	105	68	\$ 373.40	\$ 16.00	\$ 8.00	\$0.50
	50	450	9	9	6	16x 5	105	108	493.40	25.40		
	75	450	9	9	6	16x 7	107	160	633.40	36.00		
3	30	550	11	9	6	20x 4	98	69	400.00	21.40	7.70	.60
	50	550	11	9	6	20x 5	98	110	480.00	34.00		
	75	550	11	9	6	20x 7	100	161	660.00	48.00		
4	30	800	13	10	7	24x 6	92	69	446.60	24.00	10.70	.70
	50	800	13	10	7	24x 7	114	110	653.40	37.40		
	75	800	13	10	7	24x 9	117	161	833.40	53.40		
5	30	1150	16	11	8	30x 6	114	70	540.00	28.00	13.30	.90
	50	1150	16	11	8	30x 7	117	111	733.40	45.40		
	75	1150	16	11	8	30x11	89	162	960.00	66.60		
6	30	1500	18	12	9	36x 6	126	71	666.60	30.60	16.00	1.00
	50	1500	18	12	9	36x 7	111	112	933.40	52.00		
	75	1500	18	12	9	36x 9	111	163	1213.40	77.32		
7	0	1660	20	12	9	42x 7	98	72	753.40	33.40	18.70	1.10
	0	1660	20	12	9	42x 8	114	113	1073.40	56.00		
	5	1660	20	12	9	42x11	98	164	1400.00	84.00		
7½	30	2180	24	13½	10	48x 7	109	73	1020.00	36.00	21.30	1.30
	50	2180	24	13½	10	48x 9	90	114	1300.00	53.40		
	75	2180	24	13½	10	48x13	78	165	1686.60	92.00		
8	30	3520	30	15	12	54x 9	83	73	1600.00	42.60	29.30	1.40
	50	3520	30	15	12	54x13	72	114	1826.60	68.00		
	75	3520	30	15	12	54x17	81	165	2453.40	100.00		
9	30	4640	36	16	13	60x11	73	74	1813.40	44.00	45.30	1.50
	50	4640	36	16	13	60x15	74	115	2293.40	73.40		
	75	4640	36	16	13	60x19	66	166	2966.60	109.40		

Standard Cast-Iron Elevator Boots

For Wood Legging

Furnished with self-locking shields, tightener screws, pulley, shaft and oil tubes. Gates are provided in both ends and hand holes on the sides, which facilitate the rapid clearing out of the boot in case of a choke-down.

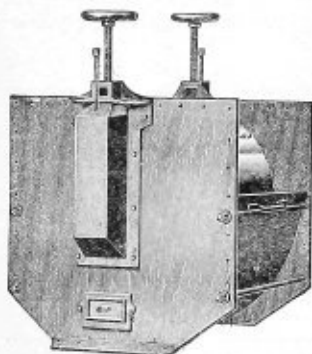


Size of Bucket, Inches	Size of Pulley, Inches	Price Each	Size of Bucket, Inches	Size of Pulley, Inches	Price Each
5x4	12x 6	\$24.00	11x7	20x13	\$56.00
6x4	12x 7	25.00	12x7	20x14	58.00
7x4½	14x 9	28.00	13x7	20x15	60.00
8x5	16x10	34.00	14x7	20x16	62.00
9x5	16x11	36.00	15x7	20x17	64.00
10x5½	16x12	38.00	18x6	20x20	68.00
11x6	18x13	44.00	20x6	20x22	70.00
12x6	18x14	46.00	16x7	20x18	66.00
14x6	18x16	48.00	18x7	20x20	68.00
16x6	18x18	50.00	20x7	20x22	70.00

Standard Wrought Steel Elevator Boots

For Light or Medium Service

Furnished with tightener screws, pulley, shaft and oil tubes. One end is made to lift out for cleaning purposes. When so specified, both ends will be made in this manner, and hand holes in the sides can also be provided. A small additional charge is made for such modifications.



Bucket, Inches	Belt, Inches	Pulley, Inches	Price Each	Bucket, Inches	Belt, Inches	Pulley, Inches	Price Each
4½	5	10x 6	\$20.00	9	10	16x11	\$30.00
5	5½	10x 6	20.00	10	11	16x12	33.00
6	7	12x 8	21.00	11	12	16x13	36.00
7	8	14x 9	23.00	12	13	18x14	40.00
8	9	14x10	26.00	14	15	18x16	44.00

Standard Take-up Boxes

For Taking up Slack in Belts, as in Elevators. Made to Pull and Push

No. of Frame and Take-up, Inches	Diameter of Shaft	Price Each, "A" or "B"	No. of Frame and Take-up, Inches	Diameter of Shaft	Price Each, "A" or "B"
4	½"	\$1.75	12	2½"	\$ 6.25
4	¾"	1.90	12	2⅞"	6.75
4	1"	2.00	20	2⅞"	9.50
5	1½"	2.55	20	2⅞"	10.00
5	1⅞"	2.70	20	2⅞"	11.00
7	1⅞"	3.25	20	2⅞"	13.50
7	1⅞"	3.50	24	3⅞"	15.00
7	1⅞"	4.00	36	3⅞"	20.00
9	1⅞"	4.75	48	3⅞"	35.00
9	2⅞"	5.00	60	3⅞"	40.00

The number of frame indicates length of movement in inches. In ordering give diameter of shaft and style desired.



Style "A"



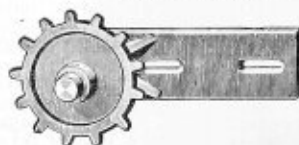
Style "B"

Idlers and Tighteners for Link Belting

Prices on application.



Roller Idler



Sprocket Tightener A



Sprocket Tightener B

“Standard” Steel Screw Conveyor



For Handling Grain, Flour, Cottonseed, Meal, Tanbark, Etc.

Diameter, Inches	Price per Foot, Black	Price per Foot, Galvanized	Gauge of Flight	Standard Length, Feet	Inside Diameter of Pipe, Inches	Revolutions per Minute	Capacity per Hour, Bushels
4	\$1.40	\$1.90	18	8	1	220	100
6	2.00	2.70	16	10	1 1/2	200	300
8	2.50	3.50	14	10	1 1/2	180	750
9	2.50	3.50	14	10	1 1/2	175	1000
9	3.25	4.55	14	10	2	175	1000
10	3.00	4.20	12	10	1 1/2	160	1400
12	3.50	5.00	12	12	2	150	2000
12	4.50	6.25	12	12	2 1/2	150	2000
14	5.00	7.00	10	12	2	140	3400
16	6.25	8.75	10	12	3	130	5000
18	7.50	10.50	10	12	3	120	6000

Our Standard Conveyors Listed Above Are Interchangeable with Other Makes

The above price list includes the curved steel lining, one hanger and one coupling with the necessary bolts for each standard length. Standard lengths given include the width of one hanger bearing. Deductions made for any regular parts not desired.

“Helicoid” Steel Conveyor

Made with a continuous flight which is heavier at the base than at the top of the flight and is conceded to be considerably stronger than the “Standard.”

Diameter, Inches	Price per Foot Std. Steel	Price per Foot Galvanized	Standard Length, Feet	Diameter of Couplings, Inches	Inside Diameter of Shaft, Inches	Outside Diameter of Shaft, Inches	Revolutions per Minute	Capacity per Hour, Bushels
4	\$1.40	\$1.90	8	1	1 1/4	1 3/8	100	100
6	2.00	2.70	10	1 1/2	1 3/4	2 1/8	140	300
8	2.50	3.50	10	1 1/2	2	2 3/8	150	750
9	2.50	3.50	10	1 1/2	2	2 3/8	150	1000
10	3.00	4.20	10	1 1/2	2	2 3/8	160	1100
12	3.50	5.00	12	2	2 1/2	2 7/8	160	2000
14	5.00	7.00	12	2 7/16	3	3 1/2	160	3000
16	6.25	8.75	12	3	3 1/2	4	160	5000

Above prices include curved steel lining, one hanger and one coupling with necessary bolts for each standard length. Standard lengths given include the length of one hanger bearing. Deductions made for any regular parts not desired.

Extra Heavy “Helicoid” Steel Conveyor

For Conveying Sand, Cement, Ore, Coal, Stone, Etc.

Diameter, Inches	Price per Foot	Standard Length, Feet	Thickness of Flight Next to Pipe, Inches	Thickness of Flight, Outer Edge, Inches	Diameter Couplings, Inches	If Made on Solid Shaft, Diameter of Shaft, Inches	Inside Diameter of Pipe, Inches
4X	\$2.50	8	3/8	.11	1	1 5/8	1 1/4
6X	3.00	10	1/4	.125	1 1/2	2 1/8	1 3/4
6XX	3.50	10	3/8	.2	1 1/2	2 1/8	1 3/4
9X	4.75	10	3/8	.172	1 1/2	2 3/8	2
9XX	5.50	10	3/8	.19	2	2 5/8	2 1/2
12X	6.00	12	3/8	.17	2	2 5/8	2 1/2
12XX	7.00	12	3/8	.18	2 7/16	3	3
12XXX	8.50	12	1/2	.25	3	3 5/8	3 1/2

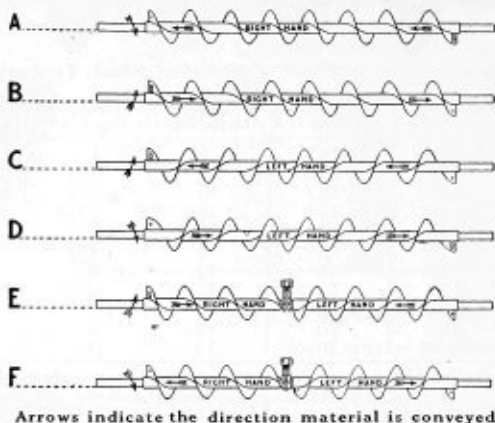
Extra Heavy Helicoid Conveyor is mounted on extra heavy pipe or on solid shaft. When mounted on solid shaft, we furnish special couplings to suit conditions. Above prices include one regular hanger for each standard length of conveyor, but does not include lining. When required, this is furnished at an additional price. Special hangers made to suit different kinds of work.

See next page—Directions for ordering.

H.Channon Company Chicago

How to Order Screw Conveyors

Indicate which of the diagrams below is wanted—it will avoid any possible error, also state whether right or left hand. Changing a conveyor end for end does not change it from right to left hand.



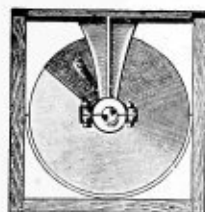
Standard Curved Steel Lining for Conveyor Boxes



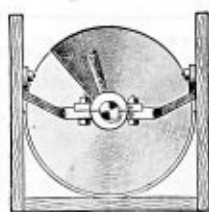
Prices on Perforated or Extra Heavy
Plain Lining will be Given
Upon Application

Diameter of Conveyor, Inches	Price per Lineal Foot	Gauge of Steel	Width of Sheet, Inches	Standard Length of Sheet, Inches
4	\$0.08	22	8	30
6	.10	22	11	30
8	.16	20	16	30
9	.16	20	16	30
10	.19	20	18	30
12	.20	20	20	30
14	.34	18	24	30
16	.36	18	27	30
18	.39	18	36	30

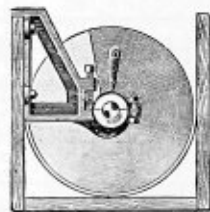
Price List of Regular Conveyor Hangers



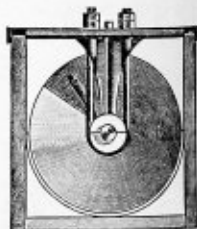
No. 13



No. 14



No. 15



No. 17

Diameter of conveyor, inches	4	6	8	9	10	12	12	16	16	18
Diameter of bearing, inches	1	1½	1½	1½	2	2	3	2	3	3
Length of bearing, inches	1½	2	2	2	2	2	3	2	3	3
Price each—Nos. 13, 14 and 15	\$0.25	\$0.40	\$0.55	\$0.55	\$1.10	\$1.25	\$1.75	\$2.50	\$3.00	\$3.50
Price each—No. 17	.45	.55	.75	.75	1.10	1.50	1.75	2.50	3.00	4.00

No. 15 Hanger made for 9, 12 and 16-inch Conveyors only
4-inch Conveyor furnished with only one style hanger—No. 13

Flexible Car Loading Spouts

Will Turn to Any Angle

Wrought lug connections. Swivel joint on hopper section.

These spouts are used to load cars without shovelling and will work perfectly where there is a little fall from bin.

Style "A" For General Use.

Style "B" For Use Where Loading Space Is Limited.



Style B
with chain
connections
closed



Style A
with lug
connections
open

Diam., Inches	Length	Price Each, Gauge Steel			
		No. 18	No. 16	No. 14	No. 12
6	5 ft.	\$ 8.50	\$10.00	\$12.00	\$17.00
8	6 ft.	10.50	12.00	16.00	21.00
10	6 ft.	12.00	15.00	18.00	23.00
12	8 ft.	18.50	20.00	25.00	30.00
Extra Sections					
6	8 1/2 in.	\$0.70	\$1.00	\$1.20	\$1.35
8	8 1/2 in.	.85	1.15	1.35	1.50
10	8 1/2 in.	1.00	1.30	1.50	1.75
12	8 1/2 in.	1.25	1.50	1.70	2.00

In ordering give size of wooden spout to which the flexible spout is to be fitted.

Any length or diameter furnished to order.

Always state whether Lug or Chain connections are desired.

Distributing Spouts For Elevator Head

Style "A" is all steel. Style "B" has cast iron hopper and elbow. The measurements from rod to discharge centers can be increased or decreased if so ordered.



Style A.

Inside Diam. of Spout, inches	Price, each		Rod to Dis- charge Centers, inches	Top of Hopper to Bottom of Spout, inches	Indi- cator Rod Socket, inches
	Style A	Style B			
6	\$ 9.00	\$12.00	30	33	7
8	12.00	16.00	36	41 1/4	1 1/4
10	15.00	20.00	42	47	1 3/4
12	18.00	24.00	48	54 3/4	1 3/4

Bifurcated Car Loading Spout

With Square Outlets



Price complete Each, \$50.00

Seeley Cast Iron Turn Heads



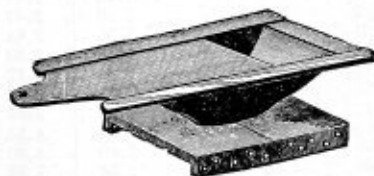
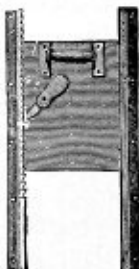
With Hopper for Elevator
Heads

Size, Inches	Price Complete, Each
7	\$ 7.00
9	9.00
12	12.00

Adjustable Bin Gates

The gate slides in grooves and can be set in any position desired, the dog holding it in place wherever set.

Size, inches	Price, Each, without Spout	Price, Each, with Spout
12x14	\$2.50	\$ 5.00
14x16	3.00	6.00
16x18	3.50	7.50
18x20	4.00	10.00
20x22	4.50	12.50
22x24	5.00	15.00



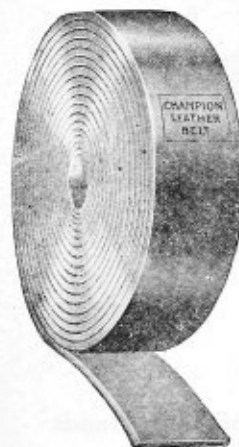
Plain
Bin
Bottoms

Size, inches	Price, Complete, Each	Size, inches	Price, Complete, Each
9	\$ 7.00	18	\$16.00
10	8.00	20	20.00
12	10.00	24	28.00
14	12.00	..	..

H. Channon Company Chicago

Champion Brand Leather Belting

Highest Quality



Our Champion Brand of leather belting is all that the name implies. There is none better made. It is a strictly short lap and short piece belt, made from heavy center stock, which is the best part of the hide, and tanned with pure oak bark. No piece longer than 50 inches is used. Uniform thickness and quality throughout. Intended for all regular service, except where exceptionally severe conditions are encountered, and the use of an extra heavy belt is imperative. Made in single, double and triple weights or plies and any width. This belt is absolutely guaranteed to give entire satisfaction.

Harrison Brand Leather Belting

Second Quality

This is a good quality, medium weight belt, which will give good service where high speed and heavy duty is not required. Made with the same careful workmanship as our Champion Brand, but lighter stock is used. In buying leather belting it should be remembered that the best is none too good and we recommend our Champion Brand.

Special Light Double, Leather Belting

For high speed and light loads, such as on dynamos, motors, fans, blowers, etc., especially where small pulleys are used, we particularly recommend this belt. It is made in double thickness only, from first cut, light shoulder stock. If the high speed is used in connection with heavy duty, we advise the use of a light, double Champion Brand belt, which is made of strictly center stock and is much stronger than the shoulder leather.

Special Creamery Leather Belting

First Quality

For use in creameries, our Special Creamery Belting will be found to be the best belt that can be produced for the purpose. It is made of heavy, first quality center stock, absolutely uniform in thickness and weight. Made in single thickness only, waterproofed to withstand the dampness and laps stitched to prevent opening.

Anhydrous Leather Belting

This belt is peculiarly suitable for use in steam laundries. It is a mineral tanned belt, light green in color. It is very soft and will not become hard after being wet. Made from center stock and strictly first quality.

Price List of Leather Belting

Price per Foot			Price per Foot			Price per Foot			Price per Foot		
Width Inches	Single	Double	Width Inches	Single	Double	Width Inches	Single	Double	Width Inches	Single	Double
1 1/2	\$0.12	\$0.24	4	\$0.96	\$1.92	17	\$4.08	\$ 8.16	36	\$ 8.64	\$17.28
5/8	.15	.30	4 1/2	1.08	2.16	18	4.32	8.64	38	9.12	18.24
3/4	.18	.36	5	1.20	2.40	19	4.56	9.12	40	9.60	19.20
7/8	.21	.42	5 1/2	1.32	2.64	20	4.80	9.60	42	10.08	20.16
1	.24	.48	6	1.44	2.88	21	5.04	10.08	44	10.56	21.12
1 1/4	.30	.60	6 1/2	1.56	3.12	22	5.28	10.56	46	11.04	22.08
1 1/2	.36	.72	7	1.68	3.36	23	5.52	11.04	48	11.52	23.04
1 3/4	.42	.84	8	1.92	3.84	24	5.76	11.52	50	12.00	24.00
2	.48	.96	9	2.16	4.32	25	6.00	12.00	52	12.48	24.96
2 1/4	.54	1.08	10	2.40	4.80	26	6.24	12.48	54	12.96	25.92
2 1/2	.60	1.20	11	2.64	5.28	27	6.48	12.96	56	13.44	26.88
2 3/4	.66	1.32	12	2.88	5.76	28	6.72	13.44	60	14.40	28.80
3	.72	1.44	13	3.12	6.24	29	6.96	13.92	64	15.36	30.72
3 1/4	.78	1.56	14	3.36	6.72	30	7.20	14.40	68	16.32	32.64
3 1/2	.84	1.68	15	3.60	7.20	32	7.68	15.36	72	17.28	34.56
3 3/4	.90	1.80	16	3.84	7.68	34	8.16	16.32			

We can furnish endless leather belts of any grade and can make shipments the same day order is received in most cases. Belts also furnished with prepared ends.

Channon's Special Genuine Balata Belting

For Heavy Duty and High Speed

The best belt for every purpose because of its enormous tensile strength, resistance to stretch, unequalled transmitting ability, immunity from deterioration, solidity of texture, absolute uniformity, and the fact that it is positively waterproof.

Balata belting is especially adapted to hard work, such as high speed and hard drive transmission. It is particularly recommended for use in saw mills, paper mills, mines, breweries, packing houses, and all places where belts come in contact with water, steam, alkalis or chemical fumes.

An European invention, Balata belting was used many years before its introduction into this country and further American experiments have developed it to a state of near perfection.

Balata is a vegetable gum of enormous strength, immune from oxidation, the peculiar qualities of which do not permit of its being compounded with any other ingredients. The duck used is very closely woven, unlike that used in rubber belting, and is of 38-oz. weight.

We guarantee our Balata belting to be absolutely proof against the action of water, steam, animal oils, alkalis or chemical fumes—to have the minimum stretch, to be practically proof from age deterioration, and by any test the most powerful belting in the world.

Being strong and non-stretching, it is an excellent drive belt, and unaffected by moisture, it will work continuously where other belting would be ruined in a short time. Balata belting does not slip and requires no dressing.

For outdoor work it is unequalled, no weather affecting it. It is the only satisfactory belt for conveying work, being waterproof throughout (not merely on the cover), with no danger of moisture separating the plies, and lasting from two to three times as long as any other belting.

Comparing the initial cost with the length, quality and reliability of service, Balata is the most economical belting in every way. We make Balata belting endless in one day, the splice being no thicker than any part of the belt.

Balata Belting can be made in any width and in any number of plies.



PRICE PER FOOT

Width in Inches	1	1 1/4	1 1/2	1 3/4	2	2 1/4	2 1/2	2 3/4	3	3 1/4	3 1/2	3 3/4	4	4 1/4	4 1/2
3-ply	\$0.18	\$0.23	\$0.27	\$0.32	\$0.38	\$0.41	\$0.45	\$0.50	\$0.54	\$0.59	\$0.63	\$0.68	\$0.72	\$0.77	\$0.81
4-ply	.24	.30	.36	.42	.48	.54	.60	.66	.72	.78	.84	.90	.96	1.02	1.08
5-ply	.30	.36	.42	.48	.54	.60	.66	.72	.78	.84	.90	.96	1.02	1.08	1.14
Width in Inches	5	5 1/2	6	6 1/2	7	7 1/4	8	9	10	11	12	13	14	15	16
3-ply	\$0.90	\$0.99	\$1.08	\$1.17	\$1.26	\$1.35	\$1.44	\$1.62	\$1.80	\$1.98	\$2.16	\$2.34	\$2.52	\$2.70	\$2.88
4-ply	1.20	1.32	1.44	1.56	1.68	1.80	1.92	2.16	2.40	2.64	2.88	3.12	3.36	3.60	3.84
5-ply	1.50	1.65	1.80	1.95	2.10	2.25	2.40	2.70	3.00	3.30	3.60	3.90	4.20	4.50	4.80
6-ply	.20	.22	.24	.26	.28	.30	.32	.34	.36	.38	.40	.42	.44	.46	.48
Width in Inches	17	18	19	20	21	22	23	24	25	26	28	30	32	34	36
3-ply	\$3.06	\$3.24	\$3.42	\$3.60	\$3.78	\$3.96	\$4.14	\$4.32	\$4.50	\$4.68	\$5.04	\$5.40	\$5.76	\$6.12	\$6.48
4-ply	4.08	4.32	4.56	4.80	5.04	5.28	5.52	5.76	6.00	6.24	6.72	7.20	7.68	8.16	8.64
5-ply	5.10	5.40	5.70	6.00	6.30	6.60	6.90	7.20	7.50	7.80	8.40	9.00	9.60	10.20	10.80
6-ply	6.12	6.48	6.84	7.20	7.56	7.92	8.28	8.64	9.00	9.36	10.08	10.80	11.52	12.24	12.96

Victor White Woven Cotton Belting

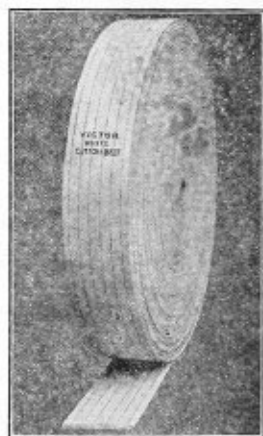
Woven Cotton Belting is a low priced belt, giving very good service for light conveying purposes, indoors. It is used largely in elevators, bakeries, etc., and for carrying packages and other light weight materials.

It is made by weaving several layers into a solid body. The thickness is designated by the stripes, 4 stripes indicate 4 ply, 6 stripes, 6 ply, etc.

This belting is not waterproofed or painted and cannot be woven endless. In cutting holes for lacing, use a pointed instrument to push the fibres apart.

PRICE PER FOOT

Width, Inches	1	1 1/4	1 1/2	1 3/4	2	2 1/4	3	3 1/4	4	4 1/2	5	5 1/2
2-ply	\$0.04	\$0.04	\$0.05	\$0.05	\$0.06	\$0.07	\$0.08	\$0.10	\$0.11	\$0.13	\$0.14	\$0.16
3-ply	.06	.06	.07	.08	.09	.11	.13	.15	.17	.19	.21	.23
4-ply	.09	.10	.11	.12	.13	.15	.18	.20	.23	.26	.28	.30
5-ply	.15	.16	.18	.19	.21	.23	.26	.29	.31	.33	.36	.38
6-ply	.20	.22	.24	.26	.29	.32	.34	.36	.38	.41	.44	.47
Width, Inches	6	7	8	9	10	12	14	16	18	20	22	24
2-ply	\$0.18	.21	.23	.26	.29	.35	.43	.49	.57	.61	.65	.69
3-ply	.25	.29	.33	.37	.42	.50	.62	.72	.82	.90	1.00	1.10
4-ply	.33	.38	.44	.50	.56	.66	.78	.90	1.00	1.15	1.35	1.55
5-ply	.41	.48	.55	.61	.69	.83	.98	1.15	1.28	1.45	1.65	1.85
6-ply	.50	.58	.65	.73	.82	1.00	1.20	1.40	1.55	1.75	1.95	2.16
8-ply	.65	.75	.85	1.00	1.15	1.35	1.60	1.85	2.15	2.35	2.60	2.85
Width, Inches	26	28	30	32	34	36	38	40	42	44	48	50
2-ply	\$0.77	\$0.85	\$0.90	\$1.00	\$1.10	\$1.20	\$1.30	\$1.40	\$1.50	\$1.60	\$1.80	\$2.00
3-ply	1.35	1.50	1.60	1.70	1.80	1.90	2.05	2.15	2.25	2.35	2.50	2.65
4-ply	1.75	1.90	2.10	2.25	2.40	2.50	2.65	2.80	2.90	3.00	3.20	3.30
5-ply	2.00	2.15	2.40	2.60	2.80	3.00	3.20	3.40	3.60	3.75	4.00	4.20
6-ply	2.36	2.60	2.85	3.00	3.25	3.50	3.70	3.90	4.05	4.20	4.50	4.80
8-ply	3.10	3.35	3.60	3.85	4.10	4.35	4.60	4.85	5.10	5.45	5.80	6.10



IMPORTANT—This belting is not waterproofed or painted and should not be confused with canvas belting. It cannot be woven endless. Do not cut lacing holes with a hollow punch.

Our Boughton Belt Dressing is equal to any bar dressing made.

Stitched Canvas Belting

Our Canvas Stitched Belting is made of first quality, long fibre, closely woven cotton duck, with four rows of stitching per inch in width. It is thoroughly saturated in a water-proofing compound and painted with a red composition paint, which gives it an excellent surface for the pulley, and is an additional preservative. It is not affected by heat or cold and will remain flexible under all conditions. It will run true and will not freeze in zero weather. Thoroughly stretched before leaving the factory. Especially adapted for places subject to varying temperatures or where belting will receive hard usage. Recommended for threshers, sawmills, quarries, wood working plants, etc.

A large stock of all regular sizes are carried in two grades, Sampson Brand and Boughton Brand.

Sampson Brand

This is a strictly first quality canvas belting made of thirty-two ounce duck and is equal to any stitched canvas belting made.



It is widely used for main drives, transmission, elevating and conveying purposes, being cheaper to install than rubber belting and in some places is just as efficient.

Boughton Brand

This grade is the one generally used. Its quality is identical with the Sampson Brand excepting that it is lighter in weight. It can be used for the same purposes, where a more inexpensive belt is desired.

Endless Belts

When endless canvas stitched belts are wanted, state the net length wanted. An extra charge of 3 feet is always made to cover the cost of labor in making the splice. There is usually a considerable delay when belts are made endless, varying from 1 to 3 weeks. Unless it is absolutely necessary to have belts endless we recommend the use of belt lacing, which saves the cost of the extra feet and the delay involved.

Price Per Foot

(Adopted by the Canvas Stitched Belt Manufacturers Association)

Width, inches	1	1½	2	2½	3	3½	4	4½	5	6	7	8	9	10	11	12	13	14
4-ply.....	\$0.12	\$0.18	\$0.24	\$0.30	\$0.35	\$0.39	\$0.43	\$0.47	\$0.51	\$0.60	\$0.70	\$0.80	\$0.90	\$1.00	\$1.10	\$1.20	\$1.43	\$1.54
5-ply.....		.30	.38	.44	.49	.54	.59	.64	.75	.88	1.00	1.13	1.25	1.38	1.50	1.79	1.91	
6-ply.....		.36	.45	.53	.59	.65	.71	.77	.90	1.05	1.20	1.35	1.50	1.65	1.80	2.15	2.31	
8-ply.....					.86	.94	1.02	1.20	1.40	1.60	1.80	2.00	2.20	2.40	2.86	3.08		
10-ply.....															3.00	3.58	3.85	

Width, inches	15	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48
4-ply.....	\$1.65	\$1.70	\$1.98	\$2.30	\$2.42	\$2.64	\$3.12	\$3.36	\$3.60	\$3.84	\$4.08	\$4.32	\$4.56	\$5.20	\$5.46	\$5.72	\$5.98	\$6.24
5-ply.....	2.06	2.20	2.48	2.75	3.03	3.30	3.60	4.20	4.50	4.80	5.10	5.40	5.70	6.18	6.50	6.83	7.15	7.48
6-ply.....	2.48	2.64	2.97	3.30	3.63	3.96	4.68	5.04	5.40	5.76	6.12	6.48	7.41	7.80	8.19	8.68	9.07	9.30
8-ply.....	3.30	3.52	3.96	4.40	4.84	5.28	6.24	6.72	7.20	7.68	8.16	8.64	9.88	10.40	10.92	11.44	11.96	12.48
10-ply.....	4.13	4.40	4.95	5.50	6.05	6.60	7.80	8.40	9.00	9.60	10.20	10.80	12.35	13.00	13.65	14.30	14.95	15.60

Rubber Belting

The most satisfactory rubber belting on the market. A different grade for each purpose. Each grade represents the highest value it is possible to offer for the money.

President Brand A special hard service, friction surface belt, designed to meet the requirements of the most severe conditions. We recommend this brand for use in saw mills or paper mills, or for any especially heavy work. Suitable for heavy main drives, due to the friction surface. Made of the highest quality 32-ounce duck.

Bullock Brand A grade of belting that is very satisfactory for ordinary service. We guarantee this belt for any work that is not extraordinarily heavy. Made of heavy quality duck. Strong, flexible and reliable.

Special Elevator Belting A belt of great tensile strength for elevator service. We can furnish this belting on short notice, most sizes from stock.

Stitched Rubber Belting Especially designed to prevent ply separation under conditions where the belt is exposed to oils, acids or moisture. Prices on application.

Conveyor Belting Constructed for carrying materials, such as ore, coal, sand, gravel, etc. Surface reinforced with pure rubber cover $\frac{1}{8}$ to $\frac{1}{4}$ inch thick, according to nature of work. Write for prices.

Price List Per Foot

Width, inches	1	1½	2	2½	3	3½	4	4½	5	6	7	8	9	10	11	12
2-ply.....	\$0.09	\$0.11	\$0.13	\$0.15	\$0.18	\$0.22	\$0.26	\$0.30	\$0.34	\$0.38	\$0.42	\$0.50	\$0.59	\$0.67	\$0.76	\$0.84
3-ply.....	.11	.13	.15	.17	.20	.25	.30	.35	.40	.45	.50	.60	.70	.80	.90	1.00
4-ply.....	.13	.16	.19	.22	.25	.31	.37	.43	.50	.55	.61	.72	.84	.96	1.07	1.20
5-ply.....		.23	.27	.31	.38	.45	.53	.61	.69	.76	.89	1.04	1.19	1.34	1.49	1.63
6-ply.....				.37	.46	.55	.65	.75	.84	.91	1.08	1.25	1.44	1.60	1.77	1.96
7-ply.....								.86	.96	1.06	1.25	1.46	1.68	1.88	2.09	2.29
8-ply.....											1.44	1.68	1.92	2.16	2.40	2.62

Width, inches	13	14	15	16	18	20	22	24	26	28	30	32	34	36	38	40	42
2-ply.....	\$1.10	\$1.19	\$1.28	\$1.37	\$1.55	\$1.74	\$1.94	\$2.16	\$2.38	\$2.60	\$2.82	\$3.04	\$3.26	\$3.48	\$3.70	\$3.92	\$4.14
3-ply.....	1.30	1.40	1.52	1.65	1.87	2.09	2.33	2.60	2.86	3.12	3.39	3.65	3.92	4.18	4.44	4.71	4.97
4-ply.....	1.56	1.69	1.83	1.96	2.22	2.49	2.77	3.08	3.39	3.70	4.00	4.31	4.62	4.93	5.24	5.55	5.85
5-ply.....	1.95	2.11	2.28	2.44	2.77	3.10	3.47	3.85	4.23	4.62	5.00	5.39	5.78	6.16	6.55	6.93	7.32
6-ply.....	2.34	2.54	2.74	2.94	3.33	3.73	4.16	4.62	5.08	5.54	6.00	6.47	6.93	7.39	7.85	8.32	8.78
7-ply.....	2.73	2.96	3.19	3.42	3.88	4.35	4.85	5.39	5.93	6.47	7.00	7.55	8.09	8.62	9.16	9.70	10.24
8-ply.....	3.12	3.39	3.65	3.92	4.44	4.97	5.54	6.16	6.78	7.39	8.00	8.62	9.24	9.86	10.47	11.09	11.70

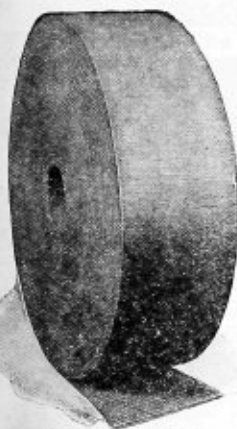
Prices on larger sizes upon application

Stanley Belting

Used all over the world for transmitting power and conveying and elevating materials. It is a solid woven cotton belting, impregnated with a special compound. Under normal conditions will not stretch more than 2 per cent, which is usually taken out the first 36 hours, thus eliminating continual stoppage for taking up belt. The most flexible belt made, and will cling to the pulleys, producing a greater arc of contact. It is absolutely uniform in thickness, with edges having a special selvage, which does not easily fray. "Stanley" is unaffected by extreme heat, and is not injured by grease, oil, gases, water, steam, etc., but if used in places which are alternately wet and dry, an idler pulley is recommended.

Price Per Foot

Width, inches.	1	1½	1½	1½	2	2½	2½	2½	3	3½	3½
Elevator.....	\$0.10	\$0.12	\$0.15	\$0.17	\$0.20	\$0.22	\$0.25	\$0.27	\$0.30	\$0.32	\$0.35
Single.....	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70
Double.....	.30	.37	.45	.52	.60	.67	.75	.82	.90	.97	1.05
Triple.....									1.20	1.30	1.40
Width in inches.	4	4½	5	6	7	8	9	10	11	12	
Elevator.....	.40	.45	.50	.60	.70	.80	.90	1.00	1.10	1.20	
Single.....	.80	.90	1.00	1.20	1.40	1.60	1.80	2.00	2.20	2.40	
Double.....	1.20	1.35	1.50	1.80	2.10	2.40	2.70	3.00	3.30	3.60	
Triple.....	1.60	1.80	2.00	2.40	2.80	3.20	3.60	4.00	4.40	4.80	
Width in inches.	13	14	15	16	17	18	19	20	21	22	
Elevator.....	1.30	1.40	1.50	1.60	1.70	1.80	1.90	2.00	2.10	2.20	
Single.....	2.60	2.80	3.00	3.20	3.40	3.60	3.80	4.00	4.20	4.40	
Double.....	3.90	4.20	4.50	4.80	5.10	5.40	5.70	6.00	6.30	6.60	
Triple.....	5.20	5.60	6.00	6.40	6.80	7.20	7.60	8.00	8.40	8.80	
Width in inches.	23	24	25	26	27	28	29	30	31	32	
Elevator.....	2.30	2.40	2.50	2.60	2.70	2.80	2.90	3.00	3.10	3.20	
Single.....	4.60	4.80	5.00	5.20	5.40	5.60	5.80	6.00	6.20	6.40	
Double.....	6.90	7.20	7.50	7.80	8.10	8.40	8.70	9.00	9.30	9.60	
Triple.....	9.20	9.60	10.00	10.40	10.80	11.20	11.60	12.00	12.40	12.80	
Width in inches.	33	34	35	36	37	38	39	40	41	42	
Elevator.....	3.30	3.40	3.50	3.60	3.70	3.80	3.90	4.00	4.10	4.20	
Single.....	6.60	6.80	7.00	7.20	7.40	7.60	7.80	8.00	8.20	8.40	
Double.....	9.90	10.20	10.50	10.80	11.10	11.40	11.70	12.00	12.30	12.60	
Triple.....	13.20	13.60	14.00	14.40	14.80	15.20	15.60	16.00	16.40	16.80	



Made in Scotland

Announcement

We are prepared to furnish beltings of all descriptions for all kinds of work, and on short notice. Our stock is large and complete.

When in doubt as to the proper belting to be used, and that which will render the maximum of efficiency, take advantage of our many years of practical experience in this line, and send us your inquiries. We earnestly solicit them, and they will be taken care of promptly and correctly.

A Few Words About the Quality of Our Belting

We especially recommend our Champion leather belting, as it is unexcelled in quality. Made of pure oak-bark slow process tanned leather, cut from center stock within 15 inches of each side of the backbone. Is of solid leather throughout—no "Shims"—nor made plumb through other deceptive means.

Our Bullock rubber belting is recommended and guaranteed for all excepting extraordinary heavy services for which we offer our President brand. This is absolutely of the highest grade obtainable.

Round Leather Belting



Solid



Twisted

Solid Round Leather Belting is made from center stock, oak tanned leather. It is firm, solid, thoroughly stretched and finely finished. All sizes from $\frac{3}{16}$ " to $\frac{3}{4}$ " are carried in stock.

Round Twisted Leather Belting is mostly used in sizes from $\frac{3}{8}$ to 1 inch, which are too large to be cut round from solid leather. The leather is folded in such a manner that it makes a perfectly round belt. This belting is made from the best oak tanned leather.

Diam., Ins.	Per Foot Solid	Per Foot Twisted	Diam., Ins.	Per Foot Solid	Per Foot Twisted
$\frac{1}{8}$		\$0.08	$\frac{1}{2}$	\$0.38	\$0.38
$\frac{3}{16}$	\$0.04	.12	$\frac{5}{8}$	.48	.48
$\frac{1}{4}$	.06	.17	1	.60	.60
$\frac{5}{16}$		.22		.80	.80
$\frac{3}{8}$	.16	.27		.96	.96

Rawhide twist belting can only be furnished in sizes up to and including $\frac{1}{2}$ -inch.

Steel Belt Couplings



For Round Belts

Sizes are outside diameters

Size, inches	$\frac{1}{4}$	$\frac{3}{16}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$
Price, per pair	\$0.30	\$0.25	\$0.20	\$0.25	\$0.30	\$0.35
Size, inches	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{1}{2}$	1	
Price, per pair	\$0.40	\$0.60	\$0.90	\$1.30	\$1.80	

Cling Surface Belt Preservative



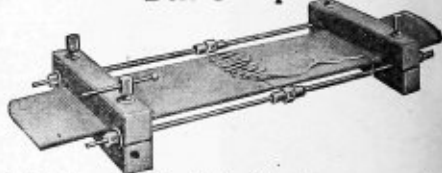
Cling Surface is a preservative, a special treatment for belts to attain special results. Leather and other materials used for belts have difficult and exhausting work to do, and to be able to give best service, and to last, need care and special treatment.

Cling Surface filters through the surface fibres into the belt, leaving it with a soft, velvety face, and a clinging surface. There is nothing on the face, it is in the face. It lets the belt grasp the pulleys and pull. It enables belts to be run slack, and to grip a greater area of the pulleys. Belts to which Cling Surface has been applied will never slip, never stick, must grip, pull for the required instant and release without effort.

Put up in 10, 25, 50 and 100 lb. packages. Full directions sent with each package.

Price, per pound.....\$1.70

Belt Clamps



No belting user should be without one or more sets of belt clamps. Belts should not be laced while off pulleys, many being ruined by this practice. When done with wide leather belts, a "crook" nearly always results, which never comes out until belt is repaired.

Using belt clamps prevents making crooked belts, and lacing is made much easier and quicker. Frame is hard wood, jaws corrugated, making it practically impossible for belts to slip when properly placed in clamp.

Our belt clamps combine simplicity, strength and convenience.

No.	0	1	2	3
For belt, inches	6 to 12	12 to 18	12 to 24	24 to 36
Price, each	\$8.00	\$10.00	\$12.00	\$18.00

Boughton Belt Cement Dressing and Wire Lace



Boughton Belt Cement is made of the purest gelatines procurable, and so condensed that it requires twice the quantity of water to reduce it to the proper consistency for use, as ordinary belt glue. For this reason Boughton Belt Cement is very economical. Most belt glues make a hard, crackly joint, stiff and difficult to bend at first. Because of its greater adhesive qualities, it takes a smaller quantity of Boughton Belt Cement to make a joint, and the splice is soft and pliable. It is put up in one pound cans and costs no more than ordinary belt glue.

Price, per can.....\$1.60

Boughton Belt Dressing is made only from the grease extracted from sheep's wool before it is woven into cloth. Tanners use this same grease for softening hides after tanning, as it is the only pure animal grease obtainable. Boughton Belt Dressing is applied to the moving belt.

the friction produced melting and spreading it. No time is lost in heating this dressing or in stopping the machinery for application.

Boughton Wire Belt Lacing is of special secret alloy, possessing great strength with convenient flexibility for lacing belts. Each box contains fifty lineal feet of lace. Made in five sizes.

No. 00 for small, thin belts	} Price, per box, any size.....	\$0.60
No. 0 for belts 2 to 3 inches wide		
No. 1 for belts 4 to 6 inches wide		
No. 2 for belts 6 to 16 inches wide		
No. 3 for very heavy belts		\$0.60



Champion Rawhide Lace Leather

Full Sides

Champion Brand is the best rawhide lace leather obtainable, being durable, pliable and strong. It is made from selected navy green salted sides and is entirely free from hard spots. A side contains about 17 square feet. Price, per square foot..... \$1.00

Champion Rawhide Cut Lace

Width inches	Price per 100 ft.	Width inches	Price per 100 ft.
$\frac{1}{4}$	\$2.50	$\frac{1}{2}$	\$5.50
$\frac{3}{16}$	3.00	$\frac{5}{8}$	6.50
$\frac{1}{2}$	3.75	$\frac{3}{4}$	7.50
$\frac{3}{4}$	4.50	.....	.....

Bristol's Steel Belt Lacing

Staggered Point for all Kinds of Belting

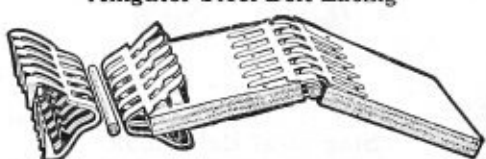


Easily and quickly applied with a hammer to new or old belts and makes the strongest kind of a joint. The wedge shaped points driven through belt force the fibres aside without cutting them. It makes flexible joints which conform to crowning of pulley and runs smoothly even on small pulleys. The staggered point principle of the hooks is the improvement which makes this kind of lacing applicable to all kinds of belting.

Thickness of Belt	No. of lace and kind of belting			Price per Box
	Leather	Fabric	All Kinds	
$\frac{1}{16}$ to $\frac{1}{8}$	00	---	---	\$1.00
$\frac{1}{8}$ to $\frac{3}{16}$	1	10	110	1.00
$\frac{3}{16}$ to $\frac{1}{4}$	1	11	111	1.50
$\frac{1}{4}$ to $\frac{5}{16}$	2	12	112	2.00
$\frac{5}{16}$ to $\frac{3}{8}$	3	13	113	2.50
$\frac{3}{8}$ to $\frac{7}{16}$	4	14	114	3.00
$\frac{7}{16}$ to $\frac{1}{2}$	5	15	115	3.50
$\frac{1}{2}$ to $\frac{5}{8}$	---	17	117	4.95
$\frac{5}{8}$ to $\frac{3}{4}$	---	19	119	6.05

Each box contains assorted lengths enough to lace 100 inches in width of belts. Can be used in leather, rubber, cotton, woven and all other belts.

Alligator Steel Belt Lacing



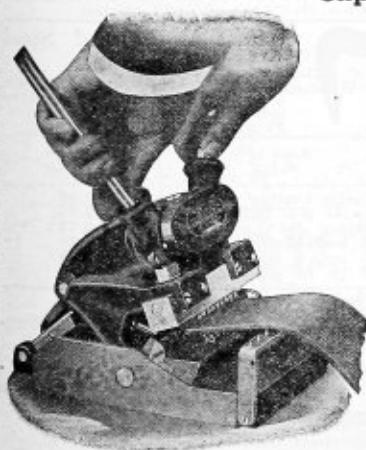
For use with leather, balata, rubber, canvas and cotton belting. Makes a flexible hinge joint. Points are sharp so that no tool is required but a hammer. No punch holes are necessary. Overcomes the tendency of fabric belts to fray at the ends. A very popular belt lacing. Packed in boxes complete with extra hinge pins in 12 inch length which can be cut to suit requirements.

Box No.	Lacing Number	Price per box	Thickness of belt inches	Length of section, in.	Width of Belting it will lace, inches	Rawhide Pin	Steel Pin
---	15	\$1.15	$\frac{1}{4}$ to $\frac{1}{2}$	8	64	\$0.45	---
F	25	1.15	$\frac{1}{4}$ to $\frac{1}{2}$	8	48	.45	\$0.45
G	25	1.15	$\frac{1}{4}$ to $\frac{1}{2}$	12	96	.45	.45
L	27	2.50	$\frac{1}{4}$ to $\frac{1}{2}$	12	96	.50	.45
M	35	1.15	$\frac{1}{4}$ to $\frac{1}{2}$	8	32	.50	.50
N	35	1.70	$\frac{1}{4}$ to $\frac{1}{2}$	12	48	.50	.50
U	45	2.25	$\frac{1}{4}$ to $\frac{1}{2}$	12	48	.60	.60
W	55	2.00	$\frac{1}{4}$ to $\frac{1}{2}$	12	48	---	.65
X	65	4.00	$\frac{1}{4}$ to $\frac{1}{2}$	12	48	---	.75
---	75	---	$\frac{1}{4}$ to $\frac{1}{2}$	12	48	---	.85

Clipper Belt Lacing Machine

Operation of this machine is very easy and simple. Hooks are furnished on cards, and placed in the machine in that condition. The card itself is withdrawn and end of belt inserted as illustrated. Pressure is applied on handles and the belt is laced. The two ends of the laced belts are joined with a rawhide pin, making a hinge joint which is flush with the surface of the belt, and which will go around small pulleys with ease.

The "Clipper" will lace light weight belts of any width easier and quicker than any other way. Price each, - - \$15.00



Cut shows actual size of hooks

Each box of hooks contains 27 cards of 37 hooks each, and 14 rawhide pins, lacing 84 inches of belting.

No. 3, for thin belts, per box.....	\$1.25
No. 4, for $\frac{1}{4}$ " belts, per box.....	1.25
No. 5, for $\frac{3}{8}$ " belts, per box.....	1.50
No. 6, for $\frac{1}{2}$ " belts, per box.....	1.75

Our balata belting is the most economical of all fabric belts.

Jones Belt Hooks



Number.....	10	9	8	7	6	5
No. in box.....	500	500	500	250	250	250
Price per box....	\$3.50	\$4.00	\$5.00	\$6.00	\$8.50	\$11.00
Number.....	4	3	2	1	2 1/2	3
No. in box.....	200	200	200	100	100	100
Price per box....	14.00	16.00	20.00	30.00	50.00	60.00

Blake's Pattern Improved Belt Studs



Price per box of 100.

Number.....	5	4	3	2	1	0	00
Price.....	\$0.70	\$0.80	\$0.90	\$1.25	\$1.65	\$2.00	\$2.50

Stag Steel Belt Hook

STAG STEEL
BELT HOOK

The Zig-Zag Hook With Solid Back.

Made of the best open hearth drawing steel in 3 point length.
Produces strong, smooth, elastic joint which runs over small pulleys easily.

Size Number	Price Per Box	Thickness of belt, ins.	Number in box
00	\$ 0.80	1/8 to 1/4	200
0	1.00	1/8 to 3/16	200
1	1.20	3/16 to 1/4	100
2	2.00	1/4 to 5/16	100
3	3.40	5/16 to 3/8	100
4	5.00	3/8 to 7/16	100
5	8.00	7/16 to 1/2	100
6	11.00	1/2 to 5/8	100
7	18.00	5/8 to 3/4	100

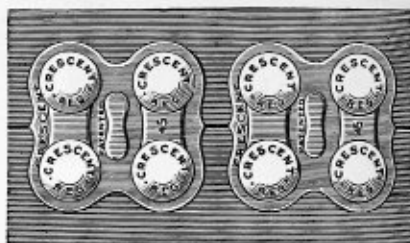
Eureka Steel Belt Coupler



Lacing is attached to belt with bifurcated rivets. Makes flexible joint, similar to hinge. Easily applied. Each prong laces 1/4" of belt. Any width laced without waste.

No. of Box	Price per Box	Thickness of belt inches	Lineal inches	Width of Belting it will lace, inches.
A	\$1.00	3/16	96	48
AA	2.00	3/16	192	96
B	1.25	1/4	96	48
BB	2.50	1/4	192	96
C	1.50	5/16	96	48
CC	3.00	5/16	192	96
D	1.75	3/8	96	48
DD	3.50	3/8	192	96
E	2.00	7/16	96	48
EE	4.00	7/16	192	96
F	2.25	1/2	96	48
FF	4.50	1/2	192	96

Crescent Belt Plates



Crescent short grip plates for light work. For belts 1/4 inch to 6 inches wide. Pulleys 3 inches or larger in diameter.

Number.....	25	45	65	85	805
Size belt, inches..	1/4 & 1	1 1/2 & 3	2 & 4	2 1/2 & 5	3 & 6
Price per gross....	\$2.88	\$6.76	\$8.64	\$11.52	\$11.52

Crescent medium grip plates for general work. For belts 1 1/2 inches to 12 inches wide. Pulleys 5 inches or larger in diameter.

Number.....	67	607	87	107	127	147
Size belt, inches..	1 1/2	2	2 1/2	3	3 1/2	4
Price per gross....	\$8.64	\$9.64	\$11.52	\$14.40	\$17.28	\$20.16

Crescent special grip plates. For belts 2 inches to 12 inches wide. Pulleys 9 inches or larger in diameter.

Number.....	63	83	103
Size belt, inches..	2	2 1/2	3
Price per gross....	\$11.52	\$14.40	\$17.28

Crescent long grip plates for heavy work. For belts 5 inches to 36 inches wide. Pulleys 12 inches or larger in diameter.

Number.....	109	149	1409	189
Size belt, inches..	2 1/2	3	3 1/2	4
Price per gross....	\$17.28	\$23.04	\$26.92	\$28.80

Crescent Large Shank Rivets

Should be used 1/4 inch longer than thickness of belting to allow for plate and clinch.



Size, in....	5/16	6/16	7/16	8/16	9/16	1 1/16	1 1/8	1 1/4	1 1/2	1 3/4	2
Per gross.....	\$0.70	.70	.80	.80	.90	.90	1.00	1.00	1.10	1.10	1.10

Larger plates and rivets can also be furnished.



Giant V Pointed Steel Belt Hooks

High shoulder prevents points from spreading. Sharp pointed teeth. Hammer only required. Packed 250 in a box.

Size No.	Kind of Belt.	Price per Thousand
A	Single Leather	\$2.00
B	Light dbl. Leather	2.25
C	Heavy dbl. Leather	2.75
D	3 and 4 ply Fabric	2.75
E	5 and 6 ply Fabric	3.25
F	7 to 10 ply Fabric	4.50

Rivet Extracting Tool



For extracting rivets from belt plates attached to belt. Made of drop forge steel, black. Jaws polished. Handles milled. Length, 8 inches. Weight about 1 pound. Price each. \$1.40

Belt Lacing Tools

Belt Punches



These punches are made from solid steel, drop-forged, drilled and reamed, oil tempered, polished and semi-polished finish. Will not stick. Points closed in to give perfect clearance for wads of punched material.

Size of Punches

Number	1	2	3	4	5	6	7	8
Size, inches	$\frac{3}{32}$	$\frac{5}{32}$	$\frac{1}{4}$	$\frac{9}{32}$	$\frac{5}{16}$	$\frac{11}{32}$	$\frac{13}{32}$	$\frac{1}{2}$
Number	9	10	11	12	13	14	15	16
Size, inches	$\frac{1}{4}$	$\frac{9}{32}$	$\frac{5}{16}$	$\frac{11}{32}$	$\frac{3}{8}$	$\frac{13}{32}$	$\frac{15}{32}$	$\frac{1}{2}$
Nos. 1, 2, 3, 4 and 5	Price doz.		\$1.80		Each		\$0.18	
Nos. 6, 7, 8 and 9	Price doz.		2.10		Each		.21	
Nos. 10, 11 and 12	Price doz.		2.50		Each		.25	
Nos. 13 and 14	Price doz.		4.50		Each		.45	
Nos. 15 and 16	Price doz.		4.80		Each		.48	

Round Punches

Cast Steel, Hand Forged, Easy Cutting



Size, inches	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	1 1/2
Price, each	\$1.26	\$1.38	\$1.50	\$1.65	\$1.80	\$2.76
Size, inches	$\frac{1}{2}$	$\frac{3}{4}$	1	1 1/4	1 3/4	2
Price, each	\$4.00	\$4.80	\$5.85	\$7.20	\$9.15	\$13.50

Spring Belt Punches



Drop forged steel drive tubes, Nos. 2 to 10/32nds.
Single Tube, 4, 6, 8 or 10/32nds.....\$0.50
Four Tubes, 4, 6, 8 and 10/32nds.....1.25
Six Tubes, Nos. 2, 4, 6, 8, 9 and 10/32nds.....1.50

Hammer Drive Rotating Belt Punch



This tool is for heavier work than the spring tool above. The tubes can be rotated into position and held stationary when used with a hammer.

Steel drive tubes, Nos. 2, 4, 6, 8, 9 and 10/32nds. Price, each.....\$1.20

Cutter, Awl and Pliers

Three Tools in One



Three most useful tools combined in one. Indispensable for a user of studs for fastening ends of belt together. Price, each.....\$1.50

Cutters and Pliers

Nickel Plated



Length, 5 1/2 inches. Price, each.....\$1.00

Improved Punch or Splicing Tool



For cutting or enlarging any size hole and for drawing lacing through without injuring it. Length, 6 1/2 inches. Price, each.....\$0.80

Patent Bent Awl



7 inches long. Price, each.....\$0.75

Belt Groover



Actual size, 6 inches. Price, each.....\$1.00

Belt Marker



Actual size, 5 1/4 inches. Price, each.....\$0.50

Lace Leather Cutter

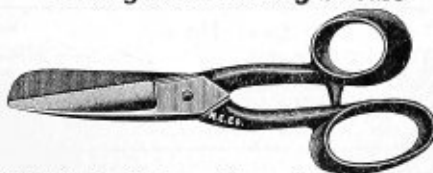


Cuts 1/16 inch to 1/4 inch wide.

For those who prefer to buy rawhide lace by the side, this tool will cut strips 1/16 to 1/4 inches in width.

Price, each.....\$0.75

Belting and Packing Shears

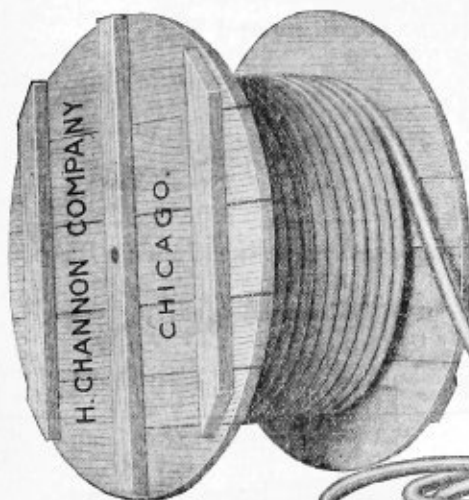


For all kinds of leather, rubber, packing, linoleum, ashes, etc. The teeth on lower blade make cutting easy.

Number	1	2
Length, over all, inches	8 1/2	11
Price, each	\$1.50	\$1.85

H.Channon Company Chicago

Dependable Garden Hose



Elastic Brand

For those who realize that "the best is the cheapest in the long run," we cannot too strongly recommend our Elastic garden hose. We honestly believe it is without a superior, regardless of price asked.

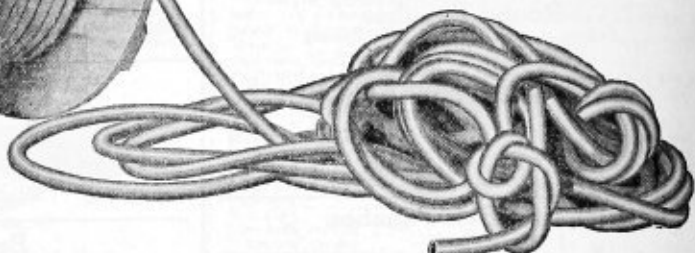
It is impossible to kink Elastic hose, regardless of how it is bent, twisted or pulled around trees or sharp corners. It cannot crack crossways because it will not kink and it cannot open at the seams, the most common fault of garden hose, because it is seamless.

Elastic hose consists of a seamless tube of pure rubber, over which is braided jackets of twisted cotton yarn, between which and on the outside is a layer of rubber, which when it is vulcanized is forced through the strands and is practically a solid tube of rubber reinforced with strong fabric.

Furnished in $\frac{3}{4}$ and $\frac{1}{2}$ -inch, in any length up to 500 feet. Couplings are attached without charge to sections of 50 feet.

Price per Foot

$\frac{3}{4}$ -inch	.....	\$0.22
$\frac{1}{2}$ -inch	.....	.20



Channon's Special

In our "Channon's" Special 7-ply garden hose we offer one of the greatest values. It is made in one size only, $\frac{3}{4}$ -inch, with 7 plies of heavy sheeting duck spirally wound on a high grade rubber lining and covered with a layer of red rubber.



It is intended for heavy duty and will not kink. Concrete contractors find it highly satisfactory. Furnished in 25 and 50-foot sections.

only, complete with couplings.
Price per foot.....

\$0.28



Bullock Brand

Our Bullock brand has been our standard for a great many years. It is made in three or four-ply, heavy duck construction, first quality throughout. We can honestly recommend this hose for all general purposes. Furnished in 25 and 30-foot sections, coupled.

Price per Foot

$\frac{3}{4}$ -inch, 3-ply	.....	\$0.22
$\frac{3}{4}$ -inch, 4-ply	.....	\$0.26

Lawn Hose

This is a special hose, made in $\frac{3}{4}$ -inch, 5-ply heavy sheeting, suitable for medium pressures and all ordinary domestic uses. Guaranteed for one season. This grade is often sold in hardware stores throughout the country at a much higher price. Sold in 25 and 50-foot sections only, coupled.

Price per foot.....

\$0.18



Sampson Cotton Garden Hose Rubber Lined

For those who prefer cotton rubber lined garden hose we offer our Sampson brand. When carefully dried after use it will be found more serviceable than rubber hose of equal price. Furnished in one size only, $\frac{3}{4}$ -inch, in 25 and 50-foot sections.

Price per foot.....

\$0.20

Please Note Special Discounts on Garden Hose in Discount Sheet.

Hose

We carry one of the largest stocks of hose in the city of Chicago, both in our main store and warehouse. This stock consists principally of the regular sizes of water, steam, suction, linen and fire hose, so that we may fill all orders immediately for practically any quantity that may be required. We also carry irregular sizes and kinds of hose not obtainable on short notice elsewhere. For instance, we stock water hose as large as three and four inches diameter, four ply, two inch, six ply rubber steam hose, flexible steel armored steam hose up to two inch in all regular length sections. Our suction hose stock is the largest in the West, factories not excepted. Our customers have learned that they can expect prompt shipments of all orders for any quantity of hose they may require. On this and the following pages we describe and price the different kinds of hose we sell. Send us your orders for all kinds of hose and particularly when you are in need of it promptly.

Suggestions on the Care of Hose

We give here a few practical suggestions on the care of hose, which if observed will greatly prolong its life and add to its utility. We refer to rubber hose in particular, which should be kept in a cool moist place when not in use. Heat dries out the rubber and causes it to crack, rendering the hose useless. Oils and greases of any kind are highly injurious to rubber and every possible precaution should be taken to keep the hose free from them. The strength of the hose lies in the duck insertion, the rubber merely acting as a waterproofing agent. As soon as moisture gets in contact with the duck it causes the plies to separate and the life of the hose will be very short.

When hose is used to conduct steam, liquids or air under high pressure the shut off or regulating device should always be at the source of supply and not at the nozzle of machine, leaving pressure in the hose. Kinking or bending the hose at sharp angles is very injurious, but the practice is very common with inexperienced laborers employed by contractors, and when the hose does not give the proper service it is thought to be of inferior quality.

Iron pipe nipples should never be forced into hose to take the place of couplings unless the hose is made with enlarged ends for that purpose. This practice ruins more hose, especially suction hose, than probably any other. When the pipe is forced in, it cuts the rubber lining, which permits the moisture to get in contact with the duck. This causes separation of the plies and seams of the hose. In suction hose the water separates the tube from the rest of the hose and when suction is applied the lining breaks down. Couplings should always be used, and they should be applied with care. When they do not enter the hose easily, soap, rubber cement or ordinary glue should be applied.

Cotton rubber lined hose should always be thoroughly dried after use, and stored in a well ventilated place to prevent the cotton jacket from mildew. It should never be kept folded on racks like unlined linen hose, but should be wound on a reel. Water should be run through the hose at least every two or three months to prevent the rubber from drying out and cracking.

Rubber Water Conducting Hose

Our stock of water hose is a most complete one and all orders for regular sizes may be placed with the assurance of immediate shipment. Two ply hose is not carried in any size or grade, but a sufficient quantity will be made to order. Three ply is carried in $\frac{1}{2}$, $\frac{3}{4}$ and 1 inch sizes, and four ply in all sizes up to and including three and four inch. We offer three reputable grades for selection. Water hose is subjected to so much abuse that it is not economical to buy cheap grades, and we neither carry nor care to sell hose which we cannot conscientiously recommend. When the proper grade is selected for the purpose, our brands of water hose will always give good service. Some conditions, however, require special hose, in which event we can furnish it promptly.

Elastic Brand

A moulded hose of great merit. Very strong and non-kinkable. While moderate in price, it gives exceptionally good service.

Diameter, inches.....	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$
Double Fabric, per foot.....	\$0.25	\$0.30	\$0.40	\$0.50

Diameter, inches.....	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{3}{4}$	2	$2\frac{1}{4}$	$2\frac{3}{4}$	$2\frac{3}{4}$	3
Triple Fabric, per foot.....	\$0.30	\$0.37	\$0.50	\$0.75	\$0.87	\$1.00	\$1.12	\$1.25	\$1.37	\$1.50



Bullock Brand

Used by contractors and others throughout the Middle West. It is unequalled for hard usage and high pressures.

Three Ply

Size, inches.....	$\frac{1}{2}$	$\frac{3}{4}$	1
Per foot.....	\$0.25	\$0.30	\$0.40

Four Ply

Size, inches.....	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$
Per foot.....	\$0.30	\$0.37	\$0.50	\$0.62	\$0.75
Size, inches.....	2	$2\frac{1}{2}$	3	4	
Per foot.....	\$1.00	\$1.25	\$1.50	\$2.00	



Castor Brand

Made of lighter fabric and less expensive materials than our Bullock Brand, but where the service is not severe will give entire satisfaction.

Three Ply

Size, inches.....	$\frac{1}{2}$	$\frac{3}{4}$	1
Per foot.....	\$0.25	\$0.30	\$0.40

Four Ply

Size, inches.....	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$
Per foot.....	\$0.30	\$0.37	\$0.50	\$0.62	\$0.75	\$1.00	\$1.25



Water hose of any grade and size made to order promptly



Steam Hose



Without question, the most severe duty that rubber hose is called upon to perform is that of conducting live steam under pressure. It is not a difficult matter to construct a hose which will successfully withstand heavy bursting pressures, but the heat of the steam vulcanizes or hardens the rubber, causing it to crack and this permits the moisture to separate the plies of fabric. Vulcanizing by steam is the fundamental principle of rubber manufacture and temperatures as high as 274 degrees are often used. By observing the table below it will be noted that a steam pressure of 30 pounds generated 274 degrees of heat.

Standard brass valves made of steam metal are only intended for 125 pounds working steam pressure, and yet some users of steam hose forget that it is a wholly vegetable product. In some cases users have even expected rubber steam hose to conduct superheated steam.

Bullock Brand

Our Bullock Brand is as good an article as can be produced and is manufactured specially for us by a factory specializing in this kind of hose making. Made of wrapped duck and of braided construction it is both strong and flexible and resists to a high degree the destructive action of heat. Wall on 6-ply is $\frac{1}{2}$ -in. thick.

Castor Brand

A second quality hose. For light work it gives satisfactory service. Also used for conducting warm or hot water, for conducting live steam at over 20 pounds, however, we recommend Bullock.

Standard Steam Hose Price List

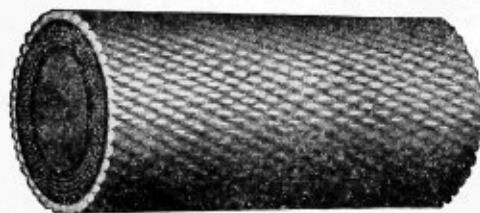
Price Per Foot

Internal Diameter, inches	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	$1\frac{3}{4}$	2	$2\frac{1}{4}$	$2\frac{1}{2}$
3-ply	\$0.37	\$0.37	\$0.70	\$0.85	\$1.02	\$1.18	\$1.34	\$1.50	\$1.66
4-ply	.56	.71	.87	1.04	1.25	1.45	1.66	1.87	2.08
5-ply	.70	.87	1.07	1.30	1.56	1.81	2.07	2.33	2.60
6-ply	.84	1.05	1.28	1.56	1.87	2.17	2.49	2.80	3.12
7-ply	.98	1.23	1.50	1.82	2.18	2.53	2.90	3.27	3.64
8-ply	1.12	1.41	1.70	2.08	2.50	2.90	3.32	3.74	4.16

The following will be convenient to consult for ordinary pressures. When extreme pressures are encountered it would be well to consult us.

20 lbs. working pressure generates 257° heat	4-ply for $\frac{1}{2}$	4-ply for $\frac{3}{4}$	4-ply for 1	4-ply for $1\frac{1}{4}$	4-ply for $1\frac{1}{2}$	4-ply for 2
40 lbs. working pressure generates 287° heat	4-ply for $\frac{1}{2}$	4-ply for $\frac{3}{4}$	4-ply for 1	4-ply for $1\frac{1}{4}$	5-ply for $1\frac{1}{2}$	6-ply for 2
60 lbs. working pressure generates 307° heat	4-ply for $\frac{1}{2}$	5-ply for $\frac{3}{4}$	6-ply for 1	6-ply for $1\frac{1}{4}$	6-ply for $1\frac{1}{2}$	6-ply for 2

"Channon Special" Steam Hose



This hose consists of our Bullock grade made with a woven painted jacket on the outside and is preferred by many users of steam hose. The regular rubber hose is 4 ply in all sizes and the jacket makes it equal to 6 ply. The woven painted jacket protects the hands of the user from the intense heat generated by the steam and the hose from external moisture. Carried in stock in 50 foot sections in the sizes priced below.

Price Per Foot

Diameter, inches	$\frac{1}{2}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$
Per foot	\$1.05	\$1.28	\$1.56	\$1.87

Internal Diameter, inches	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2
4 ply, per 50 ft. section, lbs.	18	30	40	60	70	95
5 ply, per 50 ft. section, lbs.	22	32	45	65	80	105
6 ply, per 50 ft. section, lbs.	26	40	50	70	85	115

Steam Hose should always be coupled with long shank couplings.

Hose

Elastic Molded Pneumatic Tool Hose

Triple Braided Construction



Elastic Pneumatic Tool Hose is furnished with an additional braided reinforcement over the regular plies of duck. This makes the hose stronger, more flexible and more satisfactory generally.

To withstand the hard usage to which pneumatic tool hose is daily subjected, it must be made as light and flexible as is consistent with requisite strength, so as to be easily handled by the workmen operating the hammers, drills or other pneumatic tools. Our Elastic brand is made of a special compound to resist the action of oils which escape from the air compressor. Not only does hose come in contact with oil on the inside, but on the outside as well, which necessitates an oil proof covering. Compression of air causes extreme heat which we have taken into consideration in selecting this hose. Pneumatic hose is used mostly in connection with hammers, hoists, drills and mining machines, and is always put to a severe test as to its flexibility and lasting qualities. For the best quality of pneumatic tool hose, "Elastic" cannot be equalled.

Internal diameter, inches.....	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1
Price per foot.....	\$0.17	\$0.26	\$0.71	\$0.87

Bullock Wrapped Pneumatic Tool Hose



Built for hard usage and long service, and absolutely guaranteed. The lining is compounded of an oil and dust-proof material and is not affected by extreme heat.

Internal diameter, inches.....	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1
No. of Plies.....	6	7	9	9
Price per foot, plain.....	\$0.26	\$0.34	\$0.50	\$0.60
Price per foot, wire wound.....	.32	.40	.60	.70

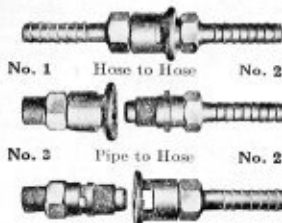
"Bullock" Gasoline Hose



Gasoline is one of the worst enemies of rubber and naturally in the manufacture of gasoline hose there are many things to be considered. We have devoted special attention to the manufacture of this hose, and are exceedingly familiar with its use. When conducting gasoline from a tank to an automobile, some gasoline is bound to stay in the hose. This is very destructive to the ordinary hose. Our Bullock brand is made to meet such requirements.

Price, $\frac{3}{4}$ -inch, 4-ply.....	\$1.00
----------------------------------------	--------

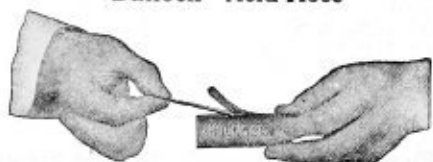
Glover Air Coupling



Composed of three simple parts; male and female and a rubber gasket attached to male end that cannot be lost or blown off. Has no inside springs or other delicate parts to get out of order, nor projecting lugs outside to catch on obstructions when hose is dragged around. It is the simplest and quickest acting coupling for air use made, a quarter turn of wrist connecting or disconnecting it. Will not become disconnected by any cause when under pressure. Air losses caused by leaky couplings in plants are enormous, sometimes 25 or 50 per cent of total amount used. The Glover is the only really air-tight and stay-tight coupling made. They are sold with the understanding that they may be returned if not all we claim or for any reason are unsatisfactory. A special illustrated pamphlet describing them in detail sent on request.

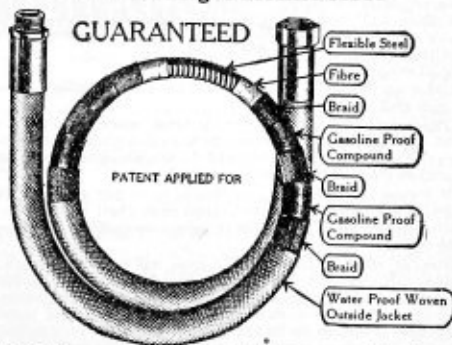
Size, inches.....	$\frac{1}{2}$	$\frac{3}{4}$
Price per pair.....	\$2.50	\$3.00
Extra Gaskets for above.....		
Size, inches.....	$\frac{1}{2}$	$\frac{3}{4}$
Price each.....	\$0.12	\$0.28

"Bullock" Acid Hose



In buying acid hose the purchaser must remember that the thickness is not all to be considered. The rubber in the hose must be of such material that it will resist the action of the acids and also contain no minerals for the acids to feed upon. Our Bullock acid hose is the best on the market for this purpose. Prices quoted on application.

Everlasting Gasoline Hose

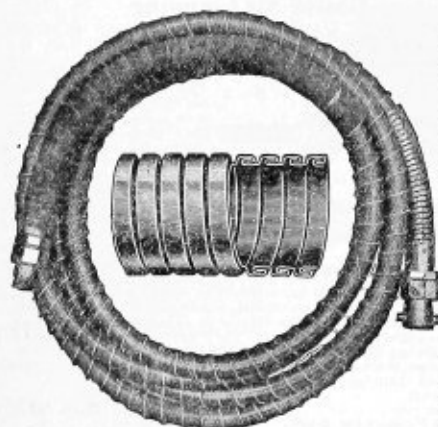


Everlasting gasoline hose is better than any rubber hose for conducting gasoline because gasoline will ultimately dissolve rubber in any form. There is absolutely no rubber used in the manufacture of this hose. Metal hose would scratch the car and is not flexible enough for all purposes.

This hose is low priced, guaranteed absolutely safe, and will not leak. It will fit any pump or tank. It is made of loosely wound metal, covered with a woven jacket. This combination makes it as flexible as rubber. Carried in 8 and 10-foot lengths. Diameter $\frac{3}{4}$ -inch.

Price per foot.....	\$1.20
Couplings. Price, per set.....	3.50

Flexible Steel and Copper Hose



Showing Hose with Braided Covering.
Sectional View of Hose Shows Spiral Construction.

Flexible metal hose is being used more and more every year owing to the demands of modern steam engineering for high steam pressures, and the realization of the need for a more lasting conductor for oil and other volatile. Rubber and fabric constructed hose, because of its cheapness and flexibility, has been largely used in the past, but it must be admitted that the uses of rubber hose are to a certain degree limited. There are many uses for flexible metallic hose to which rubber is not nearly so well adapted owing to the fact that the component parts of rubber hose are vegetable matter and are affected by temperature, oils and chemicals, which do not effect metal.

Flexible Metal Hose is especially adapted for the conveying of steam where the heat is equal or greater to the temperature required to vulcanize rubber; for suction purposes where the vacuum created has a tendency to cause rubber hose to collapse; for conducting gas, where a leak would be dangerous to property and life.

The pressure used in cleaning boiler flues produce temperatures so high that rubber hose is unsuited for the purpose, and flexible metallic hose can be used advantageously, for it stands the high pressures and is uninjured by being dragged around among hot ashes.

Flexible metal hose is made from continuous metal ribbon, wound spirally, the edges being crimped or turned in during the winding, forming an interlocking joint. Specially prepared asbestos cord is fed into a separate groove, packing the joint steam tight.

We list below the sizes generally used, but can furnish other sizes from $\frac{1}{2}$ to 12 inches in diameter.

Coverings.—Metal hose can be furnished with braided copper wires, protecting the hose from external injury. We cannot, however, furnish covered hose from stock. Phosphor bronze hose can be shipped immediately.

Soldered couplings are sweated on and should never be used on steam hose or in any service where there is sufficient heat to soften solder.

Couplings for steam hose are packed on with asbestos and red lead and will stand heavy pressure and high heat.

Price Per Foot

Inside diameter, inches	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$
Steel, steel braided	\$0.25	\$0.45	\$0.55	\$0.85	\$1.05	\$1.35	\$1.80	\$2.30	\$2.90
Bronze, steel braided	.31	.75	1.00	1.50	1.90	2.60	3.25	4.50	5.30
Soldered couplings, per set	.60	1.00	1.50	2.00	2.50	3.00	4.00	6.00	8.00
Packed couplings, per set	2.00	2.50	3.00	4.00	5.00	6.00	7.00	9.00	12.00

Flexible Steel Armored Rubber Steam Hose

Modern engineering practice requires the use of steam pressures higher than rubber hose is suited for. To meet this demand at a price less than that of flexible all metal hose, we offer our flexible steel armored rubber hose, suitable for steam or rock drill work.



The inner lining is essentially the most important part of the hose. It is made of identically the same compound that is used in our Bullock regular rubber and duck constructed hose and is well known for its heat resisting qualities.

The tube is protected on the inside by a ply of heavy duck which is kept in place by the special spun steel wire shown on the inside of hose and which is in turn surrounded by a layer of pure rubber.

Flexible steel armored rubber hose will stand pressures as high as can be expected from any rubber hose, and will be found far more durable and economical in the long run. It should be remembered, however, that standard wrought pipe is only intended for pressures up to 125 pounds, and when it is necessary to conduct steam under very high pressure it is advisable to use flexible bronze hose.

Rock Drill Couplings as used with this hose are made of malleable iron and when properly applied will never blow off. Ordinary long shank steam hose couplings are not suitable.

Internal diameter, inches	$\frac{3}{8}$	$\frac{1}{2}$	1	$1\frac{1}{2}$
Hose, per foot	\$0.30	\$1.10	\$1.40	\$1.60
Couplings, per pair	2.40	4.00	4.00	6.40
Internal diameter, inches	$\frac{1}{2}$	2	$2\frac{1}{2}$	3
Hose, per foot	\$1.95	\$ 3.00	\$ 4.00	\$ 5.00
Couplings, per pair	7.80	10.00	22.00	

Flexible Steel Tubing



For oil, water, gas, suction, compressed air, etc.

Internal diam., inches	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1
Hose, per foot	\$0.40	\$0.45	\$0.55	\$0.85
Couplings, per pair	1.40	1.70	2.00	3.50
Internal diam., inches	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$
Price per foot	\$1.30	\$1.70	\$2.25	\$3.20
Couplings, per pair	5.00	6.00	7.50	10.00

Carburetor Flexible Steel Tubing



For conveying hot air from hot air drum to carburetor. Also for connection to exhaust horn, and for enclosing and protecting electric light and ignition wires or cables.

Internal Diameter, Inches	Price per Foot	Internal Diameter, Inches	Price per Foot
$\frac{1}{2}$	\$0.20	$1\frac{1}{2}$	\$0.28
$\frac{3}{4}$	.22	$1\frac{3}{4}$	.30
1	.24	$1\frac{1}{2}$	.32
$1\frac{1}{4}$	.26	$1\frac{3}{4}$	.34

Suction Hose

Suction hose differs from conducting hose principally in being made to withstand a collapsing pressure instead of a bursting pressure. It is made in two forms, smooth bore and rough bore, the construction of both kinds being illustrated below. To give the hose the necessary strength and flexibility a spiral wire reinforcement is used. In the smooth bore hose the wire is entirely embedded in the rubber lining, making a perfectly smooth interior which offers no resistance to the free flow of the liquids or lodgement for deteriorating matter when the hose is out of use.

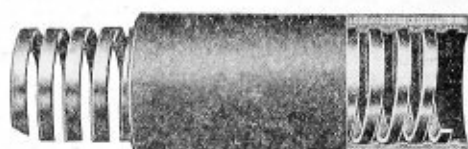
In the rough bore hose the spiral wire reinforcement is in direct contact with the fluids being drawn through the hose and appreciably increases the friction. Rough bore hose is suitable for perfectly clear liquids, but not being nearly so durable or economical as smooth bore hose, is not in great demand and is not carried in stock. It can be made to order in any length and size in about ten days' time.

Being large manufacturers and distributors of pumps, we carry at all times a large and well assorted stock of suction hose and can make immediate shipment of all orders. Our stock of suction hose is the largest in the West, factories not excepted, and consists of sizes 1½ to 8 inches in diameter, in 10, 12, 15 and 20 foot sections, with plain enlarged ends and with iron pipe nipples attached. In sizes 4 inches and larger we carry hose with nipples attached.

We particularly advise against the purchase of hose with plain ends unless it is desired to attach brass couplings. Experience has proven that the workman in endeavoring to attach iron pipe nipples to hose almost invariably injures the rubber lining, thus permitting the water to reach the duck insertion which loosens the lining and the suction soon breaks down.



Smooth Bore Construction



Rough Bore Construction

Bullock Brand Smooth and Rough Bore Suction Hose

Bullock Brand Smooth Bore Suction Hose is as good hose for general contractor's use as can be obtained. This is the same hose which we include in all our pumping outfits, and when properly used it will give entirely satisfactory service. It is carried in stock in all sizes up to 8 inches. Prices below do not include nipples for which another charge is made.

Bullock Rough Bore Suction Hose is made of the same quality materials as our Bullock Smooth Bore, but constructed differently as shown by the illustration. It will give satisfactory service when used in connection with clear or nearly clear water. It is not carried in stock. Shipments can be made in about ten days from receipt of order.

Channon Special Sand Suction Hose

For this severe service we particularly recommend our Channon Special Sand Suction Hose. It is made with smooth bore construction only and a special fine quality lining to resist the cutting effect of sand and gravel. Rough bore hose is not suitable for this work on account of the tendency of materials being drawn through the hose to cut away the rubber between the different spirals resulting in a general breakdown of the hose. This grade is not carried in stock but is made to order on short notice.

Smooth Bore

Inside Diam., Inches	Price per Foot	Inside Diam., Inches	Price per Foot	Inside Diam., Inches	Price per Foot	Inside Diam., Inches	Price per Foot
2	\$2.60	6	\$10.50	2	\$2.30	6	\$9.50
2½	3.50	8	16.50	2½	3.10	8	15.00
3	4.50	10	22.50	3	4.00	10	20.00
4	6.50	12	27.50	4	5.80	12	25.00
5	8.50	.....	.....	5	7.60	.....	.....

Rough Bore



Smooth Bore Agricultural Suction Hose

Agricultural Suction Hose is also known as Portable Suction or Tank Hose. We carry it in stock in the 2-inch size only in 10, 15, 20 and 25 foot lengths. It is well made, light weight, wire reinforced hose with smooth bore construction. Used principally with agricultural machinery for drawing water from tank to portable engine. Gives entire satisfaction for this service. The ends are enlarged to receive couplings.

Price per foot \$0.60



Agricultural Suction Hose with Woven Jacket

Constructed in the same manner as the Agricultural Suction Hose described above. It has in addition a woven cotton jacket thoroughly waterproofed to protect it from moisture. This should not be confused with a braided jacket which is not so serviceable. This style of Agricultural Suction Hose although costing a little more is more economical in the long run and is preferred by many. Smooth bore construction and ends enlarged for couplings, carried in the 2-inch size only in 10, 15, 20 and 25 foot lengths.

Price per foot \$0.80



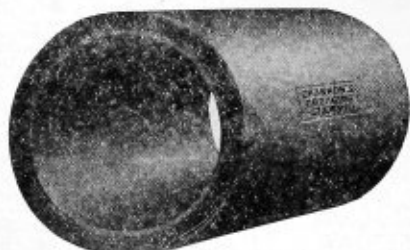
Hard Rubber Suction Hose

This hose is made entirely without wire reinforcement to prevent collapse. Special duck and firm, rigid rubber stocks are used in place of the spiral wire in other suction hose. Carried in stock in the sizes priced all with four-ply of duck insertion.

Inside diameter, inches.....	¾	1	1¼	1½
Price per foot.....	\$0.65	\$0.75	\$0.93	\$1.13

H.Channon Company Chicago

Dredging Sleeves



Dredging sleeves are used as flexible connections between sections of pipe for conveying dredged material to bank of river, shore of lake or other depositing point. They are made 12 to 36 inches in diameter, of extra heavy duck and thick rubber lining, of special quality rubber to successfully withstand the wear of material being drawn through them.

Our factory is especially successful in manufacturing these sleeves, several having been placed in competition with other makes, some higher priced, and were found to outwear the others by several weeks' actual service.

As dredging sleeves are always made specially to meet various requirements, we do not give list prices, but gladly quote net prices on them, made to meet existing conditions. When inquiring, always give all information possible regarding work.

Rubber and Cloth Insertion Tubing



White Rubber Tubing

The uses of white rubber tubing are too numerous to mention. We carry two grades which answer for all ordinary purposes, in sizes from $\frac{1}{8}$ to 1 inch in diameter with light, medium or heavy wall, plain or corrugated surface, packed in boxes containing 50 feet.

A Grade, price per pound..... \$1.50
B Grade, price per pound..... 1.10

Special tubing of any quality or thickness of wall desired can be made to order. Prices quoted on application.

Cloth Insertion Tubing

The lining of our cloth insertion tubing is a high grade of rubber compound, made perfectly smooth, with two or more plies of cloth insertion, depending upon the size, and covered with a heavy jacket of red rubber. The sizes priced below can be furnished from stock in 50-foot sections.

Internal Diam., In.	Price per Foot	Internal Diam., In.	Price per Foot
$\frac{3}{4}$	\$0.10	$\frac{3}{4}$	\$0.28
$\frac{7}{8}$	.14	$\frac{7}{8}$	.33
1	.18	1	.38
1 $\frac{1}{8}$	.20	1 $\frac{1}{8}$	.44
1 $\frac{1}{2}$	.23	1 $\frac{1}{2}$	.50

Bullock Chemical Engine Hose



Made of the best materials procurable, necessary to produce a hose which gives satisfactory service for the purpose. The lining is made of a compound which resists the action of the chemicals conveyed. The duck is extra heavy to prevent kinking. Ends are reinforced with an extra ply of duck and capped with rubber to prevent moisture from reaching the fabric. Furnished with a black or red cover.

$\frac{3}{4}$ inch, price per foot..... \$0.60
1 inch, price per foot..... 1.00

"Sterling" Sand Blast Hose



Pressures used in sand blasting are not excessive, so heavy construction is unnecessary. Sterling Sand Blast Hose is made with a light 3-ply body, making it light and flexible for the operator to handle, and reducing the outside diameter.

The lining is pure up river Para rubber, vulcanized to the right degree to give it toughness and resiliency to withstand the cutting effect of the sand. Sand blast hose is never stocked, always being made to order. Any diameter and lengths up to 50 feet made on short notice. Priced upon application.

"President" Rubber Fire Hose



For municipalities desiring rubber fire hose we offer our President Rubber Brand, which represents the highest possible quality of materials and workmanship. Fine Para Rubber is used in both tube and cover and the duck is made from extra long fibre sea island cotton. The ends are reinforced and capped to preserve the duck from moisture. A 50-foot section of this hose in the 2 $\frac{1}{2}$ -inch size with couplings weighs about 65 pounds. Furnished in 2 $\frac{1}{2}$, 3 $\frac{1}{2}$ and 4-inch size. Prices quoted upon application.

Coverings for Hose



Round Wire



Half Oval Wire



Square Wire



Marlin

Prices on Wire and Marlin Winding on application.

We furnish anything in Mechanical Rubber Goods. Prices quoted on lines not shown in this catalog.

Underwriters' Labeled Specification Cotton Rubber Lined Fire Hose



The Underwriters' Laboratories, Inc., an institution maintained by fire insurance companies of this country, have for years been testing different makes of hose, endeavoring to find one perfect or as nearly perfect as possible. Not finding it, they compiled rigid specifications for manufacturing hose which would meet their approval.

These specifications, approved by all fire insurance boards in the country, cover every detail, from selecting raw rubber for lining and cotton for jacket to finishing, testing and labeling each fifty-foot section.

Hose made to these specifications and tested is found to be the hose meeting any existing conditions. No article manufactured should be compounded more carefully because of the great responsibility placed in it at critical moments, when saving or losing thousands of dollars' worth of property depends on it.

Buying this hose, which has been subjected to inspection by the underwriters, makes it impossible for buyers to get an imperfect article. It must be right; it must meet all tests or it does not leave factory.

Double Jacket Hose is designed for constant and severe service in the larger fire departments. Outer jacket protects hose from external injury and gives additional strength to withstand heavier pressures than single jacket.

One of the Underwriters' tests subjects this hose to 400 pounds hydraulic pressure per square inch.

A special catalog containing the complete Underwriters' specifications sent on request.

The rubber lining in Single Jacket Hose is the same high quality rubber as used in the Double Jacket, and is intended for smaller fire departments of towns and villages where pressures do not exceed 250 pounds and service is lighter.

Also used for mill yard and factory fire protection. Should be carried on reels or carts and not folded on racks, which is injurious to lining. Tested to 300 pounds before leaving factory.

Price Per Foot—2½-Inch Only

Single Jacket, uncoupled.....	\$0.75
Double Jacket, uncoupled.....	1.00

"Sterling" Cotton Rubber Lined Fire Hose



Fire hose is certainly of sufficient importance in the general economy of things to warrant an equal position with not precedence over, other materials, in securing proper quality. The question of its reliability has assumed an importance far beyond that of any special interest or industry, regardless of size.

For this reason, quality should be considered first in purchasing fire hose. Some buyers, especially in smaller municipalities, reason that because their hose is not often called into service a cheap grade is sufficient. Nothing is further from the truth. All users of fire hose know that rubber deteriorates with age, whether used daily or remains idle on the reel for weeks. In order to have fire hose which will last long and be dependable, a high, and not cheap, quality should be selected.

Sterling Fire Hose is made for us by one of the most successful manufacturers in the country, and we know from our customers' experiences it meets all requirements.

The jacket is made from selected, long staple cotton, tightly woven, giving it strength and compactness. The rubber tube or lining is a high grade compound, rich in Para rubber, made in three layers, one calendered over the other to remedy in three thicknesses any "pinholes" or defects which might occur in the others. This method renders leakage impossible.

A thick rubber tube is no gauge of quality. Light lining of fine quality rubber is more durable, weighs less and much easier to handle.

Sterling Double Jacket Fire Hose is intended for city fire departments and is amply strong for any working pressure, each section being thoroughly tested before leaving factory, and fully guaranteed.

Sterling Single Jacket Hose is designed for fire protection service in medium sized towns, also for mills, factories, railroad and other shops where strong, durable hose is required. While lighter weight than double jacket, it is fully as serviceable, provided pressure is not so great and wear and tear less.

Fire hose is furnished only in 50-foot sections, coupled with expansion ring type, or "automatic," couplings, having different standards. Threads on fire hose couplings are generally special, different communities having different standards. We cut any thread on couplings, provided we are furnished with an old coupling or hydrant cap. If this is not convenient, give us outside diameter of male end of coupling and number of threads per inch.

Price Per Foot

Diameter, inches.....	2	2½	3
Single Jacket.....	\$0.65	\$0.75	.....
Double Jacket.....	.80	1.00	\$1.40

Cotton Rubber Lined Fire Hose should always be coupled with expansion ring couplings, which are priced on another page.

Mill Hose

Cotton Rubber-Lined and Unlined Linen Hose



Cotton rubber-lined hose is designed for fire protection in mills and factories equipped with standpipe systems, also in place of rubber water hose. It is adequate for use in towns and villages where pressures do not exceed 200 pounds and hose does not receive rough usage as in city fire departments.

Many users of water-conducting hose prefer cotton rubber lined to duck and rubber construction. It is lighter in weight, more flexible, fully as strong and will give equal wear if properly cared for. It should be carefully dried after use to prevent cotton jacket from mildewing and rotting; wound on reels instead of being folded on racks which is harmful to the lining, and water passed through about every two months.

Sterling Brand

Sterling is our first grade. The jacket is woven from strong, long staple cotton yarn, and lining made of good quality rubber, with perfectly smooth waterway. It is recommended to our customers who desire the best, as it will remain good after ordinary mill hose deteriorates.

Sampson Brand

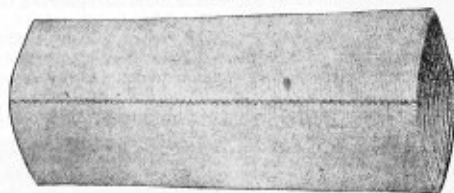
While Sampson is our second quality, we consider it equal to many "first quality" grades. The fabric is somewhat lighter and lining not so high quality rubber, as in Sterling, but with proper care will give good service.

About Couplings—Like fire hose, mill hose is usually coupled with expansion ring couplings, although common couplings can be furnished when desired. We can furnish pipe, hose or special thread, but when special thread is ordered couplings cannot be returned, nor order cancelled after work is started. We should be furnished with sample thread, such as an old coupling or hydrant cap. If inconvenient, the outside diameter of the male end and number of threads per inch will suffice. Couplings are listed on another page.

Cotton Rubber Lined Mill Hose

Internal Diameter, inches.....	1	1 1/4	1 1/2	2	2 1/2
Price per foot.....	\$0.35	\$0.45	\$0.50	\$0.60	\$0.70
Approximate weight per 50 feet.....	10	15	20	25	30

Underwriters' Unlined Linen Hose

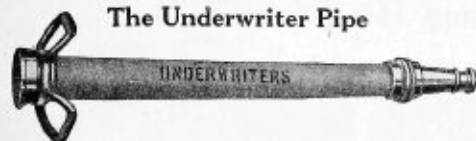


Unlined linen hose is intended for emergency fire protection, to be folded on racks when idle, and as there is no rubber used in its construction, it does not deteriorate to any great extent. It is not a substitute for rubber or cotton rubber-lined hose. It is tightly woven and when water is admitted the yarns swell, making the hose water-tight. Carried in best grade only—the difference in price being out of proportion with difference in quality. Linen hose is not expensive and purchasing a cheap grade is poor economy. Furnished in any lengths from 1 to 2 1/2 inch sizes at net prices per foot.

Expansion ring couplings are generally attached. Prices on same will be found on another page.

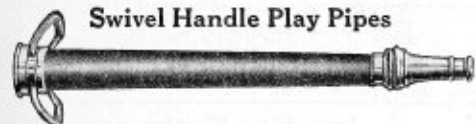
Internal Diameter, inches.....	1	1 1/4	1 1/2	2	2 1/2
Price per foot.....	\$0.30	\$0.35	\$0.40	\$0.50	\$0.60
Approximate Weight, per 50 feet, pounds.....	5	6	7	8	10

The Underwriter Pipe



Made to the specifications of the Mutual Underwriter, in one size only. 2½x30 inches. Barrel is made of pure copper castings, 52% copper, 7% tin, 3% lead. Swivel handle, marine wound and painted red. Thread cut to any standard. Weight each, 10 pounds.
Price each.....\$12.00

Swivel Handle Play Pipes



Handles are placed to conform to position of pipeman without cramping his hand or arm into an unnatural position. It often happens that hose turns over two or three times when water is forced through it. If handle did not swivel, allowing pipe to rotate, it would be wrenched from pipeman, subjecting him to danger and pipe to harm. Cut shows wound and painted style.

Size, Inches	Length, Inches	Plain Brass, Price Each	Wound and Painted, Price Each
2	20	\$ 7.50	\$ 9.00
2½	24	9.50	11.00
3	30	11.00	12.50
3½	36	13.50	15.00

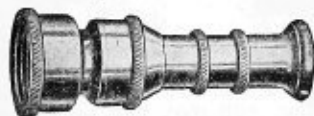
Brass Hose Pipes or Nozzles

With Screw Tips



Size, Inches	Price Each	Lgth., Inches	Dis- charge Inches	Size, Inches	Price Each	Lgth., Inches	Dis- charge Inches
¾	\$0.70	6	1/8	1½	\$4.00	18	1½
1	.80	7½	1/4	2	3.80	12	2
1½	1.00	12	3/8	2½	4.50	15	2½
2	1.00	8½	1/2	3	5.00	20	3
2½	1.20	12½	5/8	3½	7.50	15	3½
3	2.00	12	¾	4	9.50	20	4
3½	2.40	15	1	5	10.00	24	5
4	2.40	12	1½	6	14.40	30	6
4½	3.00	15	2				

Spray Nozzle



Made of cast brass. Needle valve regulates discharge from solid stream to fine spray. Made in ¾-inch size only. Weight each, 7 pounds.
Price each.....\$1.00

Cast Spray Nozzle

With Cock



Garden hose nozzle with cock. Three-quarters inch diameter by 5½ inches long.

Price.....\$1.00

The Elk Shut-Off Nozzle

This nozzle has fewer parts, more actual metal and greater strength than any other nozzle made.

The plug is solid, forming perfect ground joint with body, eliminating the danger of crushing. The nozzle can be reground if worn after long service. Handle is unbreakable. The walls and one end of the body are 1½ inches thick and will stand rough usage without injuring the nozzle. The waterway has a smooth, gradual taper with a straight way at the tip, giving a solid stream.

Nozzle is open when the handle lies back against the base. Can be used to break through a window without shutting off. When it is shut off, it may be dragged over the ground without danger of turning on.

Regular size, ¾ to 1½-inch discharge. Net price each.....\$11.25

Jumbo size, takes discharge to 1½ inch. Net price each.....\$14.75

Regular size. Detachable spray. Net price each.....\$16.75



Callahan Nozzle

Plain Shut-off.

Net price each.....\$11.25

Shut-off with spray.

Net price each.....17.50

Shut-off with double spray.

Net price each.....22.50



Brass Hose Nozzles with Cocks



Size, Inches	Length, Inches	Price Each	Size, Inches	Length, Inches	Price Each
¾	8	\$1.30	2	12	\$ 8.00
1	12	1.80	2½	20	11.00
1½	8	1.60	3	25	13.00
2	12	2.00	3½	12	14.50
2½	12	4.00	4	15	15.50
3	12	5.50	4½	24	17.50

Plain Brass Hose Pipes



Size, Inches	Length, Inches	Price Each	Size, Inches	Length, Inches	Price Each
¾	6	\$0.60	1½	12	\$2.20
1	8	.70	2	12	3.40
1½	4	.50	2½	15	4.00
2	8	.90	3	12	5.50
2½	10	1.50	3½	15	6.50
3	12	1.80	4	18	8.00
3½	10	2.00	4½	20	9.00

H. Channon Company Chicago

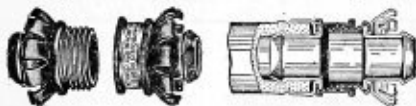
Regular Water and Suction Hose Couplings



Size, inches.....	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4
Per set.....	\$0.24	\$0.24	\$0.24	\$0.44	\$ 1.00	\$ 1.40	\$ 2.40	\$ 4.80	\$ 7.50	\$ 12.00	\$15.00
Per dozen sets.....	2.40	2.40	2.40	4.40	10.00	14.00	24.00	48.00	75.00	120.00	150.00

When ordering be sure to state whether hose or iron pipe thread is required.

Improved Perfect Hose Coupler



Made of heavy brass throughout. The clamps and tubes are stamped in one piece. Clamps and swivel fit snugly together. The only tool needed is a hammer. Bend down clamps on hose and you have a perfect joint, neat, smooth, durable and cannot leak. The harder the pressure the tighter it holds. It is as smooth and strong as a factory inserted coupling and can be taken off and used again. In sizes, 1/2, 3/4 or 1 inch. Price, per dozen... \$4.60 Price, per pair... \$0.46

Steam Hose Couplings



With long shank, for steam hose or water hose under heavy pressure. Usually furnished with iron pipe thread.

For Hose, Inches	Per Pair	Per Dozen Pairs	Weight per Dozen Pairs, Pounds
1/2 and 3/4	\$ 1.50	\$ 15.00	10
1	1.80	18.00	16 1/2
1 1/4	2.40	24.00	23
1 1/2	3.00	30.00	32
2	4.20	42.00	40
2 1/2	7.20	72.00	52
3	12.00	120.00	56

Automatic Coupling Expander



This expander is better, stronger and easier to operate than any similar machine on the market. It has an adjustable shoulder, which permits it to expand different length couplings. Screw has a coarse pitch thread, so that expander works quickly, which can be reversed without pounding coupling loose.

Can be bolted to a bench or held in a vise. Size, inches, 1 1/4, 1 1/2, 2, 2 1/2. Price each... \$25.00

Iron Pipe Nipples



We furnish suction hose from stock with nipples, scored, wired and vulcanized into ends when made. We expressly advise against the user attaching nipples to hose, as lining is usually injured in so doing, which allows the moisture to get into contact with the fabric, this in turn ruins the hose. Hose is not guaranteed when this is done.

Size, Inches	Length, Inches	Price Each	Size, Inches	Length, Inches	Price Each
2	7	\$1.40	5	12	\$4.00
2 1/2	7	1.50	6	14	5.00
3	8	2.00	8	16	7.00
4	10	3.00			

Expansion Ring or Automatic Coupling

Coupling



Expansion Ring



The principal advantages of automatic hose couplings over common couplings is that by their use a smooth and unobstructed waterway is obtained. We furnish these couplings with pipe, hose or special thread. When special thread is ordered, couplings cannot be returned on account of thread, nor can order be cancelled after the work is started. Always send sample thread if possible, or state the outside diameter of the male end of coupling and number of threads to the inch.

Price Per Pair

Size, inches.....	1 1/2	2	2 1/2
Price, per pair.....	\$2.70	\$3.00	\$3.50

Every store should be equipped with Sterling Fire Extinguishers shown in another part of this catalog.

Hose Spanners

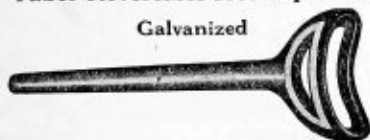
Common



1 1/2 inch.	Price, each, \$0.18	Dozen	\$1.80
2 inch.	Price, each, .24	Dozen	2.40
2 1/2 inch.	Price, each, .30	Dozen	3.00

Taber Reversible Hose Spanner

Galvanized



Price, each.....\$0.30



"Combination"

2 1/2 inch. Furnished with 3 sizes of openings for hydrant nut, 1 1/2, 1 3/4, 1 1/2 inch. Specify size required.
Price each.....\$0.50

Male



Hose
Nipples

Price Dozen

Female



Size, Inches	Male or Male and Female	Reducing Male	Size, Inches	Male or Male and Female	Reducing Male
1/2	\$3.50		2	\$14.00	\$17.50
3/4	3.50	\$4.40	2 1/2	28.00	35.00
1	5.00	6.25	3	40.00	50.00
1 1/4	9.00	11.25	3 1/2	50.00	62.50
1 1/2	10.00	12.50	4	75.00	93.25

Hose Reducers

Hose Bushings



Size, Inches	Price, Dozen	Size, Inches	Price, Dozen
1/2 x 1	\$ 6.50	2 x 1 1/2	\$16.00
1 x 1 1/2	6.50	2 x 1 3/4	18.00
1 1/2 x 2	6.50	2 1/2 x 3/4	20.00
1 3/4 x 2	8.00	2 3/4 x 1	22.00
2 x 1	10.00	2 3/4 x 1 1/2	23.00
2 x 3/4	11.50	2 3/4 x 2	24.00
2 1/2 x 1	11.50	3 x 2	26.00
2 3/4 x 1 1/2	12.00	3 x 2 1/2	30.00
2 x 3/4	13.00	3 x 2 3/4	36.00
2 x 1	14.00		

Hose Clamps

Single Bolt for Water Hose



Stamped from the best sheet brass. In ordering always specify the ply of the hose for which clamps are required. Each ply requires a different size clamp.

Size, inches	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3
Per dozen	\$0.60	\$0.60	\$0.60	\$0.60	\$2.00	\$2.50		
Price each	.05	.05	.05	.05	.20	.25		
Size, inches		1 1/2	2	2 1/4	2 1/2	3		
Per dozen		\$3.00	\$4.00	\$6.50	\$7.00	\$10.00		
Price each		.30	.40	.65	.70	1.00		

Double Bolt Suction Hose Clamps

Stamped from extra heavy sheet brass. Made with extra long tongues and hexagon head bolts.

Inside Diam. Clamp, Inches	Inside Diam. Hose, Inches	Price Each	Price Dozen
4	3	\$1.12	\$11.25
5	4	1.82	18.25
6	5	2.42	24.25
7	6	3.20	32.00

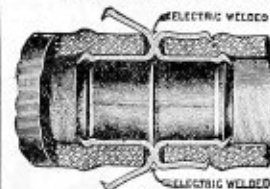


Vise Jaws for Coupling Hose

These jaws are necessary for application of the hose bands described above.

No. 1. 1 to 2 inch, each.....\$1.00
No. 2. 2 1/2 to 3 inch, each..... 1.25

Improved Clincher Hose Mender



All that is needed is a hammer to bend down the clamps on the hose to make a perfect mend.

Size, inches.....	1/2	3/4	1
Price per dozen.....	\$2.00	\$2.00	\$2.00
Weight per dozen, pounds.....	1 1/4	1 1/4	2 1/4

Hose Caps

Size, ins. ...	1/2	1	1 1/2	2
Price doz. ...	\$4.00	\$6.00	\$8.00	\$10.00
Size, ins. ...	2	2 1/2	3	4
Price doz. ...	\$15.00	\$24.00	\$31.00	\$43.00



McChesney Steel Wire Hose Bands and Hose Clamping Tool

Applying Band

Finished

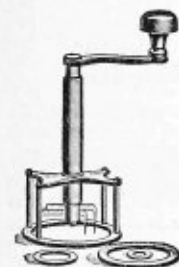


These bands, when applied by tool, make a neat, strong and effective hose clamp at low cost. No projections to cut floors, uproot grass or foul hose on corners while being handled.

Hose Clamping Tool, each, only. \$6.00

Galvanized Steel Wire Hose Bands

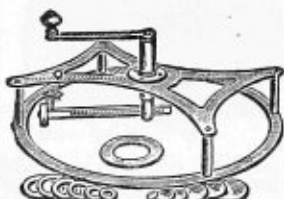
Size Hose, Ins.	Lots of 25	Lots of 100	Lots of 500	Lots of 1000	Length of Band, Inches	Approx. Weight per 1000 Pounds	
¾	\$1.10	\$ 5.00	\$ 9.50	5¼	13	
1	1.80	8.50	13.00	6¾	23	
1½	2.50	11.25	18.50	9½	50	
2	3.30	13.00	22.00	11	57	
2½	\$1.40	3.80	16.75	28.00	14½	97
3	1.75	5.30	19.00	30.00	14½	146
4	1.90	5.80	22.00	36.00	18½	181
5	2.10	6.50	26.00	43.00	21½	210
6	2.50	7.00	32.00	50.00	24	244



Washer and Gasket Cutters

Rose Pattern

These Cutters hold material in place and cut washers without damaging them—they do not leave any hole in the center. May also be used for cutting asbestos or other sheet packing. Automatic feed insures an even pressure. By means of special attachments these cutters may also be used for glass.



Nos. 3 and 4 Cutter

No.	Cuts, Ins.	Each
0.	$\frac{3}{8}$ to 2.....	\$1.15
00.	$\frac{3}{8}$ to 2, oxidized copper pl.	1.50
1.	$\frac{3}{8}$ to 4 $\frac{1}{2}$	3.75
2.	1 to 10.....	10.00
3.	4 $\frac{1}{2}$ to 21.....	23.00
4.	6 to 36.....	32.00
5.	1 to 10, rnd. or oval.....	36.00
6.	4 to 21, rnd. or oval.....	82.00
Glass Cutter Attachment....		2.00
Glass cutter attachment for No. 6.....		3.50



Washer Cutters

Ordinary Style

Simple and reliable, yet does perfect work. Cutters and point are made of best steel carefully hardened.

No. 1.	Cuts to 4 inches.	
Price dozen.....		\$12.60
No. 2.	Cuts to 8 inches.	
Price, dozen.....		14.70

Lawn Sprinklers

Columbian

The Columbian is a very popular sprinkler of the revolving type.

It distributes the water in a circle and covers a wide area. It is so constructed that the revolving parts will last for many years.

Height, 12 inches.

Weight about 3 pounds.

Price each.....\$1.50



Elgin

The Elgin is without moving parts and will distribute as much, or more—spray than any sprinkler made. We furnish an attachment which throws all the water on one side when desired.

Weight each, 1 pound.

Price each.....\$0.75



Fountain

Made of heavy sheet brass with soldered hose connection. Throws a spray over a large area in square and is particularly adapted for getting into corners.

Price each.....\$1.00



Hose Valves

With leather or rubber disc and with either wheel or tee handle.



Size, Inches

Price Each

1	\$3.15
1 1/4	3.70
1 1/2	4.75
2	7.00
2 1/2	8.00

Hydrant Gates

They are attached to the hydrant so that one stream can be stopped without interfering with the other.

For 2 1/2-inch Hose.
Single, each....\$10.00
Double, each....25.00



Single



Double

Siamese Connections

Size, Inches

Price Each

2 1/2 x 2 1/2	\$10.00
2 1/2 x 3	10.00
2 1/2 x 4	12.00

To Divide One Stream



To Unite Two Streams

Siamese Connections

For Stand Pipes

Size Iron Pipe, inches.....3

Size both Nozzles, inches.....2 1/2

Price each.....\$10.00



Hose Racks and Reels

Royal Swinging Hose

Especially designed for unlined linen hose. Made of pressed steel with fittings of malleable iron. The hose is hung on zinc pins which cannot corrode and these swing free as each lap of hose is withdrawn; adjustable in width for 1½ to 2½-inch hose. Finishes: Japanese red, copper, gold or aluminum bronzed. When ordering state diameter of hose, finish and size of pipe clamps wanted. Furnished with red finish and wall brackets unless otherwise specified.

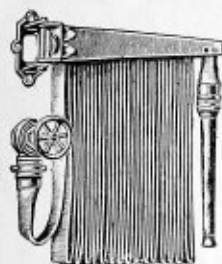
No. 18. For 25 to 75 ft. unlined linen hose. Weight 6 pounds. Price each \$5.00

No. 19. For 100 to 150 ft. unlined linen hose. Weight 8 pounds. Price each \$6.00

Hump Hose Rack

A feature of this rack is the hump in the center of the bottom which takes the weight off the folds of hose. The front of rack is partially enclosed, making it impossible to jerk too much hose off at once. Made of steel tubing and malleable iron castings. Usual finish, japanned red. When ordering state size, kind and length of hose, also finish required.

kind and length of hose, also finish required.



No.	Size Hose, Inches	Cap Unlined Linen	Cap Rubber Lnd. Cot'n	Size, Inches	Price Each
A0	1¼-1½	50	.....	11x22	\$5.00
A0X	2	50	.....	11x22	5.00
A00	2½	50	.....	11x22	5.00
A1	1¼-1½	100	.....	16x24	6.00
A1X	2	100	.....	16x24	6.00
A2	2½	100	.....	16x24	6.00
A3	1¼-1½	150	50	23x28	7.00
A3X	2	150	50	23x28	7.00
A4	2½	150	50	23x28	7.00
A5	1¼-1½	200	50	34x34	7.50
A5X	2	200	100	34x34	7.50
A6	2½	200	100	34x34	8.00

Angle Iron Rack

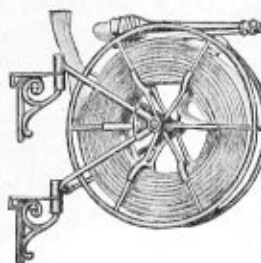
Constructed of angle iron which gives it great strength and durability. As in the Hump rack the front is partially enclosed, thus preventing entanglement of hose. Usual finish japanned red, but may be had finished in gold or aluminum bronze.

Shipped with wall brackets up to and including 4-inch, unless pipe clamps are specified. When ordering state size, kind and length of hose, also finish required. If pipe clamps are required, give size of pipe. Price includes 4-inch.

No.	Size Hose, Inches	Cap Unlined Linen	Cap Rubber Lnd. Cot'n	Size, Ins.	Price Each
70	1¼-1½	50	.....	11x22	\$5.00
71	2	50	.....	11x22	5.00
72	2½	50	.....	11x22	5.00
73	1¼-1½	100	25	16x24	6.00
74	2	100	25	16x24	6.00
75	2½	100	25	16x24	6.00
76	1¼-1½	150	50	23x28	7.00
77	2	150	50	23x28	7.00
78	2½	150	50	23x28	7.00
79	1¼-1½	200	100	34x34	7.50
80	2	200	100	34x34	7.50
81	2½	200	100	34x34	8.00

Above racks furnished in gold, copper or aluminum bronze without extra charge. Nickel, copper plate or solid brass polished at additional cost. Special catalog on application. Pipe clamps to 4-inch furnished when ordered, without additional charge.

No charge is made for pipe clamps up to 4 inch, inclusive. State size wanted.



Swinging Hose Reel

Made of steel tubing, rod and wire and malleable castings. Can be adjusted to run tight or loose. It will swing to any angle from the wall, takes up little space and is one of the most durable reels made. The hose cannot knot or twist when being unwound. The only swinging wall reel made which will hold 150 feet of cotton rubber lined hose. Furnished with wall brackets and finished in vermilion unless otherwise specified, but may be had in gold or silver bronze finish without extra charge.

No.	Size of Hose, Inches	Cap. Hose in Ft.		Dimensions, Inches	Price Each
		Unlined Linen	Rubber Lined Cotton		
0	1½	50	.....	3 x 15	\$ 6.00
00	2	50	.....	3½ x 15	6.00
000	2½	50	.....	4½ x 15	6.00
2	1½	150	50	3½ x 26	6.00
2½	2	100	.....	4½ x 21	6.00
3	2	150	50	4½ x 26	6.00
3½	2½	100	.....	4½ x 21	6.00
4	2½	150	50	4½ x 26	6.50
5	1½	300	100	5½ x 26	7.50
6	2	300	100	8 x 26	8.00
7	2½	300	100	9 x 26	8.50
8	2½	400	150	9 x 32	11.50

When ordering state whether for C. R. L. or U. L. L. hose.

Garden Hose Reel

Simplex

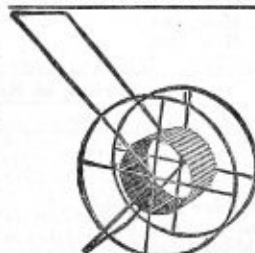
The drum, 12 inches in diameter, prevents kinking. Outside diameter 22 inches. Weight 6 pounds packed, knocked down in fibre box 11x6½x3½ inches. Capacity 50 feet ¾-inch hose.

Price each \$1.50



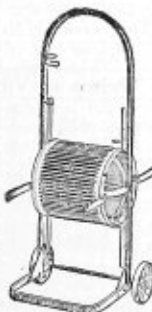
No. 1 All Metal Reel

Is strongly made with tubular frame and galvanized drum 9 inches in diameter. All joints are electrically welded. Capacity, 100 feet of ¾-inch garden hose. Wheels are 22 inches in diameter; handles 28 inches long; weight 15 pounds. Price each \$2.70



No. 2 All Metal Reel

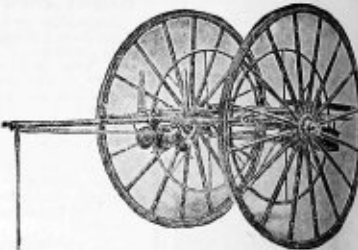
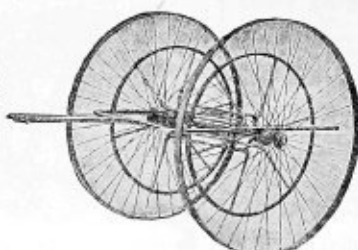
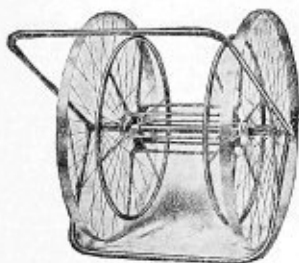
A very popular garden hose reel made of metal throughout. Substantially built and will stand hard wear. Frame is tubular with corrugated drum and wire arms. Cast iron wheels 7 inches in diameter. Drum holds 100 feet of rubber garden hose. Shipping weight 12½ pounds. Price each \$2.00



Hardwood Reel

Oil finish. Holds 100 feet ¾-inch hose. Price each \$2.00

Hose Reels and Carts



Park and Warehouse Reels

A tubular iron reel with frame mounted on flat tired steel wheels. Is strongly built, compact and serviceable and will stand hard wear.

Nos. 21, 31 and 32 are suitable for Parks, Lawns, Greenhouses, etc. Nos. 41, 51 and 61 for Mills, Warehouses, Factories, Railroads, etc.

Knox Hose Carts

These carts are suitable for a large quantity of small hose or a small quantity of large hose. The reel, frame and tongue are of tubular steel. Wheels of steel with wide tires.

Nos. 101, 102 and 103 are very strong and finished in vermilion and black. They are especially adapted for Railroads, Mills, Factories and Warehouses.

Village Hose Carts

Highest quality material and workmanship. Of medium weight and will endure extremely rough usage. Mounted on the best pattern wood wheels. Tool box and friction roller at rear, rope reel and drag rope, nozzle holder on tongue and tongue rest. Equipped with fireman's axe and crow bar in spring holders. Hub caps are polished brass or nickel plated if desired. Handsomely finished in vermilion and black.

Prices of Park and Warehouse Reels

Number of Reel	21	31	32	41	51	61
Height of wheels, inches	28	34	38	42	48	52
Outside width over all	26	27	38	38	46	52
Shipping weight of Reel, pounds	40	50	100	150	185	200
Capacity $\frac{3}{4}$ -inch 3-ply Rubber Hose, feet	200	500	800			
Capacity 1-inch 4-ply Rubber Hose, feet	100	200	350			
Capacity $1\frac{1}{4}$ -inch 4-ply Rubber Hose, feet	75	150	250			
Capacity $1\frac{1}{2}$ -inch 4-ply Rubber Hose, feet				250	400	500
Capacity 2 -inch 4-ply Rubber Hose, feet				200	300	400
Capacity $2\frac{1}{2}$ -inch 4-ply Rubber Hose, feet				150	250	300
Capacity $1\frac{1}{4}$ -inch C. R. L. Hose, feet	150	300	500			
Capacity $1\frac{1}{2}$ -inch C. R. L. Hose, feet	100	200	350	500	650	800
Capacity 2 -inch C. R. L. Hose, feet	75	150	250	350	500	600
Capacity $2\frac{1}{2}$ -inch C. R. L. Hose, feet	50	100	200	250	400	500
Price, each	\$7.50	\$10.50	\$25.00	\$35.00	\$45.00	\$55.00

Prices of Knox Hose Carts

Number of Reel	90	100	110	101	102	103
Height of wheels, inches	36	36	38	42	48	52
Extreme outside width	31	33	38	43	48	54
Shipping weight of Reel, pounds	75	90	100	145	175	200
Capacity $\frac{3}{4}$ -inch 3-ply Rubber Hose, feet	500	600	800			
Capacity 1 -inch 4-ply Rubber Hose, feet	200	300	400			
Capacity $1\frac{1}{4}$ -inch 4-ply Rubber Hose, feet	150	200	300			
Capacity $1\frac{1}{2}$ -inch 4-ply Rubber Hose, feet	100	150	200	250	400	500
Capacity 2 -inch 4-ply Rubber Hose, feet				200	300	400
Capacity $2\frac{1}{2}$ -inch 4-ply Rubber Hose, feet				150	250	300
Capacity $1\frac{1}{4}$ -inch C. R. L. Hose, feet	300	400	500			
Capacity $1\frac{1}{2}$ -inch C. R. L. Hose, feet	200	300	400	500	650	800
Capacity 2 -inch C. R. L. Hose, feet	150	200	250	350	500	600
Capacity $2\frac{1}{2}$ -inch C. R. L. Hose, feet	100	150	200	250	400	500
Price, each	\$12.00	\$17.00	\$25.00	\$35.00	\$45.00	\$55.00

Prices of Village Hose Carts

No. of Cart	419	420	421	422	Equipped with automatic gongs as follows:
Height of wheels	4 ft. 6 in.	5 ft.	5 ft. 6 in.	6 ft.	8 in., \$8.00 net;
Extreme width	5 ft.	5 ft.	5 ft. 4 in.	5 ft. 8 in.	10 in., \$9.25 net;
Extreme length	8 ft. 6 in.	9 ft.	9 ft. 6 in.	10 ft. 8 in.	each additional.
Shipping weight	400 lbs.	450 lbs.	540 lbs.	630 lbs.	For roller bearings
Capacity $2\frac{1}{2}$ -inch Double Jacket	300 ft.	400 ft.	500 ft.	600 ft.	add \$35 to list price
Price, each	\$120.00	\$130.00	\$160.00	\$190.00	

If the above carts are not suitable for your requirements, we shall be pleased to send catalog of other sizes with greater and lesser capacities, or will furnish estimates on special carts.

Our Sampson Mill Hose is strong and durable. For prices see index.

Sterling Chemical Fire Extinguisher

Approved and Labeled by the Underwriters Laboratories, Inc.

Statistics show that 90 per cent of all fires are discovered at their start and fire department reports show that 80 per cent are extinguished by chemical apparatus.

With this extinguisher a stream can be thrown 50 feet on to walls, floors, into shelving and other places. This stream carries a large amount of carbonic acid gas, which excludes oxygen, preventing further combustion. It will put out burning oil, naphtha and gasoline, which plain water only spreads.

It is handsomely finished in polished copper, well lacquered to prevent tarnishing. The cylinder is built to withstand enormous pressure and lined with lead. At the top of the cylinder is a cage which holds a bottle containing sulphuric acid, covered by a loose lead stopper. The cylinder is nearly filled with water, into which one and one-half pounds of bicarbonate of soda has been dissolved.

To operate the extinguisher, invert the cylinder and play stream at the fire. Inverting the cylinder allows the lead stopper to fall out of the bottle and the acid feeding slowly into the soda solution, instantly creates a large volume of carbonic acid gas which is forced out through the hose by the pressure generated. This dense vapor, which is thrown fifty feet literally smothers the fire. A 3-gallon extinguisher will put out more fire and in less time than 120 gallons of water.

Extra charges are inexpensive and may be purchased from us or any drug store. Extinguishers should be tested about once a year if inactive.

Chemical extinguishers are highly recommended by all fire insurance companies, and the Sterling bears the label of the Underwriters Laboratories, Inc., which is their mark of approval.

Capacity 3 gallons; weight empty 19 pounds; charged 50 pounds.

Price complete with charge.....\$15.00

Champion Fire Tube

Equal to the best dry powder fire extinguisher on the market. Made of heavy tin, enameled red, with directions in white relief. Tube fitted with detachable cover which is easily removed by a sharp jerk.

Size is 2 inches in diameter, 22 inches long and contains 3 pounds of compound.

The compound used is the result of many years' experiment. The chemicals are of the best grade and mixed in the proper proportions. (Positively no sand used in the Champion Fire Tube.)

The tube is hung on a nail or hook, and, when required for use, a jerk removes the cover and permits the operator to throw the contents on the fire.

The Champion Fire Tube is guaranteed to be equal to the best and superior to many fire tubes now on the market, and the price is only.....\$1.00



Sterling Chemical Fire Extinguisher



Champion Fire Tube

Fire Department Pump Extinguisher

Recommended and used by the Chicago Fire Department. Very efficient for putting out small fires. Especially adapted for public buildings, schools, etc. Only plain water is used, which is preferred by some to the chemical extinguishers.

Cylinder is 16½ inches high, has a capacity of 5 gallons and equipped with a double-acting brass pump, forcing a stream through hose on both up and down strokes. Painted red.

Price, Copper.....\$17.00

Price, Galvanized Iron.....\$8.50



"Arctic" Non-Freezing Fire Extinguisher

The chief objection to hand extinguishers of the ordinary type has been that the contents freeze at slightly below the freezing point of water, in which condition the extinguisher is useless. The "Arctic" is unlike any other extinguisher made. It is charged with calcium chloride which will not freeze at 30 to 40 degrees below zero. The expelling force is three ounces of carbonic acid gas contained in a steel bottle at the top of cylinder.

The "Arctic" is especially adapted for use by railroads, docks, ferries, warehouses, cold storage plants, and all other places not heated uniformly through the winter and where extinguisher must be protected from frost. Furnished in polished copper, red Japan or nickel plate, capacity 3 gals. Price.....\$25.00



Forty Gallon Factory Chemical Engine

Designed for indoor use generally in factories, warehouses, etc., but also adapted to fire-yard duty. Its high wheels and light, yet strong construction, make it easy for one man to handle. No experience is required to operate it; turn over cylinder which is balanced on the wheels, open valve and it is ready for service. Hose is folded on rack in a figure eight, preventing it from kinking when taken off for use.

Tank: Capacity 40 gallons. Seamless high pressure steel drawn cold and pressed into shape; double lead coated. Tested to three times required strength. Brass shut-off valve to hose connection. All fittings are of brass highly polished.

Acid Bottle: One of pure lead in brass case, handle on top.



Soda Bag: One of heavy canvas.

Hose: Fifty feet of 3/4-inch 4-ply extra quality, brass couplings attached.

Nozzle: One brass shut-off, nickel plated.

Hose Bracket: Four steel arms.

Painting: English vermilion on wheels and frame. Aluminum on tank, striped with gold.

Wheels: Sarven "A" grade, 48-inch high, steel tires.

Axles: Special concord steel, with solid collar.

Handle Bar: Forged steel.

Equipment: All necessary wrenches and spanners are furnished.

Dimensions: Height, 51 inches; width, 29 inches.

Weight: 400 pounds.

Can also be furnished equipped with copper tank, roller bearing axles and rubber tired wheels.

Forty Gallon Department Chemical Engine

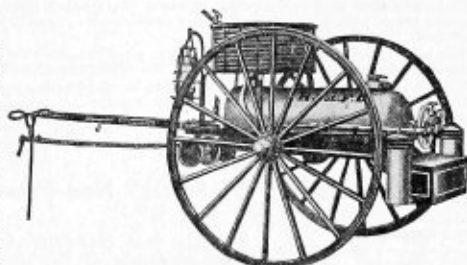
This engine is built to meet all the requirements of a Volunteer Fire Department. Its high wheels and well balanced construction make it very easy running, well adapted to cover a large territory. Operation is effected in the same way as the Factory Engine, i. e., by turning over tank and opening valve. No modern feature has been omitted, and we fully guarantee to give efficient fire service.

Tank: Capacity, 40 gallons. High pressure steel, cold drawn, double lead coated, equipped with pop safety valve and brass trunnions, which rest on brass journal boxes on frame, brass tipping wheel, shut-off valve and brass pressure gauge.

Acid Bottle: One of pure lead in brass case. Non-slopping type.

Soda Bags: Two of heavy canvas.

Funnels: Two, one galvanized and one copper tinned.



Hose: One hundred feet 3/4-inch, 4-ply extra quality chemical engine hose, in one section, with brass coupling attached.

Hose Basket: Iron, with tubular top rim allowing hose to pull out freely.

Charge Holders: Two, one on each side of frame.

Axe and Crow Bar:

One of each held to side of frame in spring holders.

Lanterns: Two nickel-plated, in spring holders.

Wheels: Sarven "A" grade, 56 inches high, with polished brass closed end hub caps, steel tired.

Axles: Special Concord steel, with solid collars.

Frame: Forged steel, with steel tongue, handle bar, hand grabs and folding tongue rest.

Rope Reel: With flanges and ratchet attached to front of frame and fifty feet of good manila rope.

Equipment: Hard wood tool box, all necessary spanners and wrenches.

Dimensions: Tread, 48 inches; width, 51 inches; height, 57 inches; length, 11 feet.

Weight, empty, 500 pounds; loaded, 825 pounds.

Prices of Chemical Engines Quoted on Application.

Fire Department Equipment

We are prepared to furnish fire department equipment of all kinds, such as chemical apparatus, ladders and ladder trucks, fire bells and steel towers, etc. Fire hose and brass hose goods, such as couplings, expanders, play pipes, etc., and fire axes, lanterns, fire buckets will be found on other pages of this catalog; consult index. Quotations on equipment of all kinds gladly furnished upon application.

"Red Raven" Red Sheet Packing

Red Raven Red Sheet Packing is made of a soft and tenacious compound which resists the action of heat, retains a high degree of pliability in the hottest joints and will not blow out under the highest pressure. It is fully equal to similar highly advertised packings and is so guaranteed by us.

Red Raven will make a cold or hot water, steam or air joint, equally well and is not affected by oils, steam, alkalis or liquors. Being absolutely uniform in thickness and not affected by ammonia, it can be safely used in packing ammonia joints in ice and cold storage plants and is particularly adapted for this work.

Red Raven is carried in stock in rolls 36 inches wide. We do not cut rolls lengthwise but will furnish any quantity 1 yard wide. Sizes $\frac{1}{8}$, $\frac{1}{4}$ and $\frac{1}{2}$ -inch. Approximate weights, 2 $\frac{1}{4}$, 5 $\frac{1}{2}$ and 11 lbs. per sq. yd.

Full rolls, per pound.....

Cut pieces, per pound.....

\$1.00

\$1.10



"Rainbow" Red Sheet Packing

A highly advertised red sheet packing preferred by some. Sizes and weights same as Red Raven Red Sheet Packing.

Per pound.....\$1.20

With wire insertion, per pound.....\$1.50



"Jenkins' 96" Sheet Packing

Jenkins' 96 is an unvulcanized sheet packing well known to the steam engineering trade for many years. Will stand high temperatures and pressures successfully. Sizes and weights same as Red Raven Sheet Packing.

Per pound.....\$2.00



"Hippo" Black Oilproof Sheet Packing

In our "Hippo" Black Oilproof Sheet Packing will be found all the characteristics which make a perfect rubber sheet packing. It can be used for packing all kinds of joints in connection with oil, gas, acids, steam, ammonia, and hot or cold water and will not crack, char or blow out under steam or other pressures. Can be used repeatedly until entirely worn out. Furnished in rolls or cut pieces 36 inches wide. Sizes and weights same as Red Raven.

Per pound.....\$1.00



Durabla Sheet Packing

Durabla compressed asbestos fibre gasket. Will hold wet as a steam equally as well as superheated steam and high pressure, is not affected by 800 degrees F. or 300 pounds steam pressure. Is oilproof and gives perfect service on ammonia, gas or compressed air. $\frac{1}{8}$ -inch thick and sheets measure 36 by 108 inches, 48 by 120 inches, 48 by 58 inches.

Price, per pound.....\$2.00



Cloth Insertion Sheet Packing

Cloth Insertion Sheet Packing is made of alternate layers of rubber and duck, one ply of duck in every 16th-inch of thickness. Intended for packing water pipe and low pressure joints. Furnished cloth insertion, cloth one side or cloth both sides, and in three grades. Rolls or cut pieces 36 inches wide in sizes $\frac{1}{8}$ and $\frac{1}{4}$ -inch. Approximate

weights, 6 $\frac{1}{2}$ and 12 $\frac{1}{2}$ pounds per square yard.

"S" grade, per pound.....\$0.32

"Q" grade, per pound......28

"M" grade, per pound......24



"Autoline" Gas Engine Sheet Packing Asbestos Wire Insertion

Made especially for gasoline engines, being unaffected by the extreme heat coincident with this service. Surfaced with a high heat resisting compound, red on one side and black on the other. This is an excellent packing and may be used with any degree of pressure or heat. Rolls 39 inches wide. Sizes $\frac{1}{8}$ and $\frac{1}{4}$ -inch. Weights 3 $\frac{1}{4}$ and 5 $\frac{1}{4}$ pounds.

Per pound.....\$2.00



"Tenax" Compressed Asbestos Packing

A perfect packing for low or high pressure steam, superheat steam, gas engines, etc. Will stand temperature of 1600 degrees F. and 600 pounds pressure. Carried in sheets 48 inches square, in sizes $\frac{1}{8}$ to $\frac{1}{2}$ by 32nds. Weights, 2 to 16 pounds per sheet.

Per pound.....\$2.00

"Endura" Fibre Sheet Packing

"Endura" for packing hot or cold water, crude oil, gasoline, etc. Contains no rubber or asbestos. Will not rot or soften. Sizes $\frac{1}{8}$ and $\frac{1}{4}$ in rolls 37 inches wide, $\frac{1}{8}$ and $\frac{1}{4}$ in sheets 36 inches square. Weights $\frac{1}{4}$ to 6 pounds per square yard.

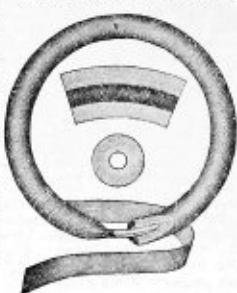
Per pound.....\$2.00

Red Raven Packing is the equal of any red sheet packing made.

Keystone Red Tubular Gaskets

For Manholes and Handholes. Made from the well-known "Red Raven" Compound

Keystone Red Tubular Gaskets are made of our well-known "Red Raven" Compound, a stock unexcelled for universal packing. They conform to all irregularities of the faces in the meeting surfaces and will not crack nor harden under the highest temperatures. They will not blow out under steam pressure. Gaskets of any size or form are readily made by cutting pieces the correct length to go around the flange, joining the ends together with a small metal tube and wrapping with adhesive tape, all of which are supplied with each box of gaskets.



These gaskets are essentially for general service and with a box of each size on hand, an engineer can pack any joint perfectly and without waste of time or material, as the **shortest pieces can be quickly formed into perfect gaskets** by utilizing the metal tubes and tapes furnished.

Made in the following sizes, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{3}{4}$ and $\frac{1}{4}$ -inch, and in lengths from 12 to 36 feet, according to the diameter. Put up in boxes weighing from 7 to 10 pounds each.

Price per pound.....\$1.30

Hydraulic Packing



Square

Cross Section

In Ring Form

For hot water service, our Sterling extra fine, hard, white friction and fine white duck will give entirely satisfactory service. Most square duck packings swell abnormally under these conditions; in a test our packing was boiled for ten hours and examination showed it had swollen but little. We have never found another duck packing which equals it and we highly recommend and guarantee it. Sizes $\frac{1}{4}$ to 1-inch square. In flat coils, packed in boxes weighing 5 to 10 lbs. Price per lb. **\$1.50**

Also supplied in ring form for water piston heads of steam pumps, plungers, etc., and being cut to exact measurements it is easily and quickly put in the pump and is superior to any other form of hydraulic packing, as it has no joints. Particularly adapted for pumps handling very hot water and under high pressure. When ordering ring packing, specify inside and outside diameter and thickness required.

For cold water service our No. 1 grade will give entire satisfaction. Made of white duck and black friction. Sizes $\frac{1}{4}$ to 1-inch square. In flat coils packed in box weighing from 5 to 10 lbs. Price per lb. **\$0.60**

Illustration shows cross section of both hot and cold water packing. When ordering be sure to specify which is wanted.

Folded Asbestos Gaskets



For manholes, handholes and flange joints. These gaskets will stand practically any working pressure and temperature of steam. They are folded by hand and made of a fine quality asbestos sheeting interwoven with a bronze wire mesh and the entire gasket is coated with a white rubber heat resisting compound. They have no raw edges. They may be re-used many times when taken out and replaced carefully. In some places they have been in use for over a year without being renewed. In ordering always give exact inside dimensions and width of flange, as there is no standard size. Failure to comply with this request will cause delay and correspondence.

Handhole sizes, per lb. **\$2.70**
Manhole sizes, per lb. **2.50**

Square Flax Packing

Sterling Flax Packing is made of pure extra long fibre flax entirely free from hemp. It is waterproof, steam proof and frictionless and will not char or burn. It is thoroughly lubricated with materials carefully selected for their efficiency, and is very soft and pliable, a quality that will be appreciated by users of flax packing. Put up in boxes of 6 to 8 pounds, in sizes $\frac{1}{4}$ to 2-inch, advancing by 8ths; also on 50, 100 and 200 lb. reels. Per lb. **\$1.00**

No. 1 Flax Packing differs from our Sterling grade in being made of shorter fibre flax but does not contain any hemp or gritty substances. It is thoroughly lubricated and where a strictly first quality is not required it will give entire satisfaction. Packed in flat coils in boxes weighing from 6 to 8 lbs., in sizes from $\frac{1}{4}$ to 2 inches, advancing by 8ths; also put up on reels. Larger sizes made to order. Per lb. **\$0.60**



Rubber Cloth Insertion Gaskets

These gaskets are made from high grade cloth insertion rubber sheet packing and are used for water or low pressure steam service in manholes and handholes.



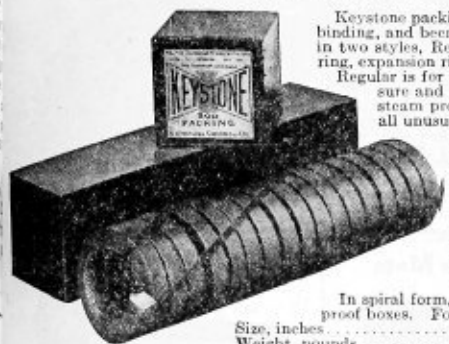
All regular sizes are carried in stock and can be shipped immediately. Sizes up to 7x9 inches have 1-inch flange and are $\frac{3}{8}$ inch thick; larger sizes have $1\frac{1}{4}$ -inch flange and are $\frac{1}{4}$ inch thick. In ordering special sizes always give width of flange and thickness, otherwise standard sizes will be furnished.

Gaskets of any size and shape can be made to order promptly. Always send sketch showing measurements or full size pattern when ordering.

Sizes 7x9 inches and smaller, per lb., **\$1.20** Larger sizes, per lb. **\$1.10**

Steamfitters can rely on the quality of the goods shown in this catalog.

"Keystone" Piston Rod Packing



Keystone packing will pack piston rods absolutely tight without binding, and because of its durability is highly economical. Made in two styles, Regular and Special, and in three forms, sectional ring, expansion ring and spiral.

Regular is for use in steam or hydraulic service where the pressure and temperature is not excessive and Special for high steam pressures, superheat steam, high speed engines and all unusual or hard conditions.

Sectional ring form is cut in wedges and used where rods are out of center, or are cut and scored, in deep stuffing boxes and other places hard to keep tight. Made to order only. Give exact measurements of stuffing box.

Regular, per lb. \$2.50 Special, per lb. \$3.00

Expansion ring form is preferred by many as it is made to exact size of stuffing box and a perfect fit assured. Give exact measurements of stuffing box.

Regular, per lb. \$2.00 Special, per lb. \$2.50

In spiral form, packing can be cut to fit any size rod. Packed in 12-foot coils in dust-proof boxes. Following is the approximate weight per box:

Size, inches	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1	1 $\frac{1}{4}$	1 $\frac{1}{2}$	1 $\frac{3}{4}$
Weight, pounds	1	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{3}{4}$	2 $\frac{1}{2}$	3	3 $\frac{1}{4}$	5 $\frac{1}{4}$	6 $\frac{3}{4}$	8
Regular, sizes $\frac{1}{4}$ to 1 $\frac{1}{2}$ -inch.	Per pound									\$1.50
Special, sizes $\frac{1}{4}$ to 1 $\frac{1}{2}$ -inch.	Per pound									\$3.00



Expansion Ring



Sectional Ring

Non X-L Spiral Piston Rod Packing

Non X L spiral packing is especially desirable for high speed engines, rods working in oil, oil pumps, valve stems of Corliss engines, etc., at medium pressures. It is elastic, frictionless and durable. The core is made from our Red Raven Compound, around which is closely rolled a special duck well frictioned together and thoroughly lubricated on the outside.

Packed in dust-proof boxes containing 12 feet in sizes $\frac{1}{4}$ to 1 $\frac{1}{2}$ inches, advancing by 16ths. Weighs a trifle less per box than Keystone spiral packing.

Per pound \$1.50



Channon's Waterproof Hydraulic Packing

This packing will not clog, corrode or gum machinery, nor scatter or dissolve by action of the water. It will outwear ordinary flax packing, being specially prepared for hydraulic service. Core is our Red Raven compound surrounded with thoroughly lubricated flax of the finest quality. Packed in dust-proof boxes containing 12 feet. Sizes $\frac{1}{4}$ to 1 inch by 8ths.



Price per pound \$2.00

Channon's Gum Core Packing



Intended for low pressure work and especially suitable for old style engines with badly worn rods or disarranged stuffing boxes, as it stands excessive gland pressure. Furnished either round or oval. Special rubber core covered with braided flax saturated with the finest lubricants obtainable for the purpose. Packed in boxes weighing 5 to 10 pounds. Sizes $\frac{1}{4}$ to 1 $\frac{1}{2}$ inches by 8ths.

Price per pound \$0.75



Dollar Junior Packing

Made of finest imported flax duck walls and purest rubber back. Stands 150 pounds of steam without hardening. For steam or air rods, pump plungers, steam hammers, rams, etc.

Price per pound \$1.50



Mabb's Hydraulic Rawhide Packing

Made of the best mechanical rawhide which is extremely tough and will outlast the best vegetable fibre many times over. It is purely glutenous, self-

lubricating and anti-friction.

Never requires entire renewal. Simply add a fresh layer on top as needed. Contains nothing to wear or injure rods, cylinder or plunger.

Furnished in packages of 5, 10, 25, 50 or 100 feet, or in lengths cut to order. Price per pound \$2.00

Metalbestos High Pressure Packing



Has a core of rubber-bestos compound covered with a series of braids of finely spun asbestos thoroughly lubricated, outside of which is a covering of soft metallic wire. Will not burn, char or blow out under any pressure. Packed in boxes weighing 5 to 10 pounds. Sizes $\frac{1}{4}$ to 1 $\frac{1}{2}$ inches.

Price per pound \$2.50

Fine Rubber Pump Valves



We are in a position to furnish any kind of valves required and for any particular service. When ordering it is necessary for us to know the diameter and thickness of the valve and the size of hole through it. Be sure to make all measurements exact. Also state what kind of liquid it will be used in conjunction with, and whether it will be hot or cold.

We have two grades, Sterling extra quality high pressure valves and No. 1, regular quality.

Sterling valves can be used for the same purpose that No. 1 quality will answer for, and as they are made of a much higher quality compound, will give double the service and prove more satisfactory in every way. No. 1 quality valves are always furnished unless sterling quality is specified.

Soft Valves

For use in cold water only. They are soft with perfectly smooth surface. Use Sterling quality for pressures over 50 pounds.

Sterling quality, per pound..... \$1.50
No. 1 quality, per pound..... 1.20

Hard Valves

These valves are made to stand very high temperature. Being compounded both hard and tough, will last a long time and stand great pressure.

Sterling quality, per pound..... \$2.00
No. 1 quality, per pound..... 1.70

Medium Hard Valves

For semi-hot water. Very durable and can be used where considerable pressure exists.

Sterling quality, per pound..... \$1.50
No. 1 quality, per pound..... 1.40

Condenser Valves

Condenser valves are made especially for marine work. They are very soft and red in color.

Sterling quality, per pound..... \$6.00
No. 1 quality, per pound..... 3.00

Water Well Cups

Made from pure oak tanned stock, carefully selected for the purpose. Size corresponds to the inside diameter of cylinder.

Size, ins. 1 1½ 2 2½ 3
Price ea. \$0.04 \$0.06 \$0.09 \$0.13 \$0.17
Size, ins. 3½ 4 4½ 5 6
Price ea. \$0.24 \$0.31 \$0.40 \$0.49 \$0.72

High Pressure Leather Cups

Cut from the best selection of valve leather. They are impervious to water and of great durability.

Size, ins. 1 1½ 2 2½ 3
Price ea. \$0.06 \$0.08 \$0.13 \$0.17 \$0.23
Size, ins. 3½ 4 4½ 5 6
Price ea. \$0.32 \$0.50 \$0.64 \$0.86 \$1.30

Victor Balata Valves.

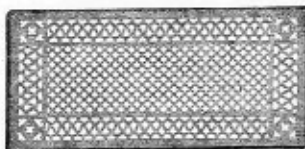
For cold water pumps. Not suitable for hot water or steam. We can furnish any size desired. Prices for special sizes on application. Any size of holes.

Thickness, Inches	Diameter, Inches				
	3	3½	4	4½	5
1/2	\$0.48	\$0.65	\$0.84	\$1.04	\$1.30
3/4	.60	.82	1.04	1.30	1.62
1	.72	.98	1.24	1.56	1.94
1 1/4	.84	1.14	1.44	1.82	2.26
1 1/2	.96	1.30	1.64	2.08	2.58

Prices are for each valve.



Perforated Rubber Mats



Perforated rubber mats possess desirable features not found in any other floor coverings, being non-slip, attractive, durable, sanitary, economical and prevent slipping. Initials, names or numbers can be inlaid at slight additional expense. It is best that large mats be made in sections, avoiding liability of tearing when being moved. Perforations like design shown or special ones can be furnished. Designs with round or nearly round perforations are better than those with sharp corners, lessening the chance of tearing.

Per Square Foot
Thickness, inches 1/4 3/8 1/2
Price..... \$0.75 \$1.00 \$1.25
Weight, pounds..... 2 3 4
Extra for lettering: Per letter, black, \$0.25 net; red or white, \$0.50 net.

Rubber Matting



several other patterns. Prices on application.

Weights approximately as follows: 1/4, 6 lbs.; 3/8, 8½ lbs.; 1/2, 13½ lbs.; 3/4, 18½ lbs. per sq. yard.

Price per pound, corrugated as shown..... \$0.40

We can furnish

Rubber Pump Diaphragms



Being large manufacturers of diaphragm pumps necessitate our furnishing diaphragms which give reliable service. There are many cheaper ones offered, but they do not give the long satisfactory service as ours, which are made of tough durable rubber to withstand severe service. Loud and Channon diaphragms are the same, but the Edison are different. Be sure to state which is wanted, otherwise Channon diaphragms will be furnished.

Number..... 1 2 3 4
Channon's or Loud's..... \$3.00 \$4.00 \$6.00
Edison..... 3.50 5.00 \$7.00

Rubber Mallets



Used in foundries, furniture and other wood working shops, garages and other industrial lines for hammering materials which would be injured by the use of a metal hammer. Our mallets are made of an excellent grade of rubber compound of correct hardness. Each mallet is furnished complete with handle as shown.

Number..... 0 1 2 3 4
Price ea. \$0.90 \$1.20 \$1.30 \$1.50 \$2.00
Length..... 2½ 3 3½ 4 4½
Dia., cen. 2½ 2½ 2½ 2½ 3½
Dia., end. 1½ 2½ 2½ 2½ 2½
Wt., ozs. 6½ 11½ 14½ 18½ 26½

Special Moulded Rubber Goods



We are fully equipped to produce all kinds of rubber compounds, formed out or molded into special shapes. When inquiring about material of this nature it is requested that a sketch be sent, when possible, together with full description of the uses for which it is intended.

Rubber Sheave Filling

Twenty-one shapes are carried in stock. When ordering it is best to send a small sample showing exact size and shape wanted. Per pound..... \$1.25



Pump Leathers

In ordering always state diameter of cylinder. Packed in cartons containing 1 dozen leathers.

Diam. Cyl., Inches	Diam. Valve, Inches	Per Dozen	Price Each
3	2½	\$0.65	\$0.07
2½	2½	.80	.08
2½	3	.85	.09
2½	3½	1.00	.10

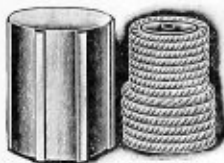
Large sizes on application.

We can furnish Pump Valves for work in any service.

Asbestos Wick and Rope Packing



Asbestos Wick



Asbestos Rope

Our asbestos wick packing is composed of the purest asbestos fibre strands, twisted into the form of a round lamp wick about $\frac{1}{4}$ inch in diameter. It is absolutely acid and fire proof. Used for packing valve stems, small steam pumps, etc. In balls of $\frac{1}{4}$, $\frac{1}{2}$ and 1 pound.

Price per pound.....\$1.75

Asbestos rope packing is made of firmly spun asbestos fibre tightly twisted into rope of any size from $\frac{1}{2}$ to 2 inches and put up on reels weighing from 10 to 25 pounds. Especially adapted for superheat steam.

Price per pound.....\$1.75

Palmetto Twisted Valve Stem Packing



A well known packing for globe valves, blow-off cocks, injectors or wherever a small size packing is needed that will not harden. Each strand carries its own lubricant and by unstranding any size valve can be packed from one spool.

Carried in sizes $\frac{1}{8}$, $\frac{3}{16}$, $\frac{1}{4}$ and $\frac{5}{16}$ inches.

Price per pound.....\$2.50



Lead Rope

For making metallic packing. For stuffing boxes and valve stems, the lead rope should be freely saturated with graphite and oil; for making gaskets it is enclosed in cheese cloth. For steam packing it may be rolled in cheese cloth, and thoroughly saturated with graphite and oil.

Price per pound.....\$2.50

Cotton Candle Wick

Our extra quality is spun into very fine yarns from pure white cotton. It will burn with a minimum of smoke.



Grade	Bale Lots, per Lb.	5-Lb. Sacks, per Lb.	Lesser Quantities, per Lb.
No. 1	\$0.36	\$0.40	\$0.50
Extra	.66	.70	.80

Palmetto Braided Packing

For all steam and compressed air pressures, especially high pressure super-heated steam. Each strand is a reservoir of lubricant and does not harden in service. Furnished in sizes from $\frac{1}{4}$ to 2 inches in 5-pound boxes.

Price per pound.....\$2.50



Channon's Three-Piece Diagonal Rod Packing



A most durable and economical rod packing. Constructed with two diagonal wedges and a cushion, encased in a cover of finely braided linen, thoroughly lubricated and wrapped with muslin to keep out all dirt and grit. Its peculiar construction makes it a compensating packing, providing for all inequalities of rod or stuffing box and packing absolutely tight without friction. It is very durable and outlasts most other rod packing.



Made in two styles, Regular for pressures up to 100 pounds and Special for all higher pressures up to 250 pounds. Packed in flat coils in boxes weighing 6 to 8 pounds. Sizes $\frac{1}{2}$ to 3 inches high.

Regular, per pound.....\$1.50

Special, per pound.....2.50

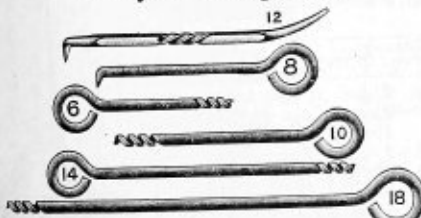
Daniels' P. P. P. Packing

The same in construction as Channon's three piece diagonal packing. When ordering P. P. P. always state if for ammonia rods as packing is especially prepared for that purpose. Regular and Special P. P. P. are made in $\frac{1}{4}$ -inch sizes from $\frac{3}{16}$ to $1\frac{1}{4}$ inches, and from $1\frac{1}{4}$ inches, advancing by $\frac{1}{8}$ inches up to 3 inches. Regular P. P. P. is for steam pressures of 100 pounds or less; ordinary water pressures (cold or warm), low ammonia pressures, valve stems, etc. Special P. P. P. for steam pressures over 100 pounds (when not superheated), high ammonia pressures, high hydraulics, etc.

Regular. Price per pound.....\$2.00

Special. Price per pound.....2.50

Pilley's Packing Tools



No. 4. Set of 4 tools, 8, 10, 12, 14 inches long. Per set.....\$1.50

No. 6. Set of 6 tools, 6, 8, 10, 12, 14, 18 inches long. Per set.....2.25



Hemp Packing

Carried in 50 and 100 pound coils in the following grades:

	Price per pound
Italian A.....	\$0.50
American B.....	.40
Plumbago and tallow laid.....	.45

Jute Gasket Packing

For calking water mains, etc. Packed in 75-pound coils. Price per pound.....\$0.14

Steel and Brass Oilers

These oilers are very suitable for machinists, engineers and for tool equipments. Made from 20 gauge stock, clock steel, spring bottom, heavily copper plated. Spout connections have large filler openings $1\frac{1}{2}$ inches in diameter and are turned from solid brass.



Copper Plated			Extra Spouts Price Each	Brass			Capacity, Pints	Diam., Inches	Length Spout, Inches
No.	Per Dozen	Each		No.	Per Dozen	Price Each			
12	\$ 4.50	\$0.45	\$0.22	120	\$ 6.50	\$0.65	$\frac{1}{4}$	$2\frac{3}{4}$	$2\frac{1}{2}$
13	5.50	.55	.27	130	8.00	.80	$\frac{1}{4}$	$3\frac{3}{8}$	3
13A	6.00	.60	.32	130A	8.75	.90	$\frac{1}{4}$	$3\frac{3}{8}$	5
14	6.50	.65	.42	140	9.20	.95	$\frac{1}{4}$	$3\frac{3}{8}$	9
14A	7.50	.75	.27	140A	10.20	1.05	$\frac{1}{2}$	$3\frac{3}{4}$	3
14AA	8.00	.80	.32	140AA	10.75	1.10	$\frac{1}{2}$	$3\frac{3}{4}$	5
14B	8.50	.85	.42	140B	11.20	1.15	$\frac{1}{2}$	$3\frac{3}{4}$	9
15	9.25	.95	.27	150	12.00	1.20	1	$4\frac{1}{4}$	3
15A	9.75	1.00	.32	150A	13.00	1.30	1	$4\frac{1}{4}$	5
16	10.50	1.05	.42	160	14.00	1.40	1	$4\frac{1}{4}$	9

Packed 1 dozen in a pasteboard box.

Wall's Brazen Steel Bench Oiler

Used by machinists, steam fitters, etc., and is recognized as the most efficient oiler on the market. It is practically indestructible, heavily brazen throughout with hard spelter. Spout is steel, case-hardened at the point, and has large opening at body. Bottom is spring steel brazed to steel body. Spout and body are polished.

No.	Price per Dozen	Price Each	Capacity, Pints	Diameter, Body, Ins.	Length Spout, Ins.	Extra Spouts	
						Dozen	Each
204	\$5.00	\$0.50	$\frac{1}{4}$	$3\frac{3}{8}$	4	\$2.00	\$0.20
304	6.00	.60	$\frac{1}{2}$	$3\frac{3}{4}$	4	2.00	.20
306	6.50	.65	$\frac{1}{2}$	$3\frac{3}{4}$	6	2.50	.25
309	7.00	.70	$\frac{1}{2}$	$3\frac{3}{4}$	9	3.00	.30
404	7.00	.70	$\frac{3}{4}$	$4\frac{1}{8}$	4	2.00	.20
406	7.50	.75	$\frac{3}{4}$	$4\frac{1}{8}$	6	2.50	.25
409	8.00	.80	$\frac{3}{4}$	$4\frac{1}{8}$	9	3.00	.30
504	8.00	.80	1	$4\frac{3}{8}$	4	2.00	.20
506	8.50	.85	1	$4\frac{3}{8}$	6	2.50	.25
509	9.00	.90	1	$4\frac{3}{8}$	9	3.00	.30

All 4, 6 and 9-inch spouts are interchangeable. Spouts 6 inches and longer furnished bent unless straight are specified.



Malleable Iron Oilers

Made with malleable iron body, spring brass bottom and sheet steel spout. Painted with rust proof bronze paint.

Number	Diameter of Body, Inches	Length of Spout, Inches	Price per Dozen	Price Each
1	$3\frac{1}{4}$	3	\$3.60	\$0.36
2	$3\frac{3}{8}$	3	4.00	.40
3	$3\frac{3}{8}$	3	4.40	.44

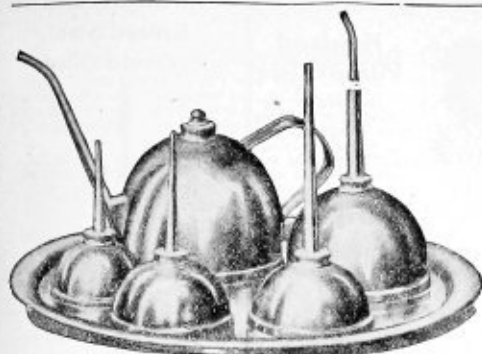
Zinc Oilers

With Double Seamed Bottoms

Seamless tank, soldered spring bottom, threaded straight spout, seamed and soldered. Not recommended for constant or rough usage.

No.	Capacity, Ounces	Price per Dozen	Price Each	Diameter of Body, Inches	Length of Spout, Inches
00	$\frac{3}{4}$	\$1.20	\$0.12	$2\frac{1}{8}$	$2\frac{1}{8}$
0	$1\frac{1}{4}$	1.50	.15	$2\frac{1}{8}$	$2\frac{1}{8}$
1	2	1.80	.18	$2\frac{5}{8}$	$2\frac{1}{8}$
$1\frac{1}{2}$	3	2.10	.21	$2\frac{7}{8}$	3
2	4	2.40	.24	$3\frac{3}{8}$	$4\frac{1}{8}$
3	$6\frac{1}{2}$	2.70	.27	$3\frac{3}{4}$	$4\frac{1}{8}$
4	$8\frac{1}{2}$	3.30	.33	$4\frac{1}{8}$	5
5	11	4.20	.42	$4\frac{1}{2}$	5
6	14	5.40	.54	$4\frac{7}{8}$	5





Steel and Brass Engineers' Sets

- No. C30.** Coppered steel. 5 pieces, including 1 No. 210 filler, 1 each Nos. 12, 13 and 14 oilers and 1 12-inch round tray. Price per set..... \$5.00
- No. 30.** Brass. Exactly the same as No. C30, except oilers and tray are brass. Price per set..... \$6.00
- No. C40.** Coppered steel. 6 pieces, including 1 No. 210 filler, 1 each Nos. 12, 13, 13A and 16 oilers, and 1 13½-inch tray. Price per set..... \$7.00
- No. 40.** Brass. Exactly the same as No. C40, except oilers and tray are brass. Price per set..... \$9.00
- No. C35.** Coppered steel. Exactly the same as No. C30, except with oval tray. Price per set..... \$7.00
- No. 35.** Brass. Exactly the same as No. 30, except with oval tray. Price per set..... \$8.00
- No. C45.** Coppered steel. Exactly the same as No. C40, except with oval tray. Price per set..... \$10.00
- No. 45.** Brass. Exactly the same as No. 40, except with oval tray. Price per set..... \$11.00

Brazed Steel Pyramid Torch



Used in factories, foundries, machine shops, rolling mills, blast furnaces, mines, construction work and by railroads. Made of heavy steel, seams hard spelter brazed, extra heavy handle and screw top. This torch is very durable and will not leak.

No.	Price		Capacity, Pints
	Dozen	Each	
81	\$ 9.00	\$0.90	1
82	10.00	1.00	2
84	12.00	1.20	4

Coppered Steel Tallow Pot

Made of extra heavy stock, drawn seamless in one piece. Spout has large opening to deliver a large volume of oil. Filler cap is attached to handle by a chain.



Capacity, Quarts	Diam. Body, Inches	Height Body, Inches	Coppered Steel		
			No.	Price Dozen	Price Each
1	5	5	212	\$21.00	\$2.10
2	6	6	213	25.00	2.50

Inspectors' and Locomotive Torches



Nos. 27 and 28

Used extensively by railroads for inspecting locomotives, cars, etc. Made of cold rolled steel, copper plated, highly polished and lacquered. They are non-explosive and will burn any kind of oil.

No.	Price		Capacity, Pints	Diam., Inches	Height, Inches
	Dozen	Each			
26	\$12.00	\$1.20	1	2	15
27	12.00	1.20	1½	4½	4½
28	15.00	1.50	2½	5½	4½

Brazed Steel Locomotive or Engineers' Torch No. 110



This torch will be found thoroughly reliable for locomotive or stationary engineers' use. Made of steel. All seams brazed with hard spelter. No soft solder of any description is used.

Price per dozen..... \$10.00
Price each..... 1.00

Engineers' Fillers

Used for filling oil cups where frequent, heavy oiling is necessary. Made of extra heavy stock, drawn seamless in one piece. Spout has large opening, delivering a large volume of oil.



Capacity, Pints	Diam. Body, Ins.	Height Body, Ins.	Coppered Steel			All Brass		
			No.	Doz.	Each	No.	Doz.	Each
1	4¼	3½	19	\$14.00	\$1.40	190	\$22.00	\$2.20
1½	4¾	4	19A	17.00	1.70	200	30.00	3.00
2	5	5	210	20.00	2.00	201	34.00	3.40
4	6	6	211	24.00	2.40			

Steel Jacket Lamps



No. 20

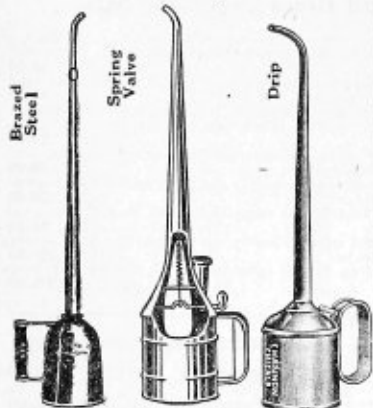


No. 22

Made from cold rolled steel, drawn seamless in one piece. Heavily copper plated. They will burn any kind of oil and are non-explosive.

No.	Price		Capacity	Diam., Inches	Style No.
	Dozen	Each			
20	\$ 6.00	\$0.60	5 oz.	3½	20
20½	9.00	.90	1½ pt.	3¾	20
21	12.00	1.20	1½ pt.	4½	20
22	9.00	.90	1	3¼	22
23	12.00	1.20	1½ pt.	4	22
24	16.00	1.60	1 qt.	4¾	22

Locomotive and Engineers' Oilers



Braze Steel Locomotive Oilier

Made entirely of steel. Is very strong and practically indestructible. All joints are brazed with hard spelter.

No.	Price Each	Diam. Body, Inches	Length Spout, Inches	Capacity, Pints
164	\$1.70	4 1/2	12	2
166	1.80	4 1/2	23	2

Extra Spouts—12-in., straight, each \$0.30
23-in., bent, each55

Spring Valve Locomotive Oilers

Made of XXX charcoal tin with double seam bottoms. Is extra strong and durable. The spring valve in spout prevents leakage when accidentally knocked over, etc., and is easily operated by the thumb.

No.	Price Each	Length Spout, Ins.	Cap., Pints	Hght., Ins.	Width, Ins.
1	\$1.75	24 1/4	3	32	4 1/4
3	1.65	20 3/4	2	27	3 3/4
5	1.60	14	2	21	3 3/4

Engineers' Tin Drip Oilers

Made from tin having a bright finish. Spouts are fastened to the oiler by a boss, thus giving double strength to the connection.

No.	Price Doz.	Price Each	Cap., Pints	Diam., Ins.	Lght., Spout
62	\$3.75	\$0.38	1	3	8
72	4.25	.43	1 1/2	4	14
82	4.75	.48	2	4	16

Railroad or Long Spout Oilers
Coppered Steel

Drawn seamless in two parts from 20-gauge cold rolled steel heavily copper plated inside and out; highly polished solid brass spout with union connection so that spout can be pointed in any direction.

No.	Price per Dozen	Price Each	Extra Spouts, Each	Diameter Body, Inches	Height Body, Inches	Length Spout, Inches	Capacity, Pints
10	\$14.00	\$1.40	\$0.60	3 3/4	5	12	1
11	18.00	1.80	.70	4 1/2	6	18	2
*101	18.00	1.80	.60	4 1/2	6	12	2
*111	20.00	2.00	.90	5	8	10 or 14	4

*The spouts on these sizes are extra large, measuring 1 1/2 inches at base.



Howland Pump Oilers

Especially designed for machinery oiling, such as overhead bearings and all places not easily reached with a common oiler. Pump mechanism, being always in oil, never loses its priming, while lo-

cation of plunger is most convenient, being directly under thumb, working with a downward pressure. Has union spout connection, which enables spout to be adjusted to any position.



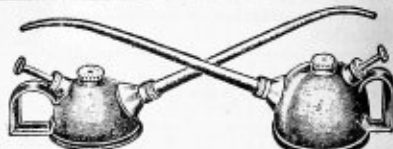
Capacity, Pints	No.	Tin Each	Diam. of Body, Inches	Length of Spout, Inches
3/2	300	\$1.55	3	6
1	302	1.75	3	10
1 1/2	303	2.20	4	12
2	305	2.45	4	16

Capacity, Pints	No.	Copper Plated Each	Diam. of Body, Inches	Length of Spout, Inches
3/2	400	\$2.30	3	6
1	402	2.50	3	10
1 1/2	403	2.55	4	12
2	405	3.25	4	16

Capacity, Pints	No.	Brass Each	Diam. of Body, Inches	Length of Spout, Inches
3/2	500	\$2.70	3	6
1	502	3.05	3	10
1 1/2	503	3.50	4	12
2	505	3.95	4	16

Auto Pump Oilers

These oilers are specially adapted for automobile, motor boat and stationary engine use. Body of oiler is made from 20-gauge stock, seamless and in one piece. Has union spout connection, which enables the user to adjust spout to any position. Equipped with the Howland pump, having two valves working automatically, which deliver oil to the bearings in a drop or spoonful at one stroke of the plunger, depending upon length of stroke.



Capacity, Pints	Diameter, Ins.	Length Spout, Ins.	Copperized No.	Price Each	Brass No.	Price Each
3/2	3 3/4	3	800	\$2.30	900	\$2.85
1	3 3/4	5	801	2.35	910	2.90
1 1/2	3 3/4	9	802	2.40	902	2.95
2	4 1/2	5	803	2.55	903	3.15
2	4 1/2	9	804	2.60	904	3.20

Braze Steel Pyramid Oilers



Made of heavy steel and brazed with hard solder. A brazed vent controls the flow of oil. Made for rough handling in mines, shops, etc., as well as for outdoor service on tractors, road rollers, etc. All sizes of spouts are interchangeable.

No.	30	31	32
Cap., pints.	1	2	4
Lght., spout 8 in.	10	10	12 in.
Price, doz.	\$9.00	\$10.00	\$12.00
Price each.	.90	1.00	1.20

Extra Spouts

Length, Ins.	8	10	12
Price each.	\$0.25	\$0.30	\$0.35

Brass

Made of brass, highly polished and lacquered; same construction throughout as the coppered steel.

No.	Price per Dozen	Price Each	Extra Spouts, Each	Diameter Body, Inches	Height Body, Inches	Length Spout, Inches	Capacity, Pints
17	\$18.00	\$1.80	\$0.65	3 3/4	5	12	1
18	21.00	2.10	.75	4 1/2	6	18	2
18A	24.00	2.40	.95	5	8	10 or 14	4

Gasoline and Oil are cheaper if bought in large quantities. Use "Channon's Steel Barrels".

Drawn Metal Compression Grease Cups

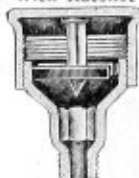
Grease cups drawn from rolled sheet metal are superior in many respects to the ordinary cup made from castings. They are lighter and better than cast cups of the same capacity, there being no excess weight of metal where it is not needed; at the same time drawn cups are very strong and rigid. The metal is dense and uniform, breakage and leakage due to spongy metal and sand holes are unknown and breakage of the threaded shank is eliminated. We offer a full and complete line.

Plain Grease Cups, Steel or Brass

Type A

Number	Inside Diameter, Inches	Capacity, Ounces	Regular Pipe Thread	Weight per Hundred	Price Each	Add for Ratchet Net Each
00	1	$\frac{1}{2}$	$\frac{1}{4}$	12.5	\$0.70	\$0.03
0	1 $\frac{1}{4}$	1	$\frac{1}{2}$	17.8	.90	.03
1	1 $\frac{1}{2}$	1 $\frac{1}{2}$	$\frac{3}{4}$	27.75	1.15	.04
2	2	2	1	42.7	1.50	.04
3	2 $\frac{1}{2}$	3 $\frac{1}{2}$	$\frac{1}{2}$	80	2.15	.05
4	3	5	$\frac{1}{2}$	107	2.90	.06

With Ratchet



Marine Compression Grease Cups, Steel or Brass

Type C

This type is particularly suited for use on marine engines and other machinery where it is desirable to feed grease to the bearings at certain intervals or where the grease must be forced some distance.

Number	Inside Diam., In.	Capacity, Ounces	Pipe Thread	Weight per Hundred	Price Each	
					Brass	Steel
00	1	$\frac{1}{2}$	$\frac{1}{4}$	23	\$1.00	\$0.80
0	1 $\frac{1}{4}$	1	$\frac{1}{2}$	38	1.20	.95
1	1 $\frac{1}{2}$	1 $\frac{1}{2}$	$\frac{3}{4}$	54	1.60	1.15
2	2	2	1	99	2.00	1.35
3	2 $\frac{1}{2}$	3	$\frac{1}{2}$	125	2.80	1.75
4	3	5	$\frac{1}{2}$	187	3.75	2.25

Interior



Spring Compression Grease Cups, Steel or Brass

Type E

This cup is of the automatic type in which the grease is fed by spring pressure.

Number	Inside Diam., In.	Capacity, Ounces	Pipe Thread	Weight per Hundred	Price Each	
					Brass	Steel
00	1	$\frac{1}{2}$	$\frac{1}{4}$	23	\$1.50	\$1.30
0	1 $\frac{1}{4}$	1	$\frac{1}{2}$	38	2.00	1.50
1	1 $\frac{1}{2}$	1 $\frac{1}{2}$	$\frac{3}{4}$	54	2.50	1.75
2	2	2	1	99	3.20	2.00
3	2 $\frac{1}{2}$	3	$\frac{1}{2}$	125	4.30	2.75
4	3	5	$\frac{1}{2}$	187	5.60	3.60

Interior



Powell Patent Compression Grease Cups

Renown

Colonial

Coin and Bruno



For finish, workmanship and elegance of design, Powell grease cups are not excelled by any other on the market. They are made from heavy castings, of the best brass and are finely finished and polished. Nickel plated cups can be furnished at additional price.

Renown

Number	00	0	1	2	3	4
Inside diameter	1	1 $\frac{1}{4}$	1 $\frac{1}{2}$	2	2 $\frac{1}{2}$	3
Capacity, ounces	$\frac{1}{2}$	1	1 $\frac{1}{2}$	3	4 $\frac{1}{2}$	9
Pipe thread	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$
Price each	\$1.50	\$2.00	\$2.50	\$3.20	\$4.30	\$6.00

Colonial

Number	00	0	1	2	3	4
Inside diameter	1	1 $\frac{1}{4}$	1 $\frac{1}{2}$	2	2 $\frac{1}{2}$	3
Capacity, ounces	$\frac{1}{2}$	1	1 $\frac{1}{2}$	3	4 $\frac{1}{2}$	10
Pipe thread	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$
Price each	\$1.00	\$1.20	\$1.60	\$2.00	\$2.80	\$4.00

Coin and Bruno

Number	00	0	1	2	3
Inside diameter	1	1 $\frac{1}{4}$	1 $\frac{1}{2}$	2	2 $\frac{1}{2}$
Capacity, ounces	$\frac{1}{2}$	1	1 $\frac{1}{2}$	3	4 $\frac{1}{2}$
Pipe thread	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$
Coin, price each	\$1.75	\$2.10	\$2.45	\$2.80	\$4.20
Bruno, price each	.85	.95	1.00	1.05	2.10

$\frac{1}{4}$ -inch pipe thread furnished on Bruno cups.
Bruno cups are all iron.

Lunkenheimer Compression Grease Cups

Tiger

Primo



The Tiger grease cup is cast brass, heavy and substantial being provided with spring lock and leather washer, making it well adapted for jarring machinery. The Primo is an all steel cup provided with spring and ratchet as shown in illustration.

Number	00	0	1	2	3	4
Inside diameter	$\frac{1}{8}$	$\frac{1}{4}$	1 $\frac{1}{4}$	1 $\frac{1}{2}$	2 $\frac{1}{4}$	2 $\frac{3}{4}$
Capacity, ounces	$\frac{1}{8}$	$\frac{1}{4}$	1	2	3 $\frac{1}{2}$	5
Pipe thread	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{1}{2}$
Weight, pounds	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	1 $\frac{1}{2}$	2
Tiger, finished	\$0.70	\$0.90	\$1.15	\$1.50	\$2.15	\$3.30
Tiger, rough	.56	.74	.96	1.28	1.76	3.20
Primo, each	.50	.65	.80	1.25	.....	.....

Midget Compression Brass Grease Cups

Made especially for automobiles.

Number	.....	0000	000	0	1
Hgt. over all in.	1 $\frac{1}{4}$	1 $\frac{1}{4}$	2	2 $\frac{1}{2}$	3
Diam. hex. in.	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{1}{2}$	1 $\frac{1}{4}$	1 $\frac{1}{2}$
Diam. cap. in.	$\frac{3}{8}$	1 $\frac{1}{4}$	1 $\frac{1}{4}$	1 $\frac{1}{4}$	1 $\frac{1}{4}$
Capacity, oz.	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{1}{2}$	1
Shank Thread in.	$\frac{1}{8}$ -32	$\frac{1}{4}$ P	$\frac{1}{2}$ P	$\frac{1}{2}$ P	$\frac{1}{2}$ P
Price	.....	\$0.87	\$1.12	\$1.50	\$2.00 \$2.60



Miscellaneous Glass Body Engine and Machine Oilers

Glass Body Oil Cups



Type A



Type B



Type C

These oil cups are all made with metal parts of cast (not pressed or spun) brass, with highly polished finish. They are correctly designed, strong and substantially constructed, and simple in operation. Type A Snap lever sight feed. Type B Plain with sight feed. Type C Plain with blind feed.

When ordering, always state which type is wanted, otherwise Type A will be furnished.

Number	0	1	2	3	4	5
O. Diam. of Glass	1 1/4	1 1/2	2	2 1/4	2 3/4	3
Height of Glass	1 1/2	1 3/4	1 3/4	2 1/4	2 3/4	3
Capacity, ozs.	1	1	2 1/2	4	5	10
Pipe Thread, in.	1/4	1/4	1/4	1/4	1/4	1/4
Type A, each	\$3.00	\$3.25	\$3.75	\$4.25	\$5.25	\$7.25
Type B, each	1.25	1.50	2.10	2.55	3.15	\$3.90
Type C, each	.80	1.00	1.50	1.90	2.40	3.10

Powell Glass Body Oil Cups



Pilgrim

The Signal oiler is one of the best known of its type on the market. When it is desired to shut off the oil it is only necessary to turn down the snap lever. This does not interfere with the adjustment, and when snap lever is again turned up the flow of oil is resumed.

When the Pilgrim is used it is necessary to reset the feed each time the oil has been shut off.



Signal

Number	00	0	1	2	3	4	5
O. Diam. of Glass	1	1 1/4	1 1/2	2	2 1/4	2 3/4	3
Height of Glass	1 1/2	1 3/4	1 3/4	1 3/4	2 1/4	2 3/4	3
Capacity, ounces	1/2	1	1 1/2	2 1/2	4	5	10
Pipe thread, inches	1/4	1/4	1/4	1/4	1/4	1/4	1/4
Pilgrim, Each	\$0.75	\$0.80	\$1.00	\$1.50	\$1.90	\$2.40	\$3.10
Signal, Each	1.70	1.90	2.10	2.50	2.80	3.60	5.00

Lunkenheimer Glass Body Oil Cups



Pioneer



Sentinel



Royal

Number	0	1	2	3	4	5
O. Diam. of Glass	1 1/4	1 1/2	2	2 1/4	2 3/4	3
Height of Glass	1 1/2	1 3/4	1 3/4	2 1/4	2 3/4	3
Capacity, ozs.	1	1	2 1/2	4	5	10
Pipe Thread, in.	1/4	1/4	1/4	1/4	1/4	1/4
Pioneer, Each	\$0.80	\$1.00	\$1.50	\$1.90	\$2.40	\$3.10
Sentinel, Each	3.00	3.25	3.75	4.25	5.25	7.25
Royal, Each	1.25	1.50	2.10	2.55	3.15	3.90

"Safety" Crank Pin Plunger Oiler

With Double Feed and Automatic Shut-off.



This cup has two feeds, a positive force feed from bottom of cup and a splash feed from top through the hollow plunger. Cup does not require shutting off when engine is stopped, as the plunger seats at bottom of cup and oil will not feed when engine is not running. Stroke of plunger is adjustable.



Number	0	1	1 1/2	2	3	4
O. Diam. of Glass	1 1/4	1 1/2	1 3/4	2	2 1/4	2 3/4
Height of Glass	1 1/2	1 3/4	1 3/4	1 3/4	2 1/4	2 3/4
Capacity, ozs.	1	1	1 1/2	2 1/2	4	5
Pipe Thread, in.	1/4	1/4	1/4	1/4	1/4	1/4
Price, Each	\$1.50	\$1.75	\$2.00	\$2.50	\$3.00	\$4.00

Pressed Brass Oil Cups



Style 60

These cups have greater capacity than cast cups. No. 60 has screw top, while No. 76 is of the same construction, style and capacity, but has spring lid, making it convenient to fill.

Made in three sizes—1/4, 1/2, 1 1/4 inch. Plain finish with 1/8 or 1/4 inch pipe threads.



Style 76

No.	Diam. Body	Height	Pipe Thread	Per 100
00	1/4	1 1/4	1/8	\$25.00
0	1/4	1 1/2	1/8	30.00
1	1/4	1 3/4	1/8	35.00
2	1/2	2	1/4	40.00
3	1 1/4	2 1/8	1/4	60.00
4	1 1/2	2 1/2	1/4	90.00

Plain Brass Oil Cups

These Oil Cups are heavy cast brass, full polished finish. Screw top, with clean cut threads.

Number	00	0	1	2	3	4
Diam., in.	1/4	1/4	1/4	1/4	1 1/4	1 1/2
Pipe Thd., in.	1/4	1/4	1/4	1/4	1/4	1/4
Price, ea.	\$0.25	\$0.50	\$0.35	\$0.40	\$0.50	\$0.60
Number	00	0	1	2	3	4
Diam., inches	1 1/4	1 1/2	2	2 1/4	2 3/4	3
Pipe Thread	1/4	1/4	1/4	1/4	1/4	1/4
Price, Each	\$0.90	\$1.25	\$1.75	\$2.25	\$2.75	



Self Closing Oil Hole Covers

Dust Proof, Nickel Plated Finish



No.	Size of Body	Size of Thread	Price Per 100
0	1/4	10x32	\$ 7.00
1	1/4	1 1/4 x32	7.00
2	1/2	5/16 x32	9.50
3	3/8	3/8 x24	10.70
4	7/16	7/16 x24	12.50
5	1 1/2	1 1/2 x24	15.00

* Also 1/8" pipe thread. † Also 1/4" pipe thread. Sizes 0 to 3 packed 100 in a box; larger sizes, 50 in box. Prices are for full boxes.

Brass Loose Pulley Oilers

Oiler is attached to hub of pulley. It is easily filled and regulated to feed from two to three weeks and feeds only when pulley is in motion.

No.	Outside Diameter	Capacity, Ounces	Pipe Thread	Price Each
00	1 1/8	1/4	1/8	\$0.20
0	1 1/4	1/2	1/8	.25
1	1 1/2	3/4	1/8	.30
2	1 3/4	1	1/8	.40
3	1 3/4	1 1/4	1/8	.50
4	2	1 3/4	1/8	.65
5	2 1/4	2 1/4	1/8	.85



Gas Engine and Air Compressor Lubricators

Standard Sight Feed Lubricator

For Gas and Gasoline Engines and Air Compressors.

This type of lubricator is intended for use on large gas engines and other places where a strong, substantial oil is required.

The feed regulation is obtained by a snap lever device which also starts and stops the flow of oil without changing the feed. The pressure is regulated by the valve in the shank.

Illustration shows lubricator with gauge glass, but the $\frac{1}{4}$ pint and $\frac{3}{8}$ pint are furnished with sight feed only.



Capacity, pints.....	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{3}{8}$	$\frac{1}{4}$	$\frac{2}{8}$
Pipe thread.....	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{3}{4}$
Price, each.....	\$7.30	\$7.60	\$8.20	\$11.00	\$15.40

Bull's Eye Sight Feed Lubricator

This lubricator is neat in design, strongly made of the best steam metal and highly polished. It is extremely simple in construction and is therefore easy to operate and keep in repair. Its action is positive and the rate of feed is under perfect control at all times. The filler opening is large and by closing lower valve, lubricator can be filled while engine or air compressor is running. The sight feed glasses can be easily replaced.



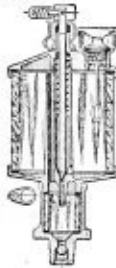
Price, per pair.....	\$0.50				
Number.....	2	3	4	5	6
Capacity, Pints.....	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{3}{4}$
Pipe thread.....	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{3}{4}$
Price each.....	\$5.00	\$5.00	\$8.00	\$12.00	\$15.00

Glass Body Gas Engine Lubricator

The special feature of this lubricator is the pressure equalizer. This is a drilled passage leading from the base of the oiler to the area above the oil. It will be noticed from the sectional view that the equalizer is not a separate tube soldered on to the bottom of the cup, which may be shaken off by vibration or become bent.

Attention is also called to the improved filler hole which is larger than usual and makes filling easy.

The metal parts are made from the best brass (cast) and are highly polished.



Number.....	1	2	3	4	5	6	7
O. D. of glass.....	$1\frac{1}{4}$	2	$2\frac{1}{4}$	$2\frac{1}{4}$	$3\frac{1}{4}$	$3\frac{1}{2}$	$4\frac{1}{4}$
Capacity, ozs.....	$1\frac{1}{2}$	$2\frac{1}{2}$	4	6	10	Pint	Quart
Pipe thread.....	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$
Price, each.....	\$2.00	\$2.20	\$2.75	\$3.20	\$4.20	\$5.40	\$10.40

Swift Sight Feed Lubricators

Swift Lubricators are perhaps the most simple automatic steam cylinder oilers made. They will feed any kind of oil perfectly. Will feed one drop of oil per second to one drop per minute. Each is thoroughly tested before leaving the factory.



Class F. D. C.	Price, Each	Class F. S. C.
Capacity, pts.....	$\frac{1}{4}$ $\frac{1}{2}$ 1	$\frac{1}{4}$ $\frac{1}{2}$ 1
Class F. D. C.	\$2.75 \$3.00 \$3.25 \$4.65 \$5.40 \$6.15	
Class F. S. C.	\$3.50 \$3.75 \$4.00 \$6.00 \$6.75 \$7.50	
Extra Sight Feed Glasses		
No. 2— $\frac{1}{4}$ in. diam. Per doz., including washers.....	\$1.20	
No. 3—1.....	1.50	

Plain Cylinder Lubricators

The plain lubricator with cock and tube (Type A) is especially serviceable on small steam cylinders which need a regular and constant supply of oil such as on steam hoists, pumps, small compressors, etc. It will deliver oil as long as there is steam in cylinder and oil in lubricator.



Number.....	1	2	3	4	5	6
Diam. In.....	$1\frac{1}{4}$	$1\frac{1}{4}$	2	$2\frac{1}{4}$	$2\frac{1}{4}$	3
Capacity, ozs.....	$1\frac{1}{2}$	$1\frac{1}{2}$	$2\frac{1}{2}$	4	5	10
Pipe thread.....	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$
Type A, each.....	\$3.40	\$3.60	\$3.90	\$4.25	\$4.75	\$5.75
Type B, each.....	2.40	2.60	2.90	3.25	3.75	4.75
State whether Type A or Type B is wanted.						

Crystal Bull's Eye Sight Feed Lubricator

This lubricator operates practically the same as the sight feed lubricator shown above. The glass body, however, shows at a glance the amount of oil in the reservoir.

Number.....	1	2	2
O. D. of Glass, In.....	$1\frac{1}{2}$	2	$2\frac{1}{2}$
Height of Glass, In.....	$1\frac{1}{2}$	$1\frac{1}{2}$	$2\frac{1}{2}$
Capacity, ozs.....	$1\frac{1}{2}$	$2\frac{1}{2}$	4
Pipe thread.....	$\frac{1}{2}$	$\frac{3}{8}$	$\frac{3}{8}$
Price each.....	\$4.00	\$5.00	\$6.00
Number.....	4	5	6
O. D. of Glass, In.....	$2\frac{1}{2}$	$3\frac{1}{2}$	$3\frac{1}{2}$
Height of Glass, In.....	$2\frac{1}{2}$	3	4
Capacity, oz.....	5	10	Pint
Pipe thread.....	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{1}{2}$
Price each.....	\$8.00	\$10.00	\$12.00



Lunkenheimer Patent Drip and Sight Feed Valves

Oiling Devices for Engine and Machinery Bearings.



Fig. 499



Fig. 690



Fig. 500

Cross Drip Valve Straight Dip Valve Angle Drip Valve



Fig. 699



Fig. 593



Fig. 965

Cross Sight Feed Straight Sight Feed Corner Sight Feed Valve, with Union Valve, with Union Valve, with Union

Size, In.....	$\frac{1}{4}$ $\frac{1}{2}$ $\frac{3}{4}$ 1			
Fig. 499—Cross Drip Valve.....	\$1.50	\$1.60		
" 690—Straight Dip Valve.....	1.25	1.40		
" 500—Angle Drip Valve.....	1.25	1.40		
" 689—Cross Sight Feed Valve with Union.....	2.50	3.70		
" 593—Straight Sight Feed Valve with Union.....	2.50	3.50		
" 965—Corner Sight Feed Valve with Union.....	2.50	3.70		

Mechanical Force Feed Lubricators

The Hanson Force Feed Lubricator



Simple in construction and positive in action. Adapted for hard, rough service and outdoor work. Weather conditions do not affect its action and it will feed any kind of oil. Operated from any moving part of engine (valve motion usually the most convenient). Entirely automatic; starts and stops with engine and requires no attention except to refill oil reservoir. When reservoir is emptied, lubricator is disconnected and alarm bell rings. Body is made of brass. Gears and ratchet are accurately cut insuring smoothness

of operation and durability. All parts are interchangeable. Oil capacity $1\frac{1}{2}$ pints.

Price each, complete..... \$19.00

Manzel Force Feed Lubricators

Supplies oil regularly and positively in harmony with speed of engine. Feed is constantly in sight and is easily and accurately adjusted, each feed being regulated separately. Not affected by temperature. Glass reservoir is extra heavy and oil in it is always visible. Sight feed glass is not under pressure. All metal parts are heavy brass and nickel plated. Furnished with ratchet mechanism on right or left side.



Capacity.....	$\frac{1}{2}$ pt.	1 pt.	2 pts.	3 pts.	5 pts.	1 gal.
1 feed.....	\$16.00	\$20.00	\$25.00	\$30.00	\$35.00	\$40.00
2 feed.....	25.00	30.00	35.00	40.00	45.00	50.00
3 feed.....			45.00	50.00	60.00	70.00
4 feed.....					80.00	90.00

Prices on other sizes up to 6 feed on application.

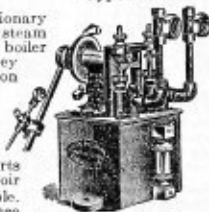
Hills-McCanna Force Feed Lubricators

Type G. B.



Used on marine, stationary or traction engines, steam shovels, elevator and boiler feed pumps, etc. They are made without friction gears, belt pulleys or intricate parts to get out of order. Pump is operated by a positive action ratchet. All moving parts are outside of reservoir and easily accessible. Equipped with gauge

Type M. B.



glass and sight feed. Feed is easily regulated with a thumb nut without stopping pump. Made in two styles: Glass body with single feed only and metal body with any number of feeds.

Type G. B. 1 pint, 1 feed. Price..... \$16.00

Type G. B. 1 quart, 1 feed. Price..... 25.00

No. of feeds.....	1	2	3	4	5
1 pint.....	\$20.00	\$30.00			
1 quart.....	30.00	40.00			
$\frac{1}{2}$ gallon.....	35.00	45.00	\$55.00		
1 gallon.....	45.00	55.00	65.00	\$75.00	
$1\frac{1}{2}$ gallon.....	55.00	65.00	75.00	85.00	\$95.00
2 gallon.....	70.00	80.00	90.00	100.00	115.00

Madison-Kipp Force Feed Lubricator

Model 50. Valveless, Sight Feed

For steam or gas engines, excavating machinery, air compressors, steam drop hammers, steam pumps, traction engines, grain separators, etc.

The new Model 50 is designed to meet every demand. It has no valves and will force oil in any temperature and against any pressure up to 2,000 pounds.

The tank is made of sheet steel, dirt and waterproof. All working parts are inside tank and work in oil. Oil gauge glass shows the amount of oil in tank at all times.



Oil gauge glass shows the

Single blind feed traction engine lubricator..... \$10.00

No. of feeds.....	1	2	3	4	5	6
Capacity, pints.....	5	$5\frac{1}{2}$	$5\frac{1}{2}$	6	$6\frac{1}{2}$	7
Weight, pounds.....	20	23	24	26	28	32
Price each.....	\$12.00	\$17.00	\$22.00	\$28.00	\$34.00	\$40.00

No. of feeds.....	7	8	9	10	11	12
Capacity, pints.....	$8\frac{1}{2}$	9	$9\frac{1}{2}$	10	$10\frac{1}{2}$	11
Weight, pounds.....	34	37	39	42	45	48
Price each.....	\$46.00	\$53.00	\$59.00	\$66.00	\$73.00	\$80.00

Manzel Single Sight Feed-Traction Engine Oil Pump

Can be furnished in right or left hand pumps which are the same, excepting that the ratchet wheels are on opposite sides.

If not positive whether a right or left hand pump is needed, send name or cut of engine and we will furnish pump to fit.

Right hand pumps finished in black are furnished unless otherwise specified.



Price, Black Finish

1 pint.....	\$10.00	1 quart.....	\$11.00
-------------	---------	--------------	---------

Price, Nickel Plated

1 pint.....	\$12.00	1 quart.....	\$13.00
-------------	---------	--------------	---------

McCord Force Feed Lubricators

McCord Force Feed Lubricators insure the positive delivery of just the right quantity of clean oil to just the right spot at just the right time and in perfect synchronism with the engines or machines they are lubricating. Interior mechanism is easily accessible; all working parts are of the best drop forged steel, case hardened, and are constantly running in oil, reducing wear to a minimum.



Class B. Phantom View Showing Interior Mechanism.

Number.....	1	2	3	4	5	6
Capacity, quarts.....	1	1	2	2	2	2
No. of feeds.....	1	2	1	2	3	4
Price, each.....	\$25.00	\$30.00	\$28.00	\$35.00	\$42.00	\$49.00

Number.....	7	8	9	10	11	12
Capacity, quarts.....	4	4	4	4	4	4
No. of feeds.....	1	2	3	4	5	6
Price, each.....	\$33.00	\$39.00	\$45.00	\$51.00	\$57.00	\$63.00

Prices include check valve for each feed and connecting head for attaching drive rod.

We can furnish Mechanical Force Feed Lubricators to meet any conditions.

Nugent's Patented Oil Filter With or Without Automatic Water Separator

The primary object of the Nugent oil filter is to provide the best known filtering elements which are convenient, simple, effective, interchangeable, get-at-able, and removable without interfering with its continuous operation or with a single pipe, fitting, bolt or valve. Simply open a door and turn on the electric light.

There are no mysterious passages for the oil to travel through. There are no partitions to complicate the cleaning operation. Wool, waste, excelsior, bone black, charcoal or felts cannot stop up the needle point sight feed valves and oil cups.

We don't claim to refine the oil and make it better than new. We guarantee to take out that which has gotten into it, viz.: dirt, grit and water. By so doing the oil is saved and cleaned and may be used over and over again, effecting a saving of fully 80%.

Removing the Filtering Bags for Washing

This operation does not interfere with the filtration process or a single pipe connection. Simply open the door, turn on the electric light and swing around the dirty set of bags which will stop automatically in front of the door and directly below the blank drip. It is not necessary to remove the bag from its respective ring for washing or cleaning. Wash bags in gasoline, benzine, kerosene or hot water.

No. 0 filter is cylindrical the total height.

Nos. 1, 2, 3 filters are rectangular like cut.

Nos. 4, 5, 6 filters have cylindrical top and rectangular base.

No.	Without Automatic Water Separator	With Automatic Water Separator	Filtering Capacity, Gallons per 24 Hours
0	\$ 46.00	\$ 56.00	96
1	70.00	80.00	96
2	105.00	120.00	144
3	160.00	180.00	288
4	208.00	224.00	432
5	360.00	380.00	720
6	620.00	570.00	1000

Larger sizes quoted upon application.

Oil Filters

For Filtering All Grades of Lubricating Oils

Cross Oil Filter

We recommend this style filter for filtering engine and common machinery oils.

The No. 2 size can be used with economy in connection with steam engines as small as thirty horsepower, or with gas and gasoline engines as small as twenty horsepower.

For garage use, this filter will reclaim all the wasted high priced lubricating oils which are drained from automobiles.

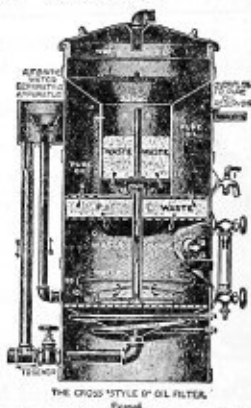
Made of extra heavy, galvanized iron, all joints soldered, lapped and riveted;

neatly painted, polished brass fittings and bosses, and nickel plated rim.

Cross "Style B" Oil Filter

This filter is guaranteed to separate water automatically from waste oil and at the same time to clean the oil so that it can be used over and over again. It will also take the condensed water and oil from oil separators and exhaust heads and successfully separate the cylinder oil from the water and filter the oil perfectly. This reclaimed oil will make an excellent lubricant for pumps and other machinery, but would not recommend it for re-use in the cylinder of an engine.

In ordering the Style "B," it is advisable to state the exact requirements and conditions under which the filter is to be operated.



No.	Capacity per Day of 24 Hours, Gallons	Price Each
1	20 to 30	\$ 59.00
2	5 to 10	39.00
3	40 to 50	120.00
4	50 to 60	150.00
5	70 to 90	180.00
6	100 to 120	220.00

No.	Capacity per Day of 24 Hours, Gallons	Price Each
1	20 to 30	\$ 80.00
2	5 to 10	50.00
3	40 to 50	140.00
4	50 to 60	180.00
5	70 to 90	220.00
6	100 to 120	260.00

For larger size filters than above we recommend the Burt unit type.

American Oil Filter.—Recommended for cleaning lard, cylinder crank-case and other grades of heavy oils. It is the ideal filter for use with gas or steam engines. This filter can also be equipped to reclaim dirty gasoline without extra charge. Prices on "American" are same as "Cross."

Write for special descriptive catalog.

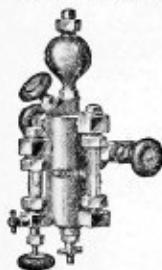
Detroit and Michigan Lubricators

We carry in stock for immediate shipment both "Michigan" and "Detroit" steam lubricators. They are exactly the same in construction and are interchangeable, repair parts for Michigan Lubricators fitting Detroit Lubricators of the same pattern and vice versa. In ordering state distinctly whether Detroit or Michigan Lubricators are wanted, otherwise we will use our own judgment.

Repair parts for all of these lubricators can be furnished promptly.

Detroit "Improved Standard" and Michigan "Cyclone"

Sight Feed Lubricators—Double Connection



This type of lubricator is for use on all kinds of reciprocating steam engines, steam pumps, etc., and is intended for general service. The heating channel which passes through the body from the support arm to the upper sight feed arm is filled with steam at all times the lubricator is in operation, so that the oil is maintained at an even temperature and there is no fluctuation in the rate of feed. The heat keeps the oil in a thoroughly liquid condition and the lubricators will, therefore, feed the heaviest oil freely and regularly even in the coldest weather. The lower sight feed arm is provided with a drain stem for blowing out or draining sight feed glass. The pipe thread on support arm is $\frac{1}{2}$ inch on all sizes except the 4 and 8 pint, on which it is $\frac{3}{4}$ inch.

Capacity, Pints	Detroit Imp. Std., Each	Michigan Cyclone, Each	For Cylinder, Diam., Ins.	Approx. Weight, Pounds
$\frac{1}{4}$	\$11.60	\$ 8.30	Up to 10	8
$\frac{1}{2}$	12.20	9.20	10-12	9
1	16.90	12.70	12-18	12
2	22.80	17.10	18-30	14
4	33.50	25.90	30 and up	26
8	43.00	33.00		29

Detroit "Improved Standard" and Michigan "Cyclone"

Lubricator with Bracket



For engines in which there is considerable vibration as on steam shovels, hoisting equipment and steam hammers. The bracket support is not affected by the vibration which often breaks the ordinary type of lubricator arm. Made extra heavy with rough body and finished trimmings. Especially adapted for the exacting service demanded by this class of engines.

Capacity, pints.....	$\frac{1}{2}$	1	2
Detroit.....	\$14.50	\$18.80	\$24.60
Michigan.....	10.50	14.20	18.70

Detroit "Zero" and Michigan "Giant"

Double Connection Lubricators



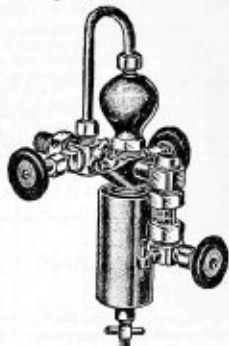
Zero and Giant Lubricators are for use in outdoor service, particularly in exposed places subject to low temperatures. The Zero Lubricator is made in two styles. Style A is for installation with both connections between boiler and throttle. Style C is designed to take steam above throttle and deliver oil below throttle either into steam pipe or directly into steam chest. Style A always furnished unless Style C is ordered.

Price Each

Capacity, pints.....	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	1	2
Pipe thread.....	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{1}{2}$
Detroit Zero.....	\$8.20	\$8.90	\$10.20	\$14.20	\$19.90
Michigan Giant.....	6.30	7.50	8.60	11.80	16.20

Detroit "Improved Standard" and Michigan "Rural"

Sight Feed Lubricators—Single Connection

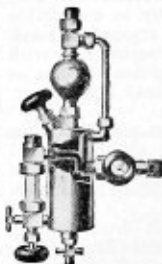


The single connection lubricators are very simple in their general construction to the double connection, except their design is modified to make them single connection style. They are intended for the same general use as the double connection type where the latter type cannot be installed because the arrangement of the equipment. Wherever possible, however, we advise the use of a double connection lubricator in preference to the single connection type because any lubricator with two connections to the steam pipe has better condensation and consequently better feeding qualities. In the $\frac{1}{2}$, $\frac{3}{4}$ and 1-pint sizes the filler and upper gauge arm are combined, eliminating the gauge.

Capacity, Pints	Detroit Imp. Std., Each	Michigan Rural, Each	Pipe Thd. on Support Arm	Approx. Weight, Pounds
$\frac{1}{4}$	\$10.90	\$ 8.30	$\frac{1}{2}$	8 $\frac{1}{2}$
$\frac{1}{2}$	11.70	9.00	$\frac{1}{2}$	8 $\frac{3}{4}$
$\frac{3}{4}$	13.20	10.00	$\frac{1}{2}$	8 $\frac{3}{4}$
1	17.90	13.40	$\frac{1}{2}$	12
2	23.60	18.20	$\frac{1}{2}$	18

"Detroit" and "Michigan"

Cylinder Grease Lubricator



For feeding grease lubricants to the cylinders of steam engines.

To insure a uniform lubrication it is necessary to keep the grease in a liquid state. To accomplish this the lubricator has a large internal heating surface, the heat being supplied by a current of live steam which passes on to the cylinder. There is no loss of heat units and no accumulation of water.

Capacity.....	$\frac{1}{2}$ Pt.	Pint	Qt.	2 Qts.
Detroit.....	\$15.80	\$21.90	\$28.70	\$37.30
Michigan.....	14.50	19.00	28.50	

Detroit "Zero" and Michigan "Giant"

Single Connection Lubricators



The single connection Zero and Giant lubricators are intended for the same service as the double connection type in places where the arrangement of the equipment does not permit the installation of a double connection lubricator. Their construction includes an automatic oil heating arrangement whereby the oil is always kept hot and a regular feed of oil is thus assured when the engine is exposed to cold weather.

Price Each

Capacity, pints.....	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	1	2
Pipe thread.....	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{1}{2}$
Detroit Zero.....	\$9.50	\$10.20	\$11.80	\$15.70	\$21.50
Michigan Giant.....	7.20	7.60	8.80	11.90	16.50

Repair parts for all these lubricators can be furnished promptly.

Brass Air Cocks

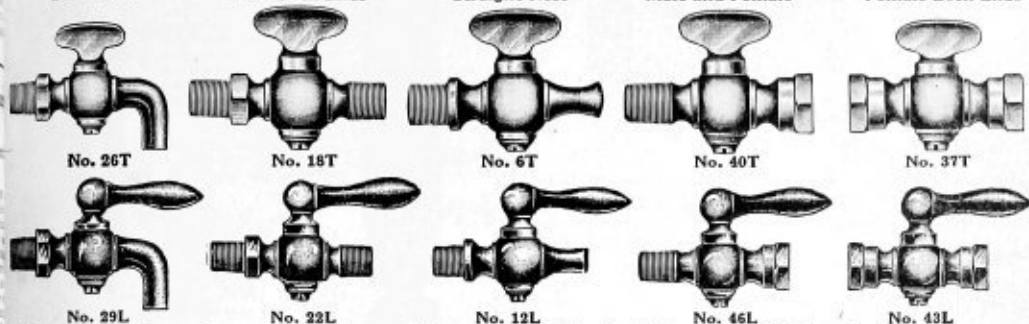
Bibb Nose

Male Both Ends

Straight Nose

Male and Female

Female Both Ends



When ordering, always give number and size wanted. The letter "T" signifies T Handle and "L" Lever Handle.

Number	26T	18T	6T	40T	37T	29L	22L	12L	46L	43L
1/2 inch, each	\$0.70	\$0.55	\$0.40	\$0.75	\$0.65	\$0.85	\$0.70	\$0.55	\$0.90	\$0.80
3/4 inch, each	.80	.65	.45	.80	.70	.95	.80	.60	.95	.85
1 inch, each	.90	.75	.50	.90	.85	1.05	.90	.65	1.05	1.00
1 1/2 inch, each	1.00	.90	.60	1.05	1.10	1.15	1.05	.75	1.20	1.25

Steam Gauge Cocks

Male and Female

Female Both Ends

With Union



Furnished with T handle (as shown) or lever handle.

Style	Lever Handle	T Handle
No. 79	\$0.90	\$0.95
No. 80	.90	.95
No. 81	2.00	1.25

Lunkenheimer Cylinder Cocks

For Traction Engines

No. 470



No. 975 with Union

Short Shank

Shank pipe thread	1/4	1/2	3/4	1	1 1/2
No. 975. Price each	\$1.70	\$1.80	\$1.95	\$2.90	\$5.30
No. 470. Price each	.75	.85	1.30	1.80	2.25
No. 471. Price each	.90	1.00	1.40	2.00	2.50

Compression Gauge Cocks



No. 1 Without Stuffing Box

No. 2 with Stuffing Box

Shank pipe thread, inches	1/4	1/2	3/4
No. 1. Price each	\$0.95	\$1.00	\$1.25
No. 2. Price each	1.20	1.30	1.45

No. 1 furnished unless No. 2 is ordered.

Mississippi Gauge Cocks



No. 738

Size, iron pipe thread, inches	1/4	1/2	3/4
Price, each	\$0.90	\$1.20	\$1.80

The Mississippi Gauge Cocks are recommended for steam working pressures up to 175 pounds.



Weighted Gauge Cock

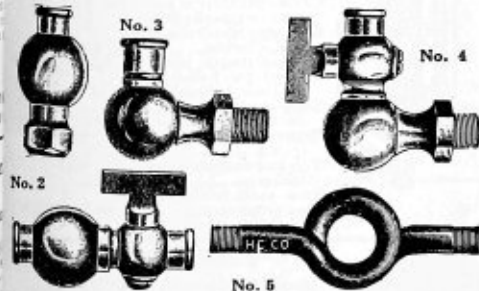
Iron pipe thread	1/4	1/2	3/4
Price, each	\$0.50	\$0.55	\$0.60

Steam Gauge Siphons

No. 1

No. 3

No. 4

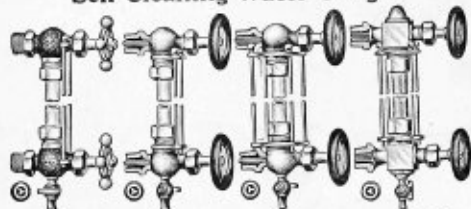


No. 5

A siphon should always be used in connecting a steam gauge. Before connecting gauge, fill the siphon with water. This will prevent the steam from coming into contact with spring of gauge. No steam gauge is warranted unless connected with siphon. Standard pipe connection, 1/4 inch.

No. 1. Straight siphon, without cock, price each	\$1.00
No. 2. Straight siphon, with cock, price each	1.50
No. 3. Elbow siphon, without cock, price each	1.25
No. 4. Elbow siphon, with cock, price each	1.50
No. 5. Common iron pipe siphon, price each	.50

Self Cleaning Water Gauges



Nos. 2, 3, 3½ Nos. 8, 9, 10 Nos. 12, 14 Nos. 16, 17

Our line of water gauges is very complete, affording a wide range for selection. They are all made from the best steam metal and differ only in size and finish. The prices given below are for complete gauges, including two valves, glass and guard rods.

No.	Price Each	Size Shank, Inches	Style of Body	No. of Rods	Size of Glass
2	\$2.75	3/8	Bronzed	2	6x10
3	3.00	3/8	Bronzed	2	6x12
3½	4.50	3/8	Bronzed	2	6x16
8	3.75	1/2	Polished	2	6x12
9	4.25	1/2	Polished	2	6x12
10	5.50	1/2	Polished	2	6x16
12	5.25	1/2	Polished	4	6x12
14	6.00	1/2	Polished	4	6x16
16	6.00	1/2	Polished	4	6x12
17	8.00	1/2	Polished	4	6x16



Chain Lever Water Gauges

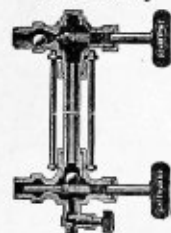
Made with extra large, square body, and heavy packing nuts. Steam can be shut off quickly if glass breaks. Intended for use on large boilers where water column is located very high. Horizontal position of levers indicates gauge is open to boiler. When right hand levers are drawn down 45° gauge blows down, and when vertical gauge closes and drains. Any length glass to 20-inch furnished.

No. 53. Glass 6x12 inches, shank, 1/2 inch. Price each.....\$18.00

No. 54. Glass 6x16 inches, shank 3/4 inch. Price each.....\$20.00

Longer glass furnished if required.

Penberthy "Safeguard" Water Gauge



A high grade, square body, water gauge constructed so that when a gauge glass breaks the lower valve closes absolutely tight against the boiler, preventing release of scalding water, as is the case where ordinary gauges are used. The lower valve is made in such a way that it will not close automatically unless the glass breaks.

Operates perfectly on any pressure. No springs are used and no adjustments of any kind are necessary.

Number	Price	Size Shank	Size Glass
1	\$5.00	3/8 or 1/2	6x12
2	6.50	3/8	6x16

Longer glass furnished at additional charge.

Gauge Glass Washers



Gilbert's self packing gauge glass protectors shown in the right hand illustration are packed 1 dozen in a box, except the 1-inch size, which is packed 6 in a box.

Size, inches	1/2	3/8	5/8
Round flanges, per dozen	\$0.20	\$0.20	\$0.20
Square flange, per dozen	.20	.20	.20
Gilbert's per box	1.50	1.50	1.50

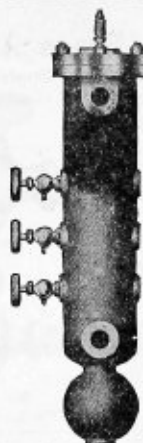


Fig. 142

Eclipse Safety Water Column

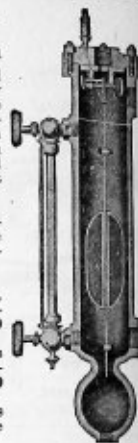
For both high and low water alarm. They have few intricate parts and are absolutely reliable. Made with any variation between alarms, and adapted for either right or left hand.

All parts are attached to top flange and can be easily removed.

No. 1. Medium, glass 12-in., with trimmings.....\$30.00

No. 2. Large, glass 15-inch, with trimmings.....\$35.00

In ordering always state boiler pressure carried.



Combination Water and Steam Gauge

Number	1	2
Center to center of boiler connections, inches...	10	12½
Center to center of water gauge connections, ins.	10	12½
Center to center of gauge cocks, inches.....	3¾	3¾
Extreme length, inches...	13¾	16¾
Tapped for boiler connections, inches.....	¾	¾
Tapped for water gauge connections, inches...	¾	¾
Tapped for gauge cocks, inches.....	¾	¾
Top and bottom tapped, inches.....	¾	¾
Price each, bodies only, no trimmings.....	\$2.75	\$4.00



Number	3	4
Center to center of boiler connections, inches...	14	18
Center to center of water gauge connections, ins.	14	18
Center to center of gauge cocks, inches.....	4¼	6
Extreme length, inches...	18¾	23¾
Tapped for boiler connections, inches.....	1	1¾
Tapped for water gauge connections, inches...	¾	¾
Tapped for gauge cocks, inches.....	¾	¾
Top and bottom tapped, inches.....	¾	1¾
Price each, bodies only, no trimmings.....	\$6.00	\$8.00

Fusible Plugs



Extra Long

Made of bronze, filled with pure Banca tin, fulfilling U. S. Government specifications. To be inserted so the small end of Banca tin is exposed to the fire.

Outside plugs furnished unless otherwise specified.



Regular Length

Size, inches	¾	¾	1
Regular	\$0.60	\$0.75	\$1.00
Extra length	1.75	2.00	3.50

Glass Body Oil Pump



Fig. 800

Used as an auxiliary to the usual sight feed lubricator service of an engine, and is intended for emergencies to supply oil quickly to the cylinder. It has a union shank connection, which is quite convenient in attaching, it being unnecessary to dismantle the pump to get it in place.

Size number.....	1	1½	2	3
Outside diameter of glass, ins.	2¼	3	3½	4½
Height of glass, inches.....	2½	3	4	5
Capacity, pints.....	¾	1½	1½	2
Pipe thread of shank.....	¾	1	1½	1½
Price, brass, each.....	\$7.50	\$8.50	\$10.00	\$15.00
Price, nickel plated, each.....	8.00	9.50	11.00	16.50

Hand Cylinder Oil Pumps

Brass—With Screw Top



Are used as auxiliaries to sight feed lubricators on stationary and marine engines. We supply gauge strainers at a nominal price, which insures clean oil.

Number	Capacity, Pint	Connection, Inch	Size Bowl	Price Each
500	¾	¾	2¼x2¼	\$3.50
501	1½	1	2¼x2¼	5.00
502	1	¾	3½x3½	7.50



Plain

For lubricating one or several steam engines from one reservoir of any desired capacity. Plain type is for high pressure. Equalizing type for compound engines. Pipe thread ½-inch. Plain. Price each.....\$6.00
Equalizing. Price each.....6.50



Dynamo and Motor Oil Gauges



The oil gauges shown here are improvements over the old style, being simple in construction and easily taken apart and cleaned. The shield is a slotted brass tube making the oil visible at all times.

Number.....	0	1	2	3
Size pipe thread, inches.....	¾	1	1½	2
Height, inches.....	2½	3½	3½	4½
Length shank, inches.....	1½	1½	2½	4½
Length of glass, inches.....	2	2½	3	4
Without drain cock, each.....	\$0.80	\$0.90	\$1.05	\$1.40
With drain cock, each.....	.90	1.00	1.15	1.55

Moncrieff Water Gauge Glasses

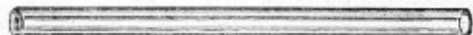


Suitable for use with steam pressures up to 200 pounds. The life of gauge glasses can be materially lengthened by careful packing. Glass should not be too large for glands; gauge corks should be perfectly true and steam turned on very slowly. Glasses run from ¼-inch to ½-inch under size. Packed ½ dozen glasses in a package.

Price per Dozen

Length, Inches	External Diameter, Inches			
	½ to ¾	¾	1	1½
10	\$ 3.00	\$ 3.60	\$ 5.04	\$ 6.12
11	3.24	3.96	5.64	6.72
12	3.60	4.32	6.12	7.32
13	3.84	4.80	6.60	7.92
14	4.20	5.16	7.08	8.52
15	4.44	5.52	7.56	9.12
16	4.80	5.88	8.16	9.72
17	5.04	6.24	8.64	10.32
18	5.40	6.60	9.12	10.92
19	5.64	7.08	9.60	11.52
20	6.00	7.44	10.20	12.12
22	6.60	8.16	11.16	13.44
24	7.20	8.88	12.12	14.64
30	9.00	11.16	15.24	18.24
36	10.80	13.44	18.24	21.96

Firma High Pressure Gauge Glasses



Can be safely used for the highest steam pressures and temperatures. Will not break when subjected to drafts or other sudden changes of temperature. Firma glass may be heated to 450 degrees F. and will not break when dropped vertically into cold water. ½ dozen in a package.

Length, ins.	10	11	12	13	14	15	16
½ and ¾.....	\$ 5.00	\$ 5.40	\$ 6.00	\$ 6.40	\$ 6.60	\$ 7.00	\$ 7.80
1.....	7.00	7.40	8.40	9.00	9.60	10.00	11.40
Length, ins.	17	18	19	20	22	24	30
½ and ¾.....	\$ 8.00	\$ 8.60	\$ 9.00	\$ 9.00	\$11.00	\$12.00	\$14.00
1.....	11.80	12.20	13.00	14.00	14.80	16.80	20.00

Cylindrical Oil Cup Glasses

Made of the best clear glass. Strong, uniform and have ground ends. The sizes given are used by all makers of standard oil cups.

Washers are made of a special cork and rubber compound.



O. D. of Glass Ins.	Hght. of Glass Ins.	Price Doz.	Cork Washers, Doz.	O. D. of Glass Ins.	Hght. of Glass Ins.	Price Doz.	Cork Washers, Doz.
¾	1	\$0.80	\$0.14	1¼	1½	\$1.32	\$0.30
1	1½	1.00	.14	2¼	1¾	1.44	.38
1¼	1	1.00	.15	2¼	2¼	1.68	.45
1¼	1	1.04	.15	2¼	2½	1.72	.45
1¼	1½	1.04	.15	2¼	2¾	1.76	.48
1¼	1¾	1.16	.18	2¾	2¾	1.80	.52
1¾	1¾	1.32	.18	2¾	2¾	2.40	.63
1¾	1¾	1.20	.22	3	3	2.88	.68
1¾	1¾	1.32	.30	3¼	4	4.00	.90

Gauge Glass Cutters



Wilkin's, \$2.70



Chesterton's, \$2.70



Favorite, \$0.50



Jelco, \$2.00

Extra cutter wheels for any of above, per dozen.....\$2.00

We can furnish glass tubes of any size for any purpose. Prices on application

Pressure, Vacuum and Altitude Gauges



Single Spring



Vacuum

Compound Pressure
and Vacuum

Hydraulic Gauge



Altitude

Our line of pressure and vacuum gauges has been greatly improved. The principal development lies in the improvement of the teeth of the gearing in the segment and pinion. The new development consists of a special design of long tooth of involute form, having a much longer arc of contact than the gearing usually furnished in gauges. All bearings are of large diameter and broad face. The bearing screws are German silver and working in phosphor bronze links or connections, give ideal bearing conditions, thus insuring maximum strength and durability. The pinion and segment staff are also German silver running in phosphor bronze bearing. The gauge spring is of special construction adopted after exhaustive experiments, and hydraulically tested before being shipped.

Single Spring Pressure or Vacuum Gauges

This type of gauge is intended for all service where there is no rapid fluctuation in pressure or external vibration, and the pressure medium will not deteriorate brass. The only difference in the construction between the vacuum and pressure gauge is the reversal of the tube spring causing the gauge to register inches of vacuum instead of pounds pressure. The price for either vacuum or pressure gauge is the same.

The standard graduation is 200 pounds, but 30, 100, 160, 250, and 300 can also be furnished from stock, and 500 and 1,000 to order. Vacuum gauge graduated for 30 inches.

The pipe connection is $\frac{1}{4}$ -inch male. A T-handle cock is furnished with all gauges to $6\frac{1}{4}$ -inch, and a union cock with larger sizes.

Size of Dial, Inches	Iron Case Brass Ring	Iron Case N. P. Ring	Brass Case	N. P. Case	Weight, Pounds
2	\$6.00	\$6.15	\$8.00	\$8.60	1
2½	6.00	6.15	8.00	8.60	1
3	6.00	6.15	8.00	8.60	2
3½	7.00	7.18	9.00	9.75	3
4½	8.00	8.20	10.00	11.00	4
5	8.00	8.20	11.00	12.00	5
5½	10.00	10.25	12.00	13.25	6
6	13.00	13.50	16.00	17.50	7
6½	16.00	16.60	20.00	22.00	8
8½	22.00	22.75	30.00	32.50	12
10	32.00	33.00	40.00	43.00	16
12	50.00	51.50	75.00	79.00	27

Compound Pressure and Vacuum Gauge

The perfect compound gauge, graduated by two mercury columns indicating both pressure and vacuum. In ordering state the maximum pressure.

Prices Including Cock

Size Dial, Inches	Iron Case, Japanned	Iron Case, N. P. Ring	Brass Case	N. P. Case
12	\$60.00	\$61.50	\$80.00	\$84.00
10	40.00	41.00	50.00	53.00
8½	30.00	30.75	40.00	42.50
6½	20.00	20.60	25.00	27.00
6	16.00	16.50	20.00	21.50
5½	14.00	14.25	16.00	17.25
4½	12.00	12.20	14.00	15.00
3½	10.00	10.18	12.00	12.75

Combination Water Pressure Gauge

For use in pumping stations to indicate the height in feet and corresponding pounds per square inch of water in reservoir or standpipe.

In ordering state the maximum pressure.

Prices are the same as for compound pressure and vacuum gauge shown immediately above.

Hydraulic Gauge

For pressures of from 500 to 20,000 pounds per square inch. Springs are made of heavy solid bar steel turned and bored to size.

Size Dial, Inches	Iron Case, Brass Ring	Iron Case, N. P. Ring	Brass Case	N. P. Case
12	\$110.00	\$111.50	\$125.00	\$129.00
10	90.00	91.00	100.00	103.00
8½	70.00	70.75	80.00	82.50
6½	50.00	50.60	60.00	62.00
6	35.00	35.50	40.00	41.50

For Pressures not Exceeding 2500 Pounds

Size Dial, Inches	Iron Case, Brass Ring	Iron Case, N. P. Ring	Brass Case	N. P. Case
5	\$30.00	\$30.50	\$35.00	\$36.00
4½	25.00	25.50	30.00	31.00

Double Spring Pressure Gauge

Designed for any pressure medium which will not deteriorate brass, and where the service is too severe for the single spring type. In the 8½, 10 and 12-inch sizes the movement is mounted on the socket independently of gauge back. Graduations on dial furnished for 100, 200, 250, 300 and 500 pounds, but 200 pounds is considered standard. Pipe connection $\frac{1}{4}$ -inch. T-handle cock furnished with sizes up to $6\frac{1}{4}$ -inch, inclusive, and union cock on larger sizes.

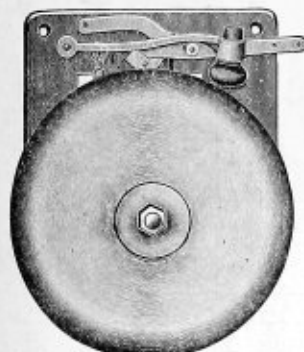
Size of Dial, Inches	Iron Case Brass Ring	Iron Case N. P. Ring	Brass Case	N. P. Case	Weight, Pounds
4½	\$10.00	\$10.20	\$12.00	\$13.00	4
5	11.00	11.20	13.00	14.00	5
5½	12.00	12.25	14.00	15.25	6
6	15.00	15.50	18.00	19.50	7
6½	18.00	18.60	22.00	24.00	8
8½	25.00	25.75	34.00	36.50	12
10	37.00	38.00	45.00	48.00	16
12	55.00	56.50	80.00	84.00	17

Altitude Gauge

For indicating the height of water in tanks, reservoirs, standpipes, heating systems, etc. The interior mechanism consists of a single spring standard geared movement. The standard graduation is for 70 feet of water, but special graduations from 50 to 1,150 feet can be made to order. The black hand indicates the head of water in feet and the red index hand can be set by the user at any desired point on the dial. The pipe connection is $\frac{1}{4}$ -inch male. Prices include a T-handle cock for sizes $4\frac{1}{2}$ to $6\frac{1}{4}$ -inch, inclusive; a small union cock for sizes $8\frac{1}{2}$ and 10-inch and a large union cock for 12-inch size.

Size of Dial, Inches	Iron Case Brass Ring	Iron Case N. P. Ring	Brass Case	N. P. Case	Weight, Pounds
3½	\$10.00	\$10.18	\$12.00	\$12.75	4
4½	12.00	12.20	14.00	15.00	4
5	12.00	12.20	14.00	15.00	5
5½	14.00	14.25	16.00	17.25	6
6	16.00	16.50	20.00	21.50	7
6½	20.00	20.60	25.00	27.00	8
8½	30.00	30.75	40.00	42.50	12
10	40.00	41.00	50.00	53.00	16
12	60.00	61.50	80.00	84.00	27

Trip Gong Bells Polished Brass



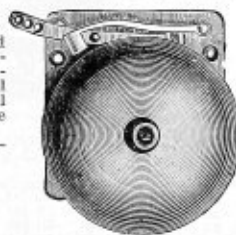
For use in schools, factories and stores or in any place where opening and closing hours must be indicated by signal. Also used extensively for fire alarm signals. It can be handily arranged to ring on different floors in unison. They are superior to the electric gongs because they are always ready for instant use, while the electric gongs are very uncertain. These gongs can be operated with up or down pull. Right hand sent unless otherwise specified, but the

left hand can be furnished upon request. Built substantially for hard usage and will not crack. Bells 10 inches or over have wooden hammers. Illustration shows right hand bell.

Diameter, Inches	Price Each	Diameter, Inches	Price Each
4	\$1.25	12	\$15.00
5	1.65	14	21.00
6	2.40	16	26.00
8	4.60	18	31.00
10	8.40		

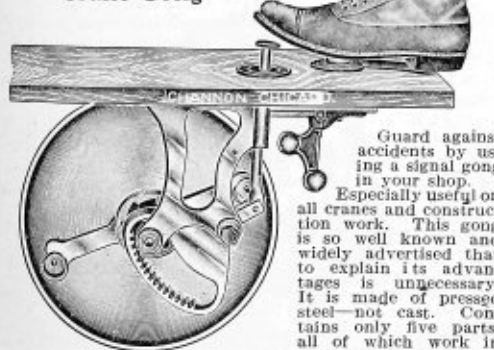
Steel Gong

All steel gong, nickel plated shell, japanned base and malleable attachments. Recommended for hard usage. Will not crack. Tone equal to bell metal. Ten-inch and over have wooden hammers.



Diam., Ins.	Price Each	Diam., Ins.	Price Each
5	\$1.20	10	\$3.60
6	1.80	12	6.00
8	2.40		

Crane Gong



Guard against accidents by using a signal gong in your shop. Especially useful on all cranes and construction work. This gong is so well known and widely advertised that to explain its advantages is unnecessary. It is made of pressed steel—not cast. Contains only five parts, all of which work in perfect union with an action as smooth as oil. Crane operators can indicate whether he intends to stop, go forward or backward—one ring for each pressure of foot on front push pin. In addition, another pin is provided which is responded to by thirty or forty loud clear rings. Saves many stuns and starts and leaves operator with both hands to run crane.

Price each, 12-inch.....	\$12.00
Price each, 14-inch.....	16.00

Brass Steam Whistles Common Steam Whistles



No. 5

These brass steam whistles are of the highest quality throughout in both material and workmanship. Made of seamless tubing, perfectly smooth on the inside and gives a good clear resonant sound. The length of the bell in all cases is twice the diameter. However if so ordered, we can furnish long bells three times the diameter or extra long bells $3\frac{1}{2}$ times the diameter. In ordering state diameter of bell and figure number.



No. 4

Dia. Bell	Size of Steam Pipe	Price Each		Dia. Bell	Size of Steam Pipe	Price Each	
		No. 5	No. 4			No. 5	No. 4
1	$\frac{3}{4}$	\$3.10	\$2.30	$3\frac{1}{2}$	1	\$11.50	\$ 9.50
$1\frac{1}{2}$	$\frac{3}{4}$	3.75	2.75	4	$1\frac{1}{2}$	15.00	12.00
$1\frac{1}{2}$	$\frac{3}{4}$	4.00	3.00	5	$1\frac{1}{2}$	22.50	19.00
2	$\frac{3}{4}$	5.50	4.35	6	2	33.00	24.00
$2\frac{1}{2}$	$\frac{3}{4}$	6.50	5.25	8	$2\frac{1}{2}$	95.00	70.00
3	1	8.50	7.25	10	3	225.00	175.00

Single Bell Chime Whistles



No. 1

Made of solid cast bronze and not built up with a web inside of a lap welded tube. Have high grade steel spindle and are exceptionally well made, durable and ornamental. Recommended for marine and stationary work, fire alarms, etc. For low pressure loosen acorn nut on top until whistle gives desired tone; for high pressure, vice versa.



No. 3

Diameter of Bell, Inches	Size of Steam Pipe, Inches	Price Each	
		No. 1 Without Valve	No. 3 With Valve
$1\frac{1}{2}$	$\frac{3}{4}$	\$ 4.50	\$ 6.00
2	$\frac{3}{4}$	5.00	7.00
$2\frac{1}{2}$	$\frac{3}{4}$	7.00	9.00
2	$\frac{3}{4}$	8.00	11.00
$3\frac{1}{2}$	1	11.00	15.00
4	$1\frac{1}{4}$	14.00	18.00
5	$1\frac{1}{2}$	22.00	28.00
6	$1\frac{1}{2}$	38.00	42.00
8	2	85.00	100.00

In ordering state diameter of bell and figure number.

Compound Balanced Bronze Whistle Valve

Size pipe thread, inches..... 2 $2\frac{1}{4}$ 3
Screwed Conn., price each..... \$36.00 \$45.00 \$63.00
One end each.
Screwed and flanged, price each 40.00 49.50 70.00
Flanged Conn., price each..... 44.00 54.00 77.00

Undoubtedly the best Compound Balanced Whistle Valve made. It does not depend entirely on the steam pressure to force valve open which is the case with most valves of this kind, as in case of piston sticking valve becomes inoperative.



Plain Brass Whistle Valves



No. 7860B

For steam working pressure up to 125 pounds.

Size, inches....	$\frac{3}{4}$	$1\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{2}$
Price each....	\$2.00	\$2.50	\$3.00	\$3.50	\$5.00
Size, inches....	$\frac{3}{4}$	2	$2\frac{1}{2}$	3	
Price each.....	6.00	9.00	18.00	27.00	

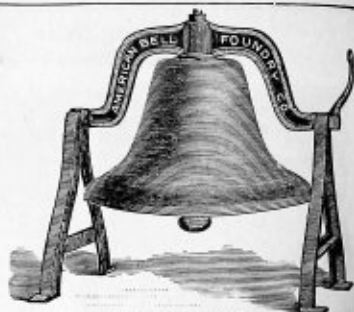
H.Channon Company Chicago



Style of
Nos. 1, 2, 3

Farm Bells

These Bells are made of "Silvery" Steel and have a remarkably clear tone which can be heard at a great distance and will not deteriorate with usage. The bell is bronze coated and will withstand the hard wear to which they are subject. All mountings are substantially made and japanned.



Style of No. 4

Number	1	2	3	4
Diameter, inches	15	17	19	20
Weight, complete, pounds	40	50	75	100
Price each	\$3.20	\$4.00	\$6.00	\$8.00

School Bells



Diam., Ins.	Weight Bell Complete, Pounds	Price Each	Diam., Ins.	Weight Bell Complete, Pounds	Price Each
20	160	\$16.00	26	345	\$40.00
22	210	20.00	28	420	50.00
24	265	25.00	30	520	60.00

Fire Alarm Bell



Price does not include wood frame

Diam., Inches	Weight Bell Complete, Pounds	Price Each	Diam., Inches	Weight Bell Complete, Pounds	Price Each
30	310	\$ 50.00	40	820	\$120.00
32	400	60.00	42	930	135.00
34	490	70.00	44	1075	150.00
36	580	80.00	46	1180	175.00
38	695	100.00	48	1460	200.00

Church Bells



Diam., Ins.	Weight Bell Complete, Pounds	Price Each	Diam., Ins.	Weight Bell Complete, Pounds	Price Each
30	540	\$ 65.00	40	1270	\$150.00
32	610	75.00	42	1380	165.00
34	745	90.00	44	1585	200.00
36	910	110.00	46	1710	225.00
38	1020	125.00	48	2100	250.00

Fire Alarm Bell



Diam., Inches	Weight Bell Complete, Pounds	Price Each	Diam., Inches	Weight Bell Complete, Pounds	Price Each
30	530	\$ 70.00	40	1200	\$155.00
32	620	80.00	42	1395	180.00
34	700	95.00	44	1560	205.00
36	845	115.00	46	1720	230.00
38	1000	135.00	48	2015	260.00

Penberthy Automatic Injector

The Penberthy Automatic Injector has been on the market for over a quarter of a century and is favorably known by steam users the world over. The standard pattern shown here is designed to cover 85 per cent of conditions under which injectors are used.

Size	Price	Horse Power Based on Ordinary Tub. Boiler	Horse Power Based on 30 lbs. Water per H. P. per Hour	Pipe Conn. Inches	Capacity per Hour, 1 to 3 ft. Lift, 60 to 110 lbs. Steam Pres.		Shipping Weight Pounds
					Maximum gallons	Minimum gallons	
O	\$15.00	3 to 6	4 to 8	1/4	60	35	2 1/4
OO	16.00	4 to 8	6 to 12	3/8	80	45	2 3/4
AA	18.00	8 to 16	10 to 20	1/2	135	70	3 1/2
B	25.00	12 to 22	15 to 30	3/4	180	100	3 3/4
BB	30.00	17 to 32	22 to 45	1	260	140	5 1/2
C	40.00	20 to 45	25 to 60	1 1/4	360	180	5 3/4
CC	48.00	40 to 65	45 to 80	1 1/2	475	250	8
D	55.00	45 to 80	50 to 100	1 3/4	600	325	8
DD	60.00	50 to 100	60 to 135	1 3/4	800	425	12
E	75.00	75 to 135	85 to 165	1 3/4	1,000	525	12
EE	90.00	100 to 180	125 to 235	1 1/2	1,400	740	25
F	110.00	115 to 255	150 to 320	1 1/2	1,900	850	25
FF	125.00	160 to 320	200 to 400	2	2,400	1,275	37
G	150.00	200 to 400	250 to 500	2	3,000	1,000	39
GG	200.00	300 to 500	325 to 600	2 1/2	3,600	1,875	75
		375 to 600	400 to 750	2 1/2	4,200	2,150	75

Repair Parts for Penberthy Automatic Injector

When ordering repair parts give name or letter indicating the part, the size, and serial number of injector, which is stamped on the body.

Size of Injector	O or OO	A or AA	B or BB	C or CC	D or DD	E	EE	F	FF	G or GG
R—Steam Jet.....	\$0.25	\$0.35	\$0.45	\$0.55	\$0.65	\$0.75	\$0.75	\$0.85	\$1.00	\$2.00
S—Suction Jet.....	.25	.35	.45	.55	.65	.75	.75	.85	1.00	2.00
Y—Delivery Jet.....	1.25	1.50	2.00	2.50	3.00	3.75	4.50	5.50	6.50	9.00
X—Coupling Nut.....	.25	.30	.40	.50	.60	1.25	1.25	1.50	1.50	2.00
V—Tail Pipe.....	.25	.30	.40	.50	.60	.80	.80	1.00	1.00	1.25
Z—Overflow Cap.....	.30	.40	.50	.60	.70	.80	.80	.90	.90	1.50
P—Overflow Valve.....	.40	.50	.60	.75	.90	1.00	1.10	1.25	1.25	1.75
N—Overflow Hinge.....	.10	.10	.15	.15	.15	.20	.20	.20	.20	.30
O—Plug.....	.60	.80	1.00	1.25	1.50	1.75	1.75	2.00	2.00	4.00
Strainer.....	.40	.45	.60	.55	.60	.75	.75	1.00	1.00	1.50

Penberthy Auto-Positive Injector

Automatic and Restarting. For High Pressures and Hot Water Supply

While a large majority of boilers carry less than 150 pounds steam pressure, the usual high pressure of the ordinary automatic injector, there is an increased demand for an injector operating between 150 and 200 pounds pressure. There is also a demand for an injector that will handle a water supply that has become heated by the use of the siphon (or ejector) and in other ways, and is consequently too hot for injectors of the usual automatic type. The "Auto-Positive" injector is especially designed to meet these demands.

This injector differs materially from any other automatic injector ever before placed on the market, being constructed on new principles, having but five working parts, and combining the features of a positive with those of an automatic injector. By this combination it is possible to handle much hotter water and work on higher steam pressures than any other automatic injector. It will handle a hot water supply as follows, from a head:

Temperature 135° to 140° Fahr. at 75 to 100 pounds steam pressure.
 Temperature 130° to 135° Fahr. at 50 to 120 pounds steam pressure.
 Temperature 118° to 120° Fahr. at 25 to 150 pounds steam pressure.
 Temperature 98° to 100° Fahr. at 18 to 175 pounds steam pressure.

No.	Price Each	Horse Power Allow. 7 1/2 to 8 gals. per H. P. per Hr.	Size of All Pipe Connections	Capacity per Hour, 75 to 125 Lbs. Steam 3 ft. Lift, Gals.		Shipping Weight, Pounds
				Maximum	Minimum	
112	\$18.00	5 to 15	3/4	120	40	5
113	20.00	7 to 25	1	200	60	6 1/2
115	30.00	16 to 50	3/4	400	130	9
117	45.00	28 to 85	1	675	225	13 1/4
119	60.00	47 to 145	1 1/4	1,125	375	20
121	90.00	87 to 265	1 1/2	2,000	700	30 1/2
123	125.00	125 to 400	2	3,000	1,000	50 1/2
125	200.00	200 to 600	2 1/4	4,200	1,500	80



H.Channon Company Chicago

Chicago Automatic Injector



The Chicago Automatic Injector is one of the simplest on the market, compact and clean cut in design, and efficient in operation. It consists of but three tubes, the body or shell, one check valve and a bushing. All of these parts are held in place by screw threaded joints and cannot drop out and become lost. Owing to the extreme simplicity of its construction, the Chicago is very easy to clean and repair. Both steam jet and forcing tube may be removed by the use of a monkey-wrench, and

when cleaning becomes necessary it may be accomplished without breaking any pipe joints or removing injector from boiler, and without the aid of special wrenches by simply removing the bottom cap.

The table of capacities given below is based on the following conditions: Steam 80 to 100 pounds; lift 1 to 3 feet; feed water 76°F.

Size No.	Price Each	All Pipe Connections, Inches	Capacity Gallons per Hour, Maximum	Horse Power Based on Ordinary Tubular Boiler	Approx. Weight, Pounds
00	\$ 16.00	3/4	80	4 to 11	4
0	18.00	1	135	10 to 19	4
1	20.00	1 1/4	180	15 to 24	5 1/2
2	25.00	1 3/4	260	18 to 34	7
3	30.00	2	355	20 to 47	9
4	40.00	2 1/4	475	40 to 64	9
5	45.00	2 1/2	600	45 to 80	9
6	55.00	2 3/4	800	55 to 106	13
7	60.00	3	1000	75 to 134	13
8	75.00	3 1/4	1400	100 to 181	23
9	90.00	3 1/2	1900	115 to 254	23
10	110.00	3 3/4	2400	150 to 320	52
11	125.00	4	3000	190 to 400	52
12	150.00	4 1/4	3600	275 to 480	85
13	180.00	4 1/2	4200	375 to 560	85
14	200.00	4 3/4	4500	400 to 600	85

U. S. Automatic Injector

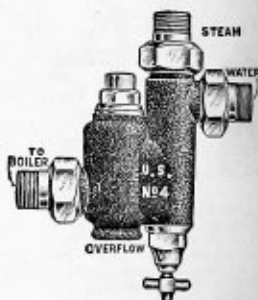
Size	Price	Pipe Connection	Horse Power Based on 30 Lbs. Water per H. P. per Hour	Capacity Gallons per Hour	
				Max.	Min.
00	\$ 13.00	1/4	1 to 4	36	20
0	14.00	3/8	4 to 8	65	35
1	16.00	1/2	6 to 12	90	55
2	18.00	3/4	10 to 20	135	65
3	20.00	1	15 to 30	180	100
4	25.00	1 1/4	22 to 45	266	140
5	30.00	1 1/2	25 to 60	355	170
6	40.00	1 3/4	45 to 80	475	300
7	45.00	2	50 to 100	600	350
8	55.00	2 1/4	60 to 135	800	425
9	60.00	2 1/2	85 to 165	1000	525
10	75.00	2 3/4	125 to 235	1400	800
11	90.00	3	150 to 320	1900	950
12	110.00	3 1/4	200 to 380	2400	1300
13	125.00	3 1/2	250 to 500	3000	1600
14	150.00	3 3/4	325 to 650	3600	2000
15	175.00	4	400 to 800	4000	2200
16	200.00	4 1/4	500 to 750	4500	2500

In every feature it is the equal of any injector made. It is easy to operate. Turning on steam starts the injector.

It is automatic with wide open suction at lower steam than any other. With throttled suction it is automatic at any pressure sufficient to enable injector to get the water. It works equally well as a lifting injector or as a non-lifter.

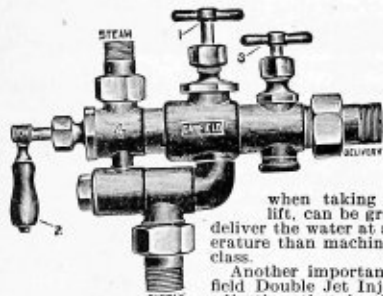
No amount of jarring can cause it to break. A traction or portable engine may be run over rocks and stumps or into ditches, but the U. S. will not stop working so long as the suction pipe or hose is under water.

A distinctive feature of the U. S. is the drip-cock which has many advantages such as draining the injector when not in use, preventing freezing, is always handy for drawing hot water, when injector is working, etc.



U. S. Injector

Garfield Double Jet Injector



The advantages of the Garfield Double Jet Injector over the ordinary single tube type lies in the fact that it will operate under a wider range of steam pressures, will give better results

when taking water from a long lift, can be graded closer, and will deliver the water at a much higher temperature than machines of the single tube class.

Another important feature of the Garfield Double Jet Injector is that it is self adjusting, that is, the higher the steam pressure under which it is working, the more water it will deliver. The Garfield is one of the simplest double tube injectors made, containing fewer working parts than any other machine of its class.

It is constructed of the best new metals by skilled mechanics and is thoroughly inspected and tested in actual service before leaving the factory.

The actual capacities exceed those listed and are fully equal to any injector of the same size, pipe connections and price.

The capacities given in the table below are based on the following conditions: Steam 80 to 100 pounds; lift 4 feet; feed water 76 degrees.

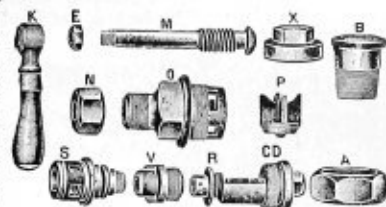
Size No.	Price Each	All Pipe Connections	Gals. per Hour	Horse Power	Wt., Lbs.
00	\$ 16.00	3/4	80	4 to 11	5
0	18.00	1	135	10 to 19	5
1	20.00	1 1/4	180	15 to 24	8
2	25.00	1 3/4	260	18 to 34	8
3	30.00	2	355	20 to 47	11
4	40.00	2 1/4	475	40 to 64	11
5	45.00	2 1/2	600	45 to 80	18
6	55.00	2 3/4	800	55 to 106	32
7	60.00	3	1000	75 to 134	32
8	75.00	3 1/4	1400	100 to 181	36
9	90.00	3 1/2	1900	115 to 254	36
10	110.00	3 3/4	2400	150 to 320	53
11	125.00	4	3000	190 to 400	53
12	150.00	4 1/4	3600	275 to 480	82
13	180.00	4 1/2	4200	375 to 560	82
14	200.00	4 3/4	4500	400 to 600	82

Model N Metropolitan Injector



Model N Metropolitan Injector

This is a self contained, automatic or restarting injector. It is operated entirely by one handle and does not require the manipulation of valves in the steam and suction pipes for different steam pressures, a feature which makes it particularly desirable where the injector is operated frequently. This result is obtained by a sliding steam nozzle. Furthermore the Model N is absolutely automatic and will restart after an interruption of



Repairs for Model N Injector

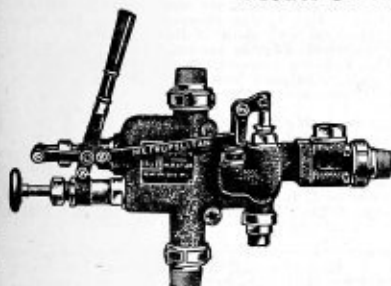
the water supply, and is, therefore, well adapted for service on traction or portable engines where the injector is subjected to severe jars. The capacities given in the table are for the pressure stated, cold feed water and with a two foot lift and in view of the fact that very high or very low steam pressure, increased lift or increased temperature of water supply decrease the capacity, allowances for these conditions of 30% have been made in the horsepower appearing in the table.

Size Number	Price Each	Size of all Pipe Connections Inches	Size of Overflow Inches	Capacity per Hour 80 lbs., Steam Pressure, 2-Ft. Lift Gallons	Horse Power According to Conditions	Shipping Weight Pounds
3	\$ 15.00			60	4 to 8	3 1/2
3 1/2	16.00			80	6 to 12	3 1/2
4	18.00			120	8 to 20	4
4 1/2	20.00			165	15 to 28	4
5	25.00			250	20 to 40	6 1/2
5 1/2	30.00			350	30 to 55	6 1/2
6	40.00	1	1 1/2	500	45 to 80	10
6 1/2	45.00	1	1 1/2	600	65 to 110	10
7	55.00	1	1 1/2	800	80 to 145	16 1/2
8	60.00	1	1 1/2	1000	100 to 180	16 1/2
10	75.00	1 1/2	2	1300	130 to 235	26 1/2
11	90.00	1 1/2	2	1750	170 to 300	26 1/2
12	110.00	1 1/2	2	2300	230 to 400	41
14	125.00	1 1/2	2	2850	300 to 500	41

Repairs for Model N Metropolitan Injector.

Size of Injector	2-3	3 1/2-4	5-6	7-8	9-10	11-12	13-14
S	\$1.50	\$1.70	\$2.00	\$2.50	\$3.75	\$5.00	\$7.00
V	.60	.70	.90	1.25	1.85	3.00	4.00
C-D-R	1.75	2.10	2.75	3.50	4.50	6.50	9.00
P	.25	.50	.75	1.00	1.25	1.75	2.50
O	1.00	1.25	1.50	2.25	3.50	5.00	7.00
M	.40	.55	.75	1.10	1.75	2.50	4.00
N	.30	.40	.50	.65	.80	1.00	1.25
K	.60	.70	.80	1.00	1.20	1.40	1.60
A	.60	.80	1.20	1.65	2.40	3.20	5.00
B	.40	.55	.80	1.20	1.70	2.40	3.40
X	.50	.75	1.00	1.25	1.75	2.25	3.00
E	.10	.10	.10	.15	.15	.15	.20
Jet Wrench	1.30	1.40	1.50	1.75	2.25	3.00	4.00

Model O Double Tube Metropolitan Injector

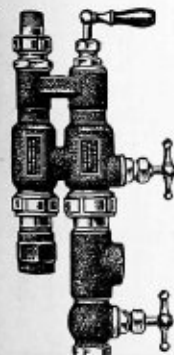


This injector will work with 20 to 250 lbs. pressure and will take feed water to 150 degrees. Lifts water 20 feet.

Size No.	Price Each	Size of all Pipe Connections Inches	Size Overflow or Waste Pipe Inches	Capacity per Hour 100 Lbs. Steam Pressure Gallons	Horse Power According to Conditions	Shipping Weight Pounds
2 1/2	\$ 18.00			135	8 to 20	20 1/2
3	20.00			180	15 to 28	20 1/2
4	25.00			260	20 to 40	20 1/2
5	30.00			365	30 to 55	20 1/2
6	40.00	1	1 1/2	525	45 to 80	28 1/2
8	45.00	1	1 1/2	625	65 to 110	28 1/2
9	55.00	1 1/2	1	835	80 to 145	46
10	60.00	1 1/2	1	1040	100 to 180	46
11	75.00	1 1/2	1 1/2	1350	130 to 235	60 1/2
12	90.00	1 1/2	1 1/2	1800	170 to 300	60 1/2
13	110.00	2	2	2350	230 to 400	89
14	125.00	2	2	2900	300 to 500	89
16	150.00	2 1/2	2 1/2	3600	375 to 650	120
17	200.00	2 1/2	2 1/2	4300	500 to 800	120
18	250.00	2 1/2	2 1/2	4900	650 to 975	181
20	300.00	2 1/2	2 1/2	5500	800 to 1250	181

The Hancock Inspirator

Stationary Type, for Stationary, Marine and Portable Boilers. Operates with high or low steam pressures on all lifts up to 25 feet. Repair parts can be supplied.



Size Number	Price Each	Horse Power		Pipe Connections, in.			Capacity, per Hour, with 60 Pounds Steam Pressure Gallons	Shipping Weight Pounds
		For the Ordinary Type of Boiler and Engine	On a Basis of 30 Pounds Evaporation per H. P. per Hour	Steam	Suction and Delivery	Overflow		
7 1/2	\$ 15.00	4 to 6	5 to 8				60	5
8	18.00	6 " 8	8 " 15				90	6
10	20.00	8 " 15	15 " 25				120	6
12 1/2	25.00	15 " 30	25 " 35				220	8 1/2
15	30.00	30 " 40	35 " 60				300	8 1/2
17 1/2	40.00	40 " 60	60 " 75				420	12 1/2
20	45.00	60 " 75	75 " 100				540	12 1/2
22 1/2	55.00	75 " 90	100 " 130	1	1	1	720	20 1/2
25	60.00	90 " 120	130 " 175	1	1 1/2	1 1/2	900	20 1/2
30	75.00	120 " 165	175 " 225	1 1/2	1 1/2	1 1/2	1,200	27 1/2
35	90.00	165 " 230	225 " 300	1 1/2	2	1 1/2	1,740	31
40	110.00	230 " 300	300 " 400	1 1/2	2 1/2	1 1/2	2,230	40 1/2
45	125.00	300 " 375	400 " 500	1 1/2	2 1/2	1 1/2	2,820	46
50	150.00	375 " 500	500 " 650	2	2 1/2	2	3,480	65
55	175.00	500 " 600	650 " 700	2	2 1/2	2	3,650	72

Repair Parts for Model O Injector and Hancock Inspirator can be supplied.

"XL-96" Improved Ejector

Syphon or Jet Pump. Lifts 20 to 25 feet. Elevates 50 to 75 feet



The lifting and elevating power is so combined in the "XL-96" Ejector as to make it one of the best devices of its kind. Other ejectors which will lift 20 feet will

elevate but 20 to 25 feet additional, and this only on very limited steam pressures, and it is therefore necessary to locate other injectors to within a few inches of the surface of the water and operate with excessive steam pressure if it is desired to transfer water any great distance vertically. Operated with 80 pounds of steam "XL-96" Ejectors will lift 25 feet and elevate 50 feet delivering 15 pounds of water per one pound of steam. Special ejectors of all kinds can be furnished.

Size No.	All Brass Price Each	Iron Body Brass Jets Price Each	Capacity 40 to 65 lbs. steam, 3 ft. lift, gals. per hour	Pipe Connection		Wght. lbs.
				Steam	Suction and Delivery	
1	\$ 8.00	.....	240	1	1	1
2	10.00	.....	500	1	1	1 1/2
3	15.00	.....	840	1	1 1/2	2 1/2
4	20.00	.....	1350	1	1 1/2	3 1/2
5	25.00	\$20.00	1950	1 1/2	1 1/2	5 1/2
6	35.00	27.50	3500	1 1/2	2 1/2	8 1/2
7	50.00	40.00	5700	2	2 1/2	12 1/2
8	70.00	50.00	8500	2 1/2	3 1/2	20 1/2
9	105.00	70.00	13800	3	4	33 1/2
10	145.00	95.00	18400	3 1/2	4 1/2	40 1/2

Sizes 5 and 6 will be furnished in all brass, unless ordered iron body, brass jets and steam connection. Sizes 7 to 10 will be furnished with iron body, brass jets and steam connection unless all brass is specified.

Ejectors or Steam Jet Pumps

Hancock

H. D. Model C.

H. D. Model P.

H. D. Drive Well



Hancock

This ejector is manufactured by the makers of the well known Hancock Inspirator. It will lift water 25 feet and elevate it 15 feet above the injector, when working with 60 pounds steam pressure.

Sizes 1, 2, 3 and 4 are made entirely of brass. Sizes 5, 6 and 7 have iron bodies with brass unions for steam and suction connections. Sizes 8, 9, 10 and 11 have iron bodies with brass union for steam connection only.

Size No.	Price Each	Pipe Connections		Capacity, Gals. per Hr. Steam Pressure 60 lbs.	Wght. lbs.
		Steam inches	Suction and Delivery inches		
1 Brass	\$ 8.00	1	1	244	1 1/2
2 Brass	10.00	1	1	550	1 1/2
3 Brass	15.00	1	1	977	2 1/2
4 Brass	20.00	1 1/2	1 1/2	1,525	3 1/2
5 Iron	25.00	1 1/2	1 1/2	2,200	6 1/2
6 Iron	35.00	1	2	3,900	10 1/2
7 Iron	45.00	1 1/2	2 1/2	6,000	18 1/2
8 Iron	55.00	1 1/2	3	8,800	23 1/2
9 Iron	70.00	2	4	15,600	41 1/2
10 Iron	110.00	2 1/2	5	24,000	67 1/2
11 Iron	160.00	3	6	35,000	105

Penberthy Noiseless Water Heater



The use of this heater does away with all noise such as otherwise occurs when heating a tank or barrel of water or other liquids with steam. Made without couplings or any loose parts.

Size No.	Price Each	Steam Pipe	Disch. Pipe	*Cap'ty	Weight
F	\$1.50	1	1	50 gal.	0 lb. 4 ozs.
G	1.75	1	1	60 gal.	0 lb. 8 ozs.
H	2.00	1	1	75 gal.	0 lb. 11 ozs.
J	2.50	1	1	100 gal.	0 lb. 12 ozs.
K	3.00	1	1 1/2	125 gal.	1 lb. 0 ozs.
L	4.00	1 1/2	1 1/2	175 gal.	1 lb. 4 ozs.
M	5.00	1 1/2	2	250 gal.	2 lbs. 0 ozs.
N	8.00	2	2 1/2	500 gal.	3 lbs. 3 ozs.

* Number of gallons of water heated from 70 degrees to 210 degrees in 30 minutes with 70 pounds steam pressure. To secure a noiseless operation a tank of sufficient depth must be used.

H. D. Model C.

In H. D. Ejectors will be found the same superior materials and workmanship which are characteristic of Metropolitan Injectors. The bronze compositions in the bodies and tubes are identical with those in the injectors.

Size 6 has iron body, balance bronze. Sizes 7 and 8 have iron bodies and delivery connections, balance bronze. Size 9 has bronze tubes, balance iron. Size 10 has iron body, bronze tubes, all connections flanged.

H. D. Model P.

This ejector is the same in general details of construction as the Model C, except for the delivery connection which in Model P is furnished without a coupling. This connection is female and in the body of the ejector.

Sizes 6, 7 and 8 have iron body, balance bronze. Size 9 has bronze tubes, balance iron.

Size No.	Price Each		Style	Pipe Connections		Capacity per Hr. with 50 lbs. S'm Pressure
	Model C	Model P		Steam	Suction and Delivery	
1	\$ 8.00	\$ 8.00	Bronze	1	1	250 gals.
2	10.00	10.00	Bronze	1	1	500 gals.
3	15.00	15.00	Bronze	1	1 1/2	960 gals.
4	20.00	20.00	Bronze	1 1/2	1 1/2	1,200 gals.
5	25.00	25.00	Bronze	1 1/2	1 1/2	2,000 gals.
6	35.00	35.00	Iron	1 1/2	2	4,000 gals.
7	45.00	45.00	Iron	1 1/2	2 1/2	8,000 gals.
8	55.00	55.00	Iron	2	3	11,000 gals.
9	70.00	70.00	Iron	2 1/2	4	15,000 gals.
10	175.00	.....	Iron	4	6	45,000 gals.

H. D. Drive Well

This ejector is designed to bring the largest possible instrument into a pipe of specified diameter. Made of bronze throughout.

Number	2	3	4	5
*Capacity, gallons	400	800	1,200	1,600
Price, each	\$15.00	\$20.00	\$30.00	\$40.00
Inside steam casing	1	1	1	1
Outside steam casing	1	1	1	1
Suction and delivery	1	1	1	1
Steam pipe casing	1	1	1	1
Minimum diam. of well	3	4	4 1/2	5
Weight, pounds	2 1/2	3 1/2	5 1/2	6 1/2

* With 75 lbs. steam. Lifting 1 foot, elevating 25 ft.

Steam Jet Pumps or Ejectors

Blakeslee Steam Jet Pumps



The Blakeslee Steam Jet Pump is operated by a relatively small jet of steam entering the pump body and expending its energy upward. As it enters the pump, its pressure moves the air upwards and in so doing is condensed, thus causing a vacuum. This vacuum in turn causes the liquid at the suction end of the pump to follow the line of steam energy. This jet pump is not intended for boiler feeding but for moving liquids in mills, mines, tanneries, etc., from one level to another. Capacities given in table are normal at 50 lbs. boiler pressure.

Prices of Pumps With Brass Fittings

No.	Price Each	Suction Pipe, Inches	Discharge Pipe, Inches	Steam Pipe, Inches	Steam Opening, Inches	Capacity, Gallons, Per Hour	H. P. of Boiler Required	Approx. Weight, Pounds
1	\$ 8.00	1	1 1/2	1 1/2	3/4	450	2	4
2	10.00	1 1/2	2	2	1	900	3	6
3	12.00	2	2 1/2	2 1/2	1 1/4	1200	4	8
4	14.00	2 1/2	3	3	1 1/2	1800	6	12
5	16.00	3	3 1/2	3 1/2	2	2400	8	16
6	20.00	3 1/2	4	4	2 1/2	3000	10	24
7	24.00	4	4 1/2	4 1/2	3	3600	15	33



Blakeslee Bilge Pumps

Will raise a large amount of water with but little steam. Not intended for elevating great heights, but will make 18 to 20 feet suction. Should be set so the discharge opening will be about on a line with point of discharge. The water may be conveyed from the pump by a trough, or a discharge pump may be connected.

No.	Price Each	Suction Pipe, Inches	Discharge Pipe, Inches	Steam Pipe, Inches	Capacity per Hour with Fifty Pounds Steam, Gallons	Wt., Lbs.
8	\$10.00	1 1/2	1 1/2	1 3/4	2400	10
9	14.00	2	2 1/2	2	3000	12
10	16.00	2 1/2	3	2 1/2	3600	18
11	20.00	3	3 1/2	3	4500	30
12	30.00	4	4 1/2	4	8000	40

Drive Well Jet Pumps

This type of jet pump is especially intended for use in driven or bored wells. Placed within 3 to 5 feet above water level it will elevate the water nearly two feet for each pound of steam pressure used.

No.	Price Each	Suction, Inches	Delivery, Inches	Steam, Inches	Size Pipe will go in, Inches	Capacity, Gallons per Hour
1	\$ 7.50	1	1 1/2	1 1/2	3	500
2	10.00	1 1/2	2	2	3 1/2	1000
3	12.50	2	2 1/2	2 1/2	4	1500
4	15.00	2 1/2	3	3	5	2000
5	25.00	3	3 1/2	3 1/2	6	3800



Chicago Ejector

The Chicago Ejector is neat in appearance, strongly made of the best steam metal and is extremely simple in construction, thus insuring ease in repairing. The jets are made of a special composition bronze, which is particularly adapted to withstanding the action of water containing sand and acid substances which these instruments are frequently called upon to handle. With 80 pounds steam pressure this ejector will lift water from 15 to 20 feet and elevate it from 40 to 50 feet.



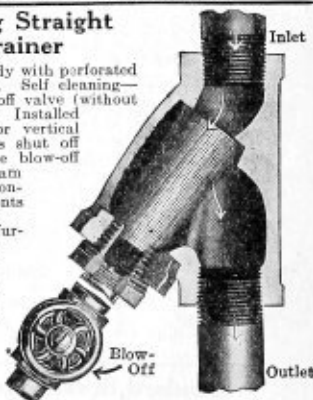
No.	Price Each	Pipe Connections, Inches			Capacity, Gallons per Hour	Wt. Lbs.
		Steam	Suct'n	Div'y.		
1	\$ 8.00	3/4	1	1 1/2	480	2
2	10.00	3/4	1 1/4	1 3/4	650	3
3	15.00	1	1 1/2	2	1000	3
4	20.00	1 1/4	1 3/4	2 1/2	1400	4
5	25.00	1 1/2	2	3	2400	6
6	35.00	1 3/4	2 1/2	3 1/2	4000	10
7	50.00	2	3	4	5100	16
8	60.00	2 1/4	3 1/2	4 1/2	6500	16
* 9	70.00	2 1/2	4	5	15000	.....
* 10	175.00	4	6	6	45000	.....

*Iron Body, Brass Jets and Steam Connection.
†Iron Body, Brass Jets, Flanged Connections.

Self Cleaning Straight Away Strainer

It has a cast iron body with perforated brass strainer cylinder. Self cleaning—simply open the blow-off valve (without removing the strainer). Installed on either horizontal or vertical lines. When steam is shut off from the line and the blow-off valve is open, the steam line is drained of all condensation, which prevents freezing. 2-inch perforations furnished for liquid service unless otherwise specified.

Made in sizes from 1/2-inch to 3-inch. When ordering specify for what service.



Size, Ins.	Price	Length, Ins.	Width, Ins.	Size, Ins.	Price	Length, Ins.	Width, Ins.
1/2	\$1.75	2 1/2	2 1/4	1 1/4	\$3.00	5 1/4	5
3/4	2.00	2 1/2	2 1/4	1 1/2	3.50	6	6
1	2.00	3 1/4	3 1/4	2	5.00	8	7 1/2
1 1/4	2.50	4 1/2	4 1/2	2 1/2	7.00	9	8 1/4
1 1/2	2.75	4 1/2	4 1/2	3	8.00	10	10

Strainers for Injectors or Ejectors

Made with cast brass with bronze wire mesh. Non-rustable.

Size Connection, Inches	Price Each	Weight Each
1/2	\$0.60	5 ozs.
3/4	.70	6 ozs.
1	.90	7 ozs.
1 1/4	1.10	8 ozs.
1 1/2	1.40	10 ozs.
2	2.00	1 1/2 lbs.
2 1/2	2.50	1 3/4 lbs.

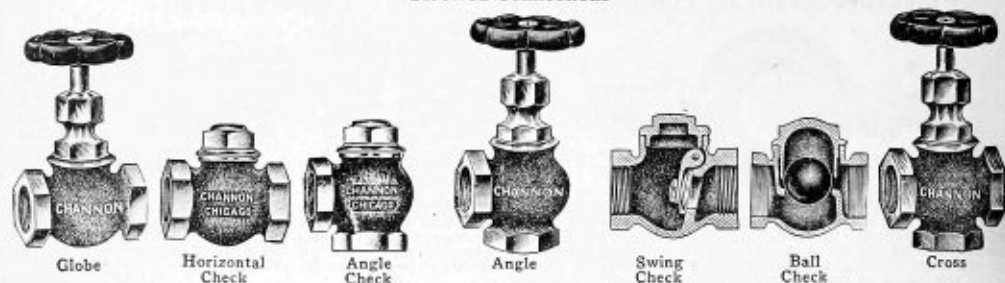


Gripwell Tires are guaranteed for three thousand five hundred miles of service.

H. Channon Company Chicago

Channon Standard Brass Valves

Screwed Connections



Channon Standard Brass Steam Valves are made from a high grade steam bronze, uniformity being assured through the use of only new metals, scrap of any kind is never used. They are guaranteed full weight and sufficiently strong for 125 pounds steam pressure and each valve is thoroughly tested before leaving the factory. Valve manufacturers usually make three grades of valves, Heavy Standard, Standard and Competition. When comparing our prices on valves, it should be remembered that Channon Standard Valves are Heavy Standard, not Regular Standard or Competition. Experience has proven that cheap valves are cheap only in the first cost, therefore we do not sell light weight valves unless they are particularly specified.

Standard for 125 Pounds Pressure, Price Each										
Size, inches	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3
Globe or Angle	\$0.72	\$0.72	\$0.77	\$1.00	\$1.26	\$1.80	\$2.52	\$3.50	\$5.30	\$10.00
Cross		1.25	1.25	1.50	2.00	2.50	3.50	5.00	8.00	16.00
Horizontal Check		.65	.70	.90	1.15	1.60	2.25	3.15	4.75	9.00
Angle or Vertical Check		.72	.77	1.00	1.26	1.80	2.52	3.50	5.30	*14.00
Swing Check			1.80	2.00	2.25	2.80	3.65	4.75	6.75	15.00
Ball Check				1.60	2.30	3.10	4.00	6.20	9.40	.....

*Furnished in angle only.

Extra Heavy for 250 Pounds Pressure, Price Each										
Size, inches	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3
Globe or Angle	\$1.30	\$1.30	\$1.30	\$2.60	\$3.50	\$5.00	\$7.00	\$11.00	\$20.00	\$29.00
Cross		1.25	1.25	2.65	3.50	4.75	6.00	9.00	14.00	28.00
Horizontal or Angle Check		1.15	1.35	1.70	2.25	3.15	4.50	6.30	9.90	18.00
Swing Check			3.25	3.25	4.25	6.00	7.50	12.00	25.00	.....

Channon Jenkins Disc Brass Valves

Screwed Connections

The ordinary Jenkins Disc Valves while made in the same general design as the Jenkins Bros. Valves, are not equal to the original pattern. Channon Jenkins Disc Valves are not only interchangeable with the corresponding sizes of Jenkins Bros. Standard Pattern Valve parts, but the metal used contains the same proportion of copper, tin, etc. We therefore offer these valves to customers who prefer the Jenkins Disc type as being exactly the same in every respect as the Jenkins Bros. Standard Pattern Valves. We can furnish them only in the Globe, Angle and Horizontal, Angle and Vertical Check patterns.



Globe



Angle

Standard Pattern for 150 Pounds Pressure, Price Each										
Size, inches	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3
Globe or Angle	\$1.10	\$1.10	\$1.25	\$1.60	\$2.20	\$2.80	\$4.00	\$5.50	\$8.75	\$22.00
Horiz. Check	1.10	1.10	1.20	1.30	1.90	2.60	3.60	5.00	7.50	13.50
Angle Check	1.10	1.10	1.20	1.30	1.90	2.60	3.60	5.00	7.50	13.50

Standard Brass Gate Valves

For 125 Pounds Pressure



Regular



Quick Opening

Screwed Connections, Price Each				
Size, inches	1/4	3/8	1/2	3/4
Regular	\$1.45	\$1.45	\$1.55	\$2.05
Quick Opening				3.60
Size, inches	1 1/4	1 1/2	2	2 1/2
Regular	\$3.70	\$5.00	\$7.30	\$13.00
Quick Opening	6.20	8.50	11.80	20.25

Smolensky Rotary Check Valve

Standard Screwed

Guaranteed Working Pressure: Steam, 150 Lbs.; Water 180 Lbs.

It has no screws, nuts or hinges to work loose, nor a ball which necessitates removing the valve to clean, but consists of a housing, plug and ring only.

The housing is cast with solid seat, has a bevel finish, and ribs on the inside which hold the plug in position. When valve is open, fluid enters through holes in the plug side.

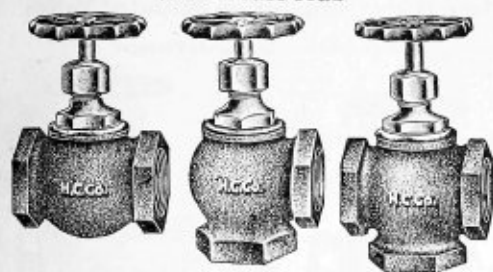
The seating edge of plug is fitted into the beveled valve seat and the brass retaining ring keeps the plug in the housing.

The valve plug slides back and forth on the ribs of the housing. It operates in any position and can be used for any fluid. The area of valve is larger than that of the pipe.

Price each				
Size, inches	1/4	3/8	1/2	3/4
Price each	\$0.68	\$0.68	\$0.83	\$0.98
Size, inches	1 1/4	1 1/2	2	2 1/2
Price each	\$2.70	\$3.53	\$5.92	\$10.92



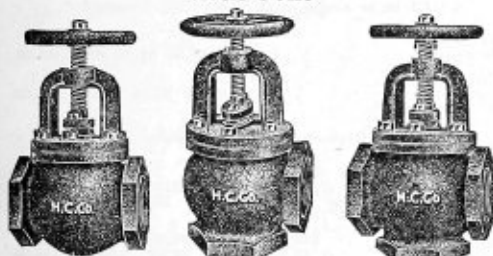
Standard Iron Body Brass Mounted Valves With Brass Hub



Globe Angle Cross
Standard for 125 Pounds Working Pressure
Screwed Connections, Price Each

Size, inches.....	2	2½	3
Globe and Angle.....	\$5.40	\$7.35	\$9.80
Cross.....	6.50	9.00	12.50

With Yoke



Globe Angle Cross
Standard for 125 Pounds Working Pressure
Screwed Connections, Price Each

Size, inches.....	2	2½	3	3½	4	4½
Globe and Angle \$ 7.00 \$ 9.00 \$12.50 \$15.25 \$ 19.00 \$ 24.00						
Cross.....	16.25	20.00	23.50	30.65		
Size, inches.....	5	6	7	8	10	12
Globe and Angle \$27.00 \$37.50 \$63.00 \$72.00 \$114.00 \$170.00						
Cross.....	35.25	47.25	78.00	92.00	162.00	240.00
Flanged Connections, Price Each						
Size, inches.....	2	2½	3	3½	4	4½
Globe and Angle \$8.60 \$10.75 \$15.00 \$18.50 \$22.50 \$27.50						
Cross.....	20.00	25.00	28.50	35.00		
Size, inches.....	5	6	7	8	10	12
Globe and Angle \$31.00 \$42.00 \$68.00 \$77.00 \$123.00 \$187.00						
Cross.....	41.00	54.00	85.00	100.00	175.00	265.00

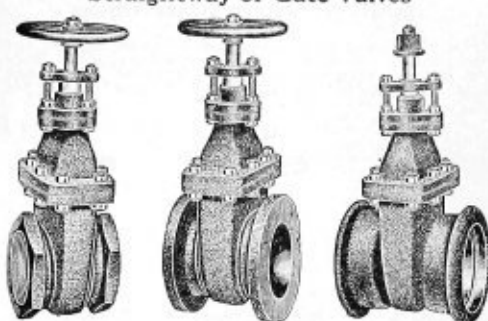
Check Valves



Horizontal Vertical Swing
Standard for 125 Pounds Working Pressure
Screwed Connections, Price Each

Size, inches.....	2	2½	3	3½	4	5
Horizontal.....	\$3.60	\$ 6.50	\$ 8.90	\$12.25	\$14.25	\$22.00
Vertical.....	9.50	12.50	17.00	21.00	33.00	
Swing.....	12.00	13.50	17.50	20.00	30.00	
Flanged Connections, Price Each						
Size, inches.....	2½	3	3½	4	4½	5
Horizontal.....	\$11.50	\$11.00	\$18.00	\$24.00	\$36.00	
Swing.....	14.50	17.00	21.00	24.00	30.00	34.00
Size, inches.....	6	7	8	10	12	
Horizontal.....	\$35.00	\$50.00	\$62.00	\$115.00	\$175.00	
Vertical.....	45.00	67.00	78.00	135.00		
Swing.....	41.00	60.00	75.00	115.00	168.00	

Straightway or Gate Valves



Screwed Flanged Hub End

Standard Pattern

Standard straightway or gate valves. Opens to the left. Wedge gate. Non-rising stem. For steam working pressures up to 125 pounds. Water working pressures 40% greater on sizes 12-inch and smaller; 20% greater on larger sizes.

Hub end valves are intended for hydraulic service only. For water working pressures sizes 12-inch and smaller up to 175 pounds; size 14-inch up to 150 pounds. All valves have 2-inch square head on stem.

Size, inches.....	2	2½	3	3½	4	4½
Screwed.....	\$10.00	\$11.50	\$14.00	\$17.00	\$ 19.00	\$ 24.00
Flanged.....	12.00	13.50	16.50	19.50	23.00	28.00
Hub end.....	10.00	14.00	19.00			
Size, inches.....	5	6	8	10	12	14
Screwed.....	\$27.50	\$32.50	\$54.00	\$90.00	\$125.00	
Flanged.....	31.50	36.50	58.00	95.00	133.00	\$181.00
Hub end.....	27.50	32.50	54.00	90.00	125.00	173.00

Quick Opening Straightway or Gate Valves



For Steam Working
Pressures up to 125
Pounds

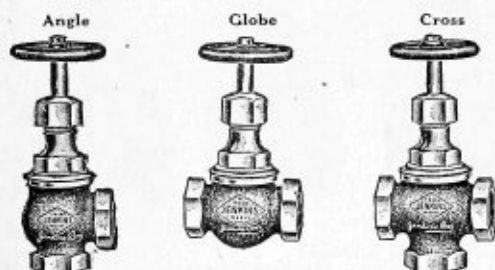
Quick opening, iron body, brass trimmings, wedge gate, sliding stem.

Size, inches.....	2	2½	3	3½	4	4½
No. 470, screwed, each.....	\$16.00	\$18.00	\$22.00	\$25.00	\$27.00	\$30.00
No. 471, flanged, each.....	16.00	18.00	22.00	25.00	27.00	30.00
End to end, screwed, ins.....	5½	5¾	6¼	6½	6¾	7¼
Face to face, flanged, ins.....	7	7½	8	8½	9	9½
Diam. of flanges, ins.....	6	7	7½	8½	9	9½
Size, inches.....	5	6	7	8	9	
No. 470, screwed, each.....	\$34.00	\$40.00	\$57.00	\$69.00	\$96.00	
No. 471, flanged, each.....	34.00	40.00	57.00	69.00	96.00	
End to end, screwed, inches.....	7½	7¾	8¼	8½	9¼	
Face to face, flanged, inches.....	10	10½	11	11½	12	
Diameter of flanges, inches.....	10	11	12½	13½	15	
Size, inches.....	10	12	14	15	16	
No. 470, screwed, each.....	\$110.00	\$150.00				
No. 471, flanged, each.....	110.00	150.00	\$225.00	\$275.00	\$325.00	
End to end, screwed, inches.....	13	13½	14	15	16	
Face to face, flanged, inches.....	13	14	15	15	16	
Diameter of flanges, inches.....	16	19	21	23½	23½	

Genuine Jenkins Bros. Valves

Standard Pattern Brass Valves

Jenkins Bros. standard pattern brass valves are designed and guaranteed for a working steam pressure of 150 pounds. Made of special high grade steam metal and have the Jenkins disc. Jenkins disc removing nut and nut lock, the keyed stuffing box and other features.



Price, Each, Screwed Connection

Size, inches	1/4	1/2	3/4	1	1 1/2	2
Globe or Angle	\$1.10	\$1.10	\$1.25	\$1.60	\$2.20	\$2.80
Cross		1.70	2.00	2.25	2.50	3.25
Size, inches	1 1/4	1 1/2	2	2 1/2	3	
Globe or Angle	\$4.00	\$5.50	\$8.75	\$15.75	\$22.00	
Cross	4.75	6.25	9.50	20.00	27.50	

Standard Pattern Brass Check Valves



Horizontal, Angle or Vertical, Screwed

Size, inches	1/4	1/2	3/4	1	1 1/2	2
Price, each	\$1.10	\$1.10	\$1.20	\$1.30	\$1.90	\$2.60
Size, inches	1 1/4	1 1/2	2	2 1/2	3	
Price, each	\$3.60	\$5.00	\$7.50	\$14.00	\$21.00	

Standard Swing Check Valves

Price, Each, Screwed Connection

Size, inches	1/4	1/2	3/4	1	1 1/2	2
Standard	\$1.20	\$1.30	\$1.90	\$2.60	\$3.60	
Size, inches	1 1/4	1 1/2	2	2 1/2	3	
Standard	\$5.00	\$7.50	\$14.00	\$21.00		

Brass Gate Valves

Stationary spindle, inside screw, standard pattern, for 125 pounds steam or 175 pounds water pressure.

Price, Each, Screwed

Size, inches	1/4	3/8	1/2	3/4	1	
Standard	\$1.45	\$1.45	\$1.65	\$2.05	\$2.80	
Size, inches	1 1/4	1 1/2	2	2 1/2	3	
Standard	\$3.70	\$5.00	\$7.30	\$13.00	\$19.00	



Iron Body Composition Mounted Valves

Standard for 150 Pounds Pressure



With Brass Hub



With Yoke

Globe or Angle, with Brass Hub, Screwed

Size, inches	1/4	1/2	1	1 1/2
Price each	\$2.80	\$2.80	\$3.00	\$4.00
Size, inches	1 1/4	2	2 1/2	3
Price each	\$5.00	\$7.25	\$11.00	\$16.00

Globe or Angle, with Yoke

Size, inches	2	2 1/2	3	3 1/2	4
Screwed	\$10.00	\$12.00	\$16.75	\$19.50	\$24.00
Flanged	11.75	14.00	18.50	21.50	26.00
Size, inches	5	6	8	10	12
Screwed	\$40.00	\$48.00	\$90.00	\$130.00	\$185.00
Flanged	42.00	50.00	90.00	130.00	185.00

Cross, with Yoke

Size, inches	2 1/4	3	3 1/2	4	5	6
Screwed	\$16.00	\$21.00	\$26.00	\$30.00	\$45.00	\$65.00
Flanged	19.00	24.00	29.00	33.00	48.00	62.00

Horizontal, Angle or Vertical Check Valves

Size, inches	2	2 1/4	3	3 1/2
Screwed	\$ 8.00	\$11.00	\$14.00	\$17.00
Flanged	10.00	13.00	16.50	20.00
Size, inches	4	5	6	8
Screwed	\$20.00	\$30.00	\$40.00	\$50.00
Flanged	23.00	33.00	43.00	50.00

Discs for Jenkins Bros. Valves



Regular Jenkins discs for steam pressure up to 150 pounds. Can be furnished with round hole for old style valves, or oval hole for new style valves. Steam metal discs fit all styles of Jenkins valves excepting gate valves, and are for extra heavy pressure.

Size, inches	1/4	3/8	1/2	3/4	1
Regular	\$0.03	\$0.04	\$0.04	\$0.05	\$0.06
Metal	.14	.14	.16	.20	.22
Size, inches	1 1/4	1 1/2	2	2 1/2	3
Regular	\$0.09	\$0.12	\$0.18	\$0.24	\$0.40
Metal	.28	.30	.34	.40	.55
Size, inches	4	6	8	10	12
Regular	\$0.60	\$1.00	\$1.40	\$2.25	\$2.50
Metal	1.60	2.60	4.00	5.60	7.30

Prices on other models of Jenkins Bros. Valves quoted upon request.

Powell Model Star Brass Valves



Globe Pattern

The body and trimmings are cast of steam bronze composition which conforms to the requirements of the Bureau of Steam Engineering, U. S. Navy Department. The bonnet is connected to the body in such a way that the contact of the bevel faces make a steam tight joint. There is no lead or other cementing material necessary on the body threads or on the bonnet threads. The disc is attached to the stem by a disc nut lock which is held by a wire ring snugly fitted to a groove in the stem, permitting it to swivel freely. Stem and disc of the 1/2-inch and smaller valves are made in one piece and do not swivel. Disc and seat are easily regrindable by using fine sand or ground glass without disconnecting valve from piping. Wheels are cast iron japanned black and can be removed if desired. Round knobs outside rim permit a firm grip for the hands.



Horizontal Check



Angle Pattern

Size, inches.	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3
Globe or angle	\$0.70	\$0.70	\$0.85	\$1.15	\$1.45	\$2.00	\$2.80	\$3.90	\$6.20	\$12.00
Cross	1.00	1.00	1.00	1.80	2.00	2.70	3.50	5.10	8.00	16.00
Hor. or Ang. check	.50	.50	.60	.85	1.15	1.55	2.30	3.25	5.20	10.00

Regular Pattern for 200 Pounds Pressure. Screwed.

Radiator Valves for Steam and Hot Water



Hot Water



Union Elbow



Angle with Union



L. H. Corner



Offset

Our radiator valves are strong and well made, neat and attractive in appearance, and are made for real service, not merely to sell. Every steam valve is tested to 60 pounds pressure before leaving the factory, although the service is rarely more than 10 pounds. The packing nut is heavy and provides a large space for packing. All valves are fitted with black enameled wood wheels and heavily nickel plated all over, the body being rough and the trimmings highly polished.

Hot Water Valve and Union Elbow

Size, inches.	1/4	3/8	1	1 1/4	1 1/2	2
Valve	\$2.40	\$2.85	\$3.65	\$5.05	\$7.10	\$10.85
Elbow	1.75	2.00	2.50	3.20	4.00	7.00

Steam Valves

Size, inches.	1/4	3/8	1	1 1/4	1 1/2	2
Angle with union	\$3.15	\$3.80	\$4.75	\$6.40	\$8.10	\$13.10
*Corner	3.45	4.20	5.25	7.05	8.95	14.45
Offset	4.25	5.15	6.95	8.95	14.25	

*When ordering corner valves specify whether right or left-hand is wanted.

Beaton's Floor and Ceiling Plates Nickel Plated


No. 3
Ceiling Plate

No. 6
Floor Plate

Size, inches.	1/4	3/8	1	1 1/4	1 1/2	2
Price each	\$0.27	\$0.28	\$0.32	\$0.36	\$0.40	\$0.45
Size, inches.	1 1/2	2	2 1/2	3	3 1/2	4
Price each	\$0.38	\$0.45	\$0.65	\$0.80	\$1.00	\$1.20

Floor and Ceiling Plates One Piece Cast Iron



Size, inches.	1/4	3/8	1	1 1/4	1 1/2	2	2 1/2
Floor plates	\$0.06	\$0.06	\$0.08	\$0.11	\$0.14	\$0.16	\$0.24
Ceiling plates	.11	.13	.16	.18	.23	.27	.36

Skinner Valve Reseating Tools

These tools are a necessity in every plant using Globe or angle valves. Their operation is so simple that any mechanic can use them without previous experience. They do not grind the seat, but cut it, leaving it smooth and polished. Valves to be reseated are not disconnected from pipes and they may be reseated many times.

By using the bonnet of the valve with the taper bushing, as illustrated, perfect alignment is assured.

Tools are highly polished and packed in varnished cases.



No. 1. For 1/2 to 2-inch valves. Price per set. \$20.00
No. 2. For 1/2 to 3-inch valves. Price per set. 30.00

Important: When ordering, state make of valves it is desired to reseat, as an outfit is adaptable for one make of valves only.

Straight Stem



Hot Water Thermometer

Accurately indicating the temperature of the water in a hot water heating apparatus.

They are unsurpassed for accuracy, sensitiveness, durability and practical construction.

Each thermometer carefully tested and fully guaranteed, and carefully packed and boxed.

Straight, price each.....\$2.50

Angle, price each.....2.80

Heating Boiler Gauges

Altitude



Steam Pressure



The Altitude gauge indicates at boiler, height of water in feet in the system. Short hand denotes height water should be kept and long hand registers the actual height of water at all times.

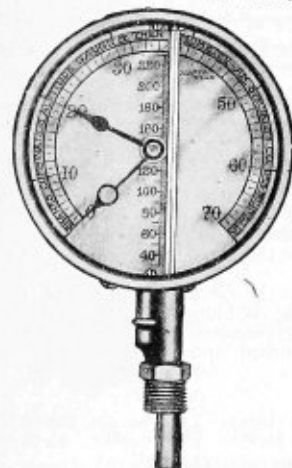
Price each.....\$3.50

The Steam gauge is of the Bourdon single spring type and is constructed to prevent corrosion of parts, especially adapting it for use in basements, etc.

Price each.....\$3.50

Combined Altitude Gauge and Thermometer

(Patented)



For Hot Water Heating Systems

This gauge meets all the requirements of two separate instruments commonly used on hot water heating boilers. It can be fitted into half-inch opening regularly provided in boilers, for thermometer. It registers the height of water in feet and the temperature. Both registers are accurate. All parts which come in contact with moisture are made of non-corrosive material. Price each...\$5.00

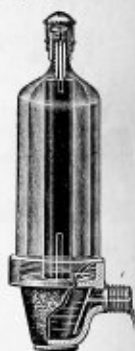
Radiator Air Valves



No. 1



No. 2

No. 1
Phantom View

"Thatcher" Water Seal Automatic air valves will not leak steam or water, will automatically relieve the radiator of air and prevent tapping. Made for $\frac{1}{4}$ -inch and $\frac{1}{2}$ -inch. Every valve guaranteed.

1. Thatcher "Water Seal." Price each.....\$1.50

2. Thatcher "Empire." Price each......75

Compression Radiator Air Valves



Size, inches		$\frac{1}{4}$	$\frac{1}{2}$
No. 202. All brass. Each.....		\$0.35	\$0.40
No. 204. Wood wheel. Each.....		.45	.55
No. 206. Wood wheel, with nose. Each.....		.70	.75
No. 208. Lock and shield. Each.....		.35	.40
No. 210. Lock and shield. Each.....		.57	

Keys for Nos. 208 and 210, extra; plated, each 18 cents.

Nickel Plated Ceiling and Floor Plates

No. 3
Ceiling PlateNo. 6
Floor Plate

Size, inches...	$\frac{1}{4}$	$\frac{3}{4}$	1	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3
Price each...	\$0.27	\$0.28	\$0.32	\$0.35	\$0.58	\$0.45	\$0.65 \$0.80

Larger sizes, prices on application.

Brass Steam Cocks

Standard Square Head



Flat Head



Three-Way with Check



For working pressures up to 100 pounds.

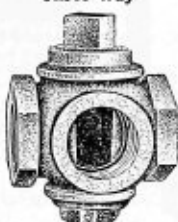
Size, Ins.	Price Each		Size, Ins.	Price Each	
	Standard	3-Way		Standard	3-Way
$\frac{1}{4}$	\$0.85	\$1.80	$1\frac{1}{4}$	\$ 3.70	\$ 5.75
$\frac{3}{8}$	1.00	2.10	$1\frac{1}{2}$	4.85	7.15
$\frac{1}{2}$	1.25	2.50	2	7.30	11.00
$\frac{3}{4}$	1.70	3.00	$2\frac{1}{2}$	14.50	18.75
1	2.35	3.75	3	22.50	26.00

Iron Cocks

Straight Way



Three-Way



For Working Pressure up to 125 Pounds

All iron cocks should never be used with steam or water, as the plug will stick in the barrel, making it almost impossible to turn. Iron cocks with brass washers are recommended for this use.

Straightway Square or Flat Head

Size, inches	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2
All iron	\$0.90	\$1.05	\$1.30	\$1.60	\$1.95	\$2.70
With brass washer	1.00	1.20	1.35	1.95	2.35	3.20
With brass plug	1.30	1.60	1.90	2.65	3.75	5.25
Size, inches	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	5	6
All iron	\$4.40	\$ 6.75	\$12.00	\$15.50	\$32.00	\$45.00
With brass washer	5.15	7.75	14.00	19.00	35.00	53.00
With brass plug	8.75	13.00	27.50	36.50	67.00	94.00

Three-Way

Size, inches	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2
All iron	\$1.65	\$1.80	\$2.05	\$2.65	\$3.65
With brass washer	1.80	2.05	2.40	3.05	4.15
With brass plug	2.20	2.40	3.10	4.50	6.25
Size, inches	$2\frac{1}{2}$	3	4	5	6
All iron	\$5.35	\$ 7.50	\$19.00	\$36.50	\$ 52.00
With brass washer	6.10	8.30	22.50	42.50	60.00
With brass plug	9.75	13.75	40.00	71.50	100.00

Miscellaneous Cocks


Fig. 4
Rough Stop

Size, inches	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2
Price	\$2.10	\$2.94	\$3.60	\$5.25	\$8.94	\$14.94	\$25.80

Screwed for Iron Pipe


Fig. 6
Check and Waste

Vulcanized Asbestos Groove Packed Iron Cocks

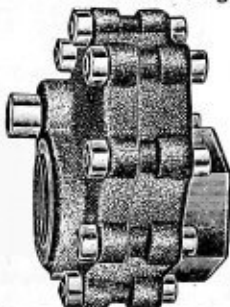
$\frac{1}{2}$ to 2-in. for 125 pound steam pressure.
 $\frac{2}{3}$ to 3-in. for 100 pound steam pressure.
The plugs are carefully finished and barfed to render them rustless. The plugs have no metallic bearing, coming in contact with asbestos only, the elasticity of which compensates for the differential expansion and contraction. Extensively used for boiler service. Recommended for use where ground plug cocks are unsatisfactory. Cocks should be opened wide, not partially opened.



Price Each

Size, inches	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	1
Screwed	\$1.30	\$1.30	\$1.45	\$1.60	\$2.10
Flanged				1.60	2.10
Size, inches	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3
Screwed	\$3.50	\$4.75	\$7.00	\$12.00	\$18.00
Flanged		3.50	4.75	7.00	12.00

Everlasting Blow-off Valve



It is composed of a top and bottom bonnet, a disk and a lever and post.

By pressing down the square head with a wrench the valve is opened and by reversing it is closed.

The operating post is held down by a stiff bronze spring, doing away with a stuffing box and making it absolutely tight.

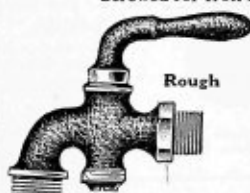
Iron body—Naval bronze working parts, bronze to iron wearing surfaces.

Semi-Brass—Brass body. Naval bronze working parts. Brass to bronze wearing surfaces.

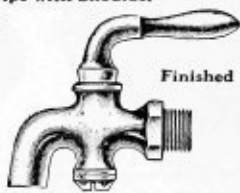
Type, inches	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1
Iron body, screwed	\$9.00	\$9.00	\$9.00	\$11.00	\$11.00
Iron body, flanged				15.00	15.00
Semi-brass, screwed			8.50	12.00	12.50
Semi-brass, flanged				20.00	20.00
Type, inches	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3
Iron body, screwed	\$16.00	\$22.00	\$25.00	\$32.00	\$44.00
Iron body, flanged	19.00	26.00	30.00	39.00	50.00
1-B ser'd rack and pinion			34.50	40.00	54.00
1-B fl'ng'd rack and pinion			39.00	47.00	60.00
Semi-brass, screwed	21.00	27.50	35.00	50.00	
Semi-brass, flanged	28.00	35.00	45.00	55.00	

Brass Bibb Cocks

Screwed for Iron Pipe with Shoulder



Rough

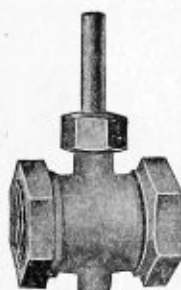


Finished

Bibb Screwed for Hose

Plain Bibb

Size, inches	Plain Bibb, Rough	Plain Bibb, Finished	Hose Bibb, Rough	Hose Bibb, Finished
$\frac{1}{4}$	\$ 2.04	\$ 2.52		
$\frac{3}{8}$	2.10	2.58	\$ 2.45	\$ 2.85
$\frac{1}{2}$	2.94	3.54	3.24	3.84
$\frac{3}{4}$	3.50	4.50	3.90	4.80
1	5.28	6.48	6.00	7.20
$1\frac{1}{4}$	8.94	10.74	10.02	11.82
$1\frac{1}{2}$	14.94	17.94	16.44	19.44
2	25.80	30.00	28.02	32.22



Iron Body Brass Trimmed Butterfly Valves

For Steam Working Pressures up to 125 Pounds

Butterfly valves are not intended to be steam tight.

Size, inches.....	2	2½	3	3½	4	5	6	8	10
Screwed.....	\$8.00	\$9.50	\$12.00	\$16.00	\$18.50	\$23.50	\$42.50		
Flanged.....	9.50	11.50	15.00	19.00	22.00	32.00	47.00	90.00	125.00
Diameter of flanges, ins..	6	7	7½	8½	9	10	11	13½	16
End to end, inches.....	4¼	4¾	5¼	5½	6	6¾	7½	9¼	10¾

Can be made with a brass stem instead of steel stem at an extra price.

Powell's Brass and Iron Body Lever Throttle and White Star Gate Valves



Ready



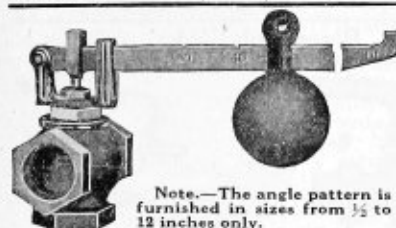
Titan



Ready lever gate valves can be used for steam pressures up to 75 pounds, Titan for steam pressures up to 175 pounds and White Star for 150 pounds.

Price Each, Screwed Connections

Size, inches.....	¼	¾	½	¾	1	1¼	1½	2	2½	3	3½	4	5
Ready, all brass.....			\$1.60	\$1.80	\$2.50	\$3.50	\$5.00	\$7.50	\$13.50	\$19.00			
Ready, iron body.....								7.00	12.00	15.00	\$18.00	\$21.00	\$30.00
Titan, all brass.....			2.50	3.00	4.00	5.00	7.00	10.00	19.00	29.00			
Titan, iron body.....								13.00	16.00	20.00	25.00	30.00	35.00
Star, screwed.....	1.25	1.25	1.30	1.75	2.50	3.50	5.00	7.50	14.00	20.00			
Star, flanged.....		2.50	3.00	4.00	5.25	7.75	10.50	14.00	21.00	32.00			



Standard Weight and Lever Safety Valve

For 100 pounds steam pressure. Lever graduated from 30 to 100 pounds.

Cross or Angle, All Brass Screwed

Size, ins.	¼	¾	½	¾	1	1¼	1½	2	2½
Price each.....	\$2.20	\$2.50	\$3.25	\$3.90	\$4.70	\$7.15	\$9.00	\$12.50	\$22.50

Cross Only, Iron Body, Brass Trimmed

Size, inches.....	1¼	1½	2	2½	3	3½	4
Screwed, each.....	\$5.00	\$5.50	\$7.80	\$13.25	\$17.25	\$23.00	\$28.75

Note.—The angle pattern is furnished in sizes from ½ to 12 inches only.

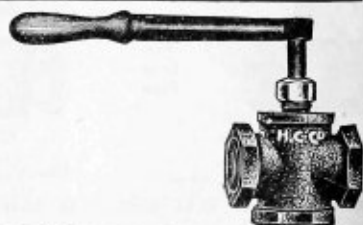
Throttle Valves

For steam working pressures up to 125 pounds.

These throttle valves are extensively used on hoisting and traction engines, are opened by one-quarter turn of handle, and are provided with stops.

Always specify brass throttle valves when ordering.

Size, inches.....	¾	1	1¼	1½	2	2½
Price each.....	\$10.00	\$11.50	\$14.00	\$20.00	\$25.00	\$35.00



Blow-Off Valves

**Homestead Brass
Straightway Valves**
Screwed Connections



200 Pounds Working Pressure

Can be fully opened or closed with a quarter turn. The unobstructed passage especially adapts it for handling heavy liquids or carrying off sediment as in case of a blow-off valve.

Size, ins.	1/4	1/2	3/4
Price each	\$3.83	\$3.83	\$4.00
Size, ins.	1	1 1/2	2
Price each	\$4.50	\$5.37	\$7.17
Size, ins.	1 1/2	2	2 1/2
Price each	\$9.60	\$13.40	\$23.30
Size, ins.	2 1/2	3	3 1/2
Price each	\$35.00	\$60.40	
Size, ins.	3 1/2	4	
Price each	\$104.13	\$120.40	

**Homestead
Straightway Valves**
Semi-Steel Body, Brass Plug

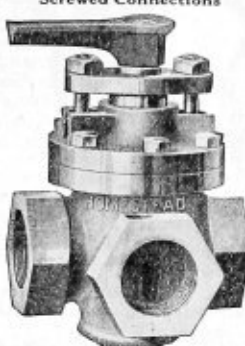


200 Pounds Working Pressure

Screwed Connections
The semi-steel is close grained and extremely tough, about 2 1/2 times stronger than average cast iron. Not suitable for service where subject to heat, as the difference in expansion of the two metals may cause the plug to stick.

Size, ins.	3/4	1	1 1/2
Price each	\$10.22	\$10.22	\$12.80
Size, ins.	1 1/2	2	2 1/2
Price each	\$16.66	\$24.00	
Size, ins.	2 1/2	3	3 1/2
Price each	\$35.55	\$62.22	

**Homestead Brass
Three Way Valves**
Screwed Connections

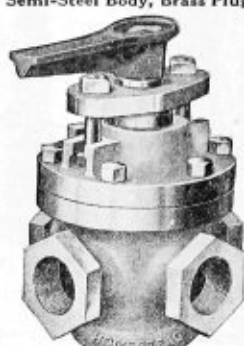


200 Pounds Working Pressure

Prices
Size, ins. 1/4 1/2 3/4
Price each \$6.34 \$6.67 \$6.90
Size, ins. 1 1 1/2 2
Price each \$15.80 \$19.30 \$22.90
Size, ins. 2 2 1/2 3
Price each \$36.60 \$60.80 \$93.30
Can also be supplied with semi-steel body, and brass plug.

Prices as follows:			
Size, ins.	1	1 1/2	2
Price each	\$16.96	\$23.33	\$26.66
Size, ins.	2	2 1/2	3
Price each	\$40.00	\$55.55	
Size, ins.	3	4	
Price each	\$75.55	\$137.77	

**Homestead
Four Way Valves**
Semi-Steel Body, Brass Plug



200 Pounds Working Pressure

Screwed Connections
Very successful on air and cold water pressures—not advised for steam or where subject to heat, as the difference in expansion of the two metals may cause the plug to stick.

Prices			
Size, ins.	3/4	1	1 1/2
Price each	\$26.27	\$47.15	\$48.88
Size, ins.	1 1/2	2	2 1/2
Price each	\$66.66	\$88.88	
Size, ins.	2 1/2	3	3 1/2
Price each	\$127.69	\$177.77	

Jenkins Bros. "Y" or Blow-Off Valve

While best known as a blow-off valve, for which service it is particularly adapted, it is also used successfully for a variety of other purposes, especially where thick fluids are handled, as for instance, in sugar refineries, pulp and paper mills, chemical and dye works, and the like. Fitted with Jenkins disc and renewable seat rings.



Brass, Standard Pattern, Screwed Ends

Size, inches.	1/4	1/2	3/4	1	1 1/2	2	2 1/2
Price each	\$2.00	\$3.00	\$4.00	\$5.00	\$6.50	\$9.25	\$18.00

Iron Body, Composition Mounted, Standard Pattern

Size, inches.	1/4	1/2	3/4	1	1 1/2	2	2 1/2
Screwed, each				\$11.00	\$15.00	\$20.00	
Flanged, each				13.00	18.00	23.00	

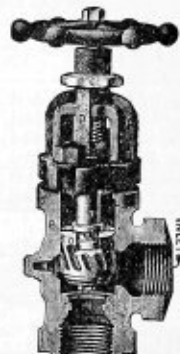
Iron Body, Extra Heavy Pattern, with Yoke

Size, inches.	1/4	1/2	3/4	1	1 1/2	2	2 1/2
Screwed, each				\$16.00	\$20.00	\$26.00	
Flanged, each				18.00	24.00	32.00	

Powell "Cyclone"

Iron body, brass mounted. Both seats and discs regrindable. Reversible and renewable.

The disc holder, D, is given a centrifugal motion when opening and closing the valve, by the steam striking the spiral grooves cast around the sides. This motion tends to keep the inside of walls of the valve clean, as it does not give the scale or sediment a chance to collect. The plunger in passing the inlet orifice, shuts off the steam before the disc reaches the seat, and the vacuum created by the rush of matter through the valve prevents any scale or silt from lodging on the seat. Each valve is tested to 250 pounds.



Size, inches.	1/4	1/2	2	2 1/2	3
Screwed, each	\$7.50	\$10.00	\$13.50	\$18.20	\$27.50
Flanged, each	8.70	11.20	15.00	20.00	30.00

Powell Straightway or "Y" Blow-Off Valve With Reversible Inserted Seat Ring



Like all Powell products it is of the very best material and workmanship and will give satisfaction in the difficult work for which it was designed.

Medium, for 175 lbs. Pressure

Size, inches.	1/4	1/2	1 1/2	2	2 1/2
Screwed. Price each	\$3.00	\$4.00	\$5.00	\$6.50	\$9.25

Extra Heavy, for 300 lbs. Pressure

Size, inches.	1/4	1/2	1 1/2	2	2 1/2
Screwed. Price each	\$6.00	\$8.00	\$10.00	\$13.00	\$19.00

Brass Pop Safety Valves

Top Lever



No. 154

Top Outlet



No. 148

Top Outlet Lock-up



No. 148C

Side Outlet



No. 149

Side Outlet Lock-up



No. 149A

Muffler



No. 1158

Fig. 154. Low pressure pattern. Set for any pressure not exceeding 30 pounds. Has been adopted generally by leading makers of house heating boilers. Same construction as is used in high pressure valves. Heavy pipe wrenches should not be used in connecting them.

Fig. 148. For stationary, portable and marine engines. Made to comply with the rules of the U. S. Board of Supervising Engineers of Steam Vessel Inspectors. Only best non-corrosive metal is used and each valve is tested and adjusted before leaving factory. Suitable for any pressure up to 200 pounds.

Fig. 148C. Exactly the same as Fig. 148 above, except with lock-up attachment and is especially adapted for export trade wherein a lock-up device is required.

Fig. 149. For marine and stationary boilers. Especially adapted for use on yachts and steam launches where it is necessary to pipe escaping steam away from boiler. For any pressure up to 200 pounds. When ordering state whether for marine or stationary use.

Fig. 149A. This valve is the same as Fig. 149, except that it is equipped with a lock-up attachment and is especially adapted for export trade where it is desired to use a lock-up device.

Fig. 1158. For road rollers, traction engines or any place where it is desired to muffle the sound of escaping steam. Muffler does not retard or affect relieving capacity. For any pressure up to 250 pounds. Furnished in polished brass only.

Figs. 148, 148C, 149 and 149A are regularly furnished semi-finished, but can be furnished in polished brass at slightly additional price. Lock-up valve, and valves which are used where state laws regarding safety valves are in force, prices are slightly higher.

Always state size, number and pressure at which valve is to be set.

Size, inches		$\frac{1}{2}$ - $\frac{3}{4}$	1	1 $\frac{1}{4}$	1 $\frac{1}{2}$	2	2 $\frac{1}{2}$
No. 154. Finished		\$ 8.00	\$ 9.00	\$10.25	\$12.50	\$17.00	\$38.00
No. 148. Finished		8.50	10.50	13.00	16.00	24.00	45.00
No. 148C. Finished		13.50	16.50	19.00	23.00	31.00	53.00
No. 149. Finished		10.00	12.50	15.50	19.00	28.00	52.00
No. 149A. Finished		15.00	18.50	21.50	26.00	35.00	60.00
No. 1158. Finished			21.00	26.00	32.00	48.00	

American Iron Body Bronze or Nickel Seat Safety Valve



Fig. 116
Outside View Showing
Screwed Base

Furnished with flat seats for stationary boilers and beveled seats at an angle of 45 degrees for marine boilers. Suitable for any pressure up to 200 pounds. Thoroughly adjusted and tested before leaving factory, and guaranteed to be absolutely accurate at time of shipment. Furnished with either flanged or screwed base connection. Elongated base is also threaded, as shown in cut at right hand side of page. Fitted with blow-down ring for means of adjustment from outside casing.

When ordering state size, style of base, whether bronze or nickel seat relieving pressure.

Size, inches	2	2 $\frac{1}{2}$	3	3 $\frac{1}{2}$	4	4 $\frac{1}{2}$	5	6
H. P. of boiler.	40	75	100	125	150	175	200	Higher
Bronze seat	\$35.00	\$42.00	\$50.00	\$68.00	\$75.00	\$100.00	\$120.00	\$170.00
Nickel seat	40.00	48.00	57.00	75.00	87.00	115.00	135.00	190.00
Wgt., screwed	23	36	49	67	87	96	114	157
Wgt., flanged	30	44	60	80	102	113	128	172

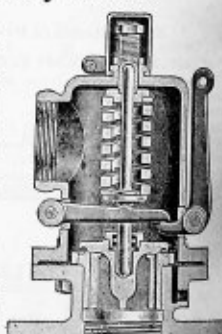


Fig. 119
Inside View Showing
Flanged Base

Brass, Water and Cylinder Relief Valves

For Pumps, Steam Engine Cylinders, Pipe Lines, Tanks

With Cap or Wheel—for pressures up to 200 pounds.

These valves are used on the ends of the cylinders of steam engines and obviate all danger of blowing out cylinder heads on account of accumulation of water in the cylinder.

Furnished with cap and male base connection, or with wheel and female base connection, as desired, at the same price. The cap may be removed, which exposes a nut, the manipulation of which determines the pressure at which the valve will relieve. The relieving pressure is set, on the other style, by the wheel. When ordering, state the pressure at which valve should relieve. Valves are guaranteed accurate when leaving factory. We cannot be responsible for adjustments made thereafter.

Size, inches.....	1/2-3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4
Semi-finished.....	\$10.00	\$12.00	\$15.00	\$18.00	\$27.00	\$43.00	\$72.00	\$95.00	\$120.00
Weight, pounds.....	1 1/4	2	3	4 1/2	7 3/4	13 1/2	17 1/2	30	32 1/2

When ordering, always state Fig. No., size, and pressure at which valve will relieve.



Fig. 150



Fig. 1128

Wide Body Water Relief Valve

With Cap or Wheel

Relief valves made with a wide body have a much greater capacity than the regular pattern. Made in brass and iron body. Sizes from 2 inches and upward are made either with screwed or flanged bottom. If flanged bottom is desired, state diameter wanted. Be sure to state pressure it is desired valve to relieve.

Prices—Brass

Size, inches.....	1/2-3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4
Semi-finished.....	\$10.00	\$12.00	\$15.00	\$18.00	\$27.00	\$43.00	\$72.00	\$95.00	\$120.00

Prices—Iron Body

Size, inches.....	2	2 1/2	3	3 1/2	4	5	6
Price, each.....	\$35.00	\$42.00	\$50.00	\$68.00	\$75.00	\$120.00	\$170.00
Approximate weight							
Flanged Inlet, lbs.....	30	45	58	80	92	170	240

When ordering, always state Fig. No., size, and pressure at which valve will relieve.



Fig. 145



Fig. 146

The American Underwriter Water Relief Valve

The American Underwriter Water Relief Valve is of the same type as the wide body pattern shown above, but furnished only with wheel as is required by the Underwriters. Capacity for relief is guaranteed greater than any other of same size. Made with screwed and flanged connections.

Prices—Brass

Size, in.....	1/2-3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4
Semi-finished.....	\$10.00	\$12.00	\$15.00	\$18.00	\$27.00	\$43.00	\$72.00	\$95.00	\$120.00

Prices—Iron Body

Size, inches.....	2	2 1/2	3	3 1/2	4	5	6
Price each.....	\$35.00	\$42.00	\$50.00	\$68.00	\$75.00	\$120.00	\$170.00
Approx. weight							
Flanged Inlet, lbs.....	30	45	58	80	92	170	240

When ordering, always state Fig. No., size, and pressure at which valve will relieve.



Fig. 144



Fig. 143A



Pressure Regulators

These regulators or reducing valves are intended for service in reducing steam, water and air pressures. Suitable for initial pressures up to 150 pounds. Will reduce to any lower pressure and automatically maintain it regardless of the demand or fluctuations in the high or initial pressure. The delivery pressure may be as low as one pound if the regulator is counter-weighted by suspending weights from the opposite end of the lever to overcome an actual weight of the internal parts.

No. 0 regulator is for service where there is no sudden variation of volume, as for heating coils, etc. It is fitted for a dashpot, which can be added if necessary after being installed.

No. 1 regulator with dashpot is used where there is a sudden variation in volume used, as on an engine or pump, also when required to control a number of heating coils or other apparatus.

When ordering, state initial and reduced pressures and whether for water, steam or air service.



No. 0 Without Dashpot

Price Each

No. 1 with Dashpot

Size, inches.....	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4	5	6	8	10	12
No. 0.....	\$18.00	\$20.00	\$22.00	\$24.00	\$25.00	\$30.00	\$35.00	\$40.00	\$60.00	\$75.00	\$100.00	\$175.00	\$275.00	\$400.00
No. 1.....	22.00	24.00	26.00	28.00	30.00	36.00	42.00	48.00	72.00	90.00	120.00	200.00	300.00	435.00
Weight, pounds	16	16	17	18	25	50	60	76	130	140	185	260	450	575

Low Pressure Regulators

Will reduce steam, air or water pressures. Especially adapted for vacuum steam heating systems, also atmospheric or very low pressure steam heating. Suitable for initial pressures up to 150 pounds and reduced pressures not exceeding 8 pounds. When ordering state initial and reduced pressures and whether for steam, water or air. It is operated by an independent diaphragm controlled by pressure through a small pipe direct from the low pressure system at a distance from the regulator where the pressure is about average excepting on sizes 1 1/2 inches and under, where this connection is made through the bottom of valve cap.

No. 3 regulator is a straightway valve with inlet and bottom connection the same size. Sizes 2 to 6 made screwed or flanged ends, but screwed furnished unless otherwise ordered. Larger sizes, flanged ends.

No. 4 is exactly the same as No. 3 except that it has an expanded outlet and is especially adapted for controlling heating mains. Sizes 1x2 to 2x4 screwed ends, 2 1/2x5 to 3x6 inlet screwed and outlet flanged, 3 1/2x7 and larger flanged ends.

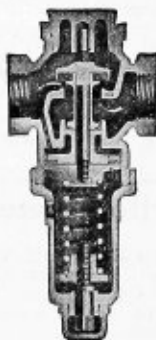
No. 3 Low Pressure Regulators

Size, inches.....	1/2	1	1 1/4	1 1/2	2	2 1/2	3	4	5	6	8	10	12
Price each.....	\$26.00	\$28.00	\$32.00	\$35.00	\$40.00	\$50.00	\$60.00	\$80.00	\$105.00	\$140.00	\$230.00	\$290.00	\$360.00
Weight, pounds	16	18	20	30	55	65	81	135	145	190	260	450	525

Foster Q Pressure Regulator



For air or steam heating systems. No weights or close fitting pistons; easily adjustable for pressures between 0 and 15 pounds. Sizes 2 inches and under are fitted with brass bodies, larger sizes have iron bodies.

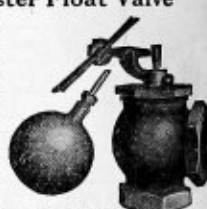


Foster U Pressure Regulator

A water pressure regulator equally adaptable for air service under certain conditions. Reduces 300 pounds initial pressure to a final of from 5 to 200 pounds. Sizes 1/2 to 2-inch, all composition; 2 1/2 to 12-inch, iron body, composition mounted.

Foster Float Valve

Auxiliary operated (can also furnish "direct-acting type"). Quick, sensitive and non-leakable. Functions with pressure in a supply pipe. Automatically controls admission of steam to pump, returning condensation. Size up to two inches, inclusive, all composition. Larger sizes, iron body, composition mounted, and fitted with removable seats.



Dimensions and Price List Including Float

Size, Ins.	3/4	1	1 1/4	1 1/2
Screw Flgd.	\$18.50	\$20.00	\$24.00	\$28.00
Flgd.	21.50	25.00	30.00	33.00
Size, Ins.	2	2 1/2	3	3 1/2
Screw Flgd.	\$35.00	\$40.00	\$48.00	\$55.00
Flgd.	38.00	43.00	52.00	60.00
Size, Ins.	4	4 1/2	5	6
Screw Flgd.	\$70.00	\$80.00	\$85.00	\$120.00
Flgd.	75.00	85.00	90.00	125.00
Size, Ins.	7	8	10	12
Screw Flgd.	\$170.00	\$200.00	\$300.00	\$400.00

Size, Ins.	1 1/2	3 1/2	1	1 1/2
Screw Flgd.	\$20.00	\$24.00	\$22.00	\$27.00
Flgd.	22.00	23.00	24.00	30.00
Size, Ins.	1 1/2	2	2 1/2	3
Screw Flgd.	\$35.00	\$44.00	\$60.00	\$77.00
Flgd.	37.00	47.00	65.00	82.00
Size, Ins.	3 1/2	4	4 1/2	5
Screw Flgd.	\$90.00	\$110.00		
Flgd.	95.00	115.00	\$130.00	\$148.00
Size, Ins.	6	7	8	9
Screw Flgd.	\$190.00	\$250.00	\$310.00	\$400.00
Flgd.				
Size, Inches.....	10	12		
Flanged.....	\$620.00	\$625.00		

Size, Ins.	Dia. Flg. Ins.	Flanged		Screwed		Screw. Flgd.
		Center to Face Ins.	Face to Face Ins.	Center to Face Ins.	Face to Face Ins.	
3/4				1 1/4	3/8	\$ 6.50
1				1 3/4	4	8.50
1 1/4				2 1/4	4 1/2	9.50
1 1/2				2 1/2	5	12.00
2	6	3 3/4	7	2 3/4	6 1/2	20.00
2 1/2	7	4 1/2	9	4	8 1/2	40.00
3	7 1/2	5	10	4 1/2	10	60.00
4	9	6	12	5 1/2	11	88.00
5	10	6 1/2	13	6	12 1/2	110.00
6	11	7 1/2	14	7 1/2	14 1/2	150.00
8	13 1/2	10	20 1/2			200.00

Extra charge for flanges of different dimensions, distance between faces and drilling.

Fisher Float Valve for Open Tank Service



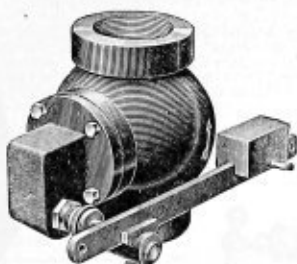
Type 17

For open tanks where a fixed level of water or other fluid is to be maintained. Automatically controlled by a seamless copper float, directly connected to lever by an adjustable stem. Made in angle and globe types.

All valves are tested. The standard are suitable for cold water or air pressures up to 200 pounds. If used for hot water, steam, oil or other service, we must be advised, otherwise we ship angle type standard valve.

List Prices—Angle and Globe			
Screwed Flanged		Flanged	
1/4-in. \$11.75	3 1/2-in. \$38.00		
1/2-in. 12.00	4-in. 49.00		
1-in. 14.00 14.00	5-in. 68.50		
1 1/4-in. 15.00 15.00	6-in. 81.00		
1 1/2-in. 16.00 16.00	8-in. 128.50		
2-in. 18.00 18.00	10-in. 140.00		
2 1/4-in. 23.00 23.00	12-in. 170.00		
3-in. 29.50 29.50			

Fisher Noiseless Back Pressure Valve

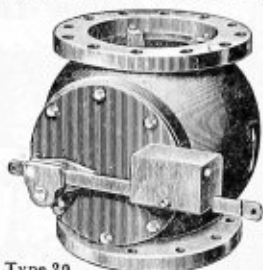


Type 9

Particularly adapted for the exhaust line of a non-condensing system and can be adjusted to hold any back pressure up to fifteen pounds. Very sensitive and can be placed in any position in the pipe line.

Furnished in the following sizes:			
In.	Sewd.	Flngd.	Flgd.
2	\$14.00	\$15.00	7 \$ 80.00 \$ 86.00
2 1/2	16.00	17.00	8 100.00 106.00
3	18.00	19.00	9 120.00 127.00
3 1/2	22.00	23.50	10 145.00 153.00
4	25.00	27.00	12 220.00 229.00
4 1/2	30.00	34.00	14 Flanged 345.00
5	40.00	44.00	15 Flanged 400.00
6	60.00	65.00	16 Flanged 465.00

Fisher Combination Back Pressure and Exhaust Relief Valve—Cushioned



Type 20

Condensing and non-condensing systems sometimes require a valve that can be used either as a back pressure or automatic exhaust relief valve. At others a lever controlled relief valve is preferred. For non-condensing service, it is weighted for a maximum back pressure of five pounds or by placing weight on opposite end of lever, valve will be held open.

For condensing service it has a water seal to prevent leakage under vacuum.

Recommended for vacuum heating systems. List Prices			
6-in. \$100.00	20-in. \$ 554.00		
7-in. 150.00	20-in. 670.00		
8-in. 170.00	22-in. 917.00		
9-in. 225.00	24-in. 1170.00		
10-in. 270.00	26-in. 1420.00		
12-in. 335.00	28-in. 1600.00		
14-in. 415.00	30-in. 2000.00		
15-in. 460.00	36-in. 3000.00		
16-in. 500.00			

Fisher Reducing Valve or Pressure Regulator



Type 10A

Reducing steam, water, air, gas, or oil. Very sensitive, responding quickly to the slightest variation or sudden draw on the service pressure. Reduces any initial power plant pressure to any desired low pressure in one reduction, will not chatter, stick nor allow pressure to build up. Vertical or inverted type. Angle or globe pattern sizes from 1/4-inch to 12-inch.

Angle Pattern			
Screwed	Stand.	Ex.	
1/4-in. \$25.00	1-in. \$35.00	\$36.00	
1/2-in. 25.00	1 1/4-in. 40.00	41.00	
1-in. 27.50	1 1/2-in. 45.00	46.00	
1 1/4-in. 30.00	2-in. 50.00	52.00	
1 1/2-in. 35.00	2 1/2-in. 60.00	62.50	
1 3/4-in. 42.50	3-in. 75.00	78.00	
2-in. 50.00	3 1/2-in. 87.50	92.00	
Globe Pattern			
Screwed	Stand.	Ex.	
1/4-in. \$27.50	1-in. \$35.00	\$36.00	
1/2-in. 27.50	1 1/4-in. 40.00	41.00	
1-in. 27.50	1 1/2-in. 45.00	46.00	
1 1/4-in. 28.50	2-in. 55.00	57.00	
1 1/2-in. 32.50	2 1/2-in. 65.00	67.50	
1 3/4-in. 37.50	3-in. 80.00	83.00	
1 3/4-in. 45.00	3 1/2-in. 90.00	94.50	
2-in. 52.50	4-in. 110.00	115.00	

Fisher Reducing Valve or Pressure Regulator with Increased Outlet



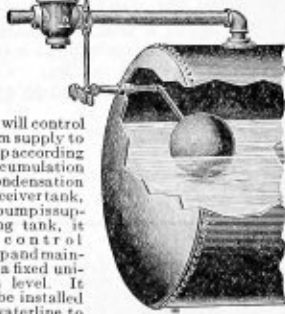
Type 11A

Specially designed for low pressure or any vacuum system of heating. An increased outlet allows quick expansion of steam after passing through the valve from the high pressure side and being so nearly balanced it reduces from high initial pressure to atmospheric pressure or below.

Vertical or inverted type, in sizes from 1/4-inch to 12-inch on the inlet side. Any size outlet.

Screwed			
1 1/2 x 1/4 or 1-inch			\$30.00
1 1/2 x 1-inch			31.00
1 x 1 1/2, 1 1/2 or 2			32.50
1 1/2 x 1 1/2, 2 or 2 1/2			37.50
1 1/2 x 2, 2 1/2 or 3			47.50
2 x 2 1/2, 3, 3 1/2 or 4-inch			55.00
Flanged			
1 x 1 1/2, 1 1/2 or 2	Std.	Ex. Hvy.	
1 1/2 x 1 1/2, 2 or 2 1/2	Flgd.	Inlet Flg.	
1 1/2 x 2, 2 1/2 or 3	\$ 40.00	\$ 41.00	
2 x 2 1/2, 3, 3 1/2 or 4	45.00	46.00	
2 1/2 x 3, 3 1/2, 4, 4 1/2 or 5	50.00	52.00	
3 x 3 1/2, 4, 4 1/2 or 5	55.00	57.00	
3 x 3 1/2, 4 1/2, 5 or 6	75.00	79.00	
3 1/2 x 4, 4 1/2, 5 or 6	85.00	88.00	
4 x 4 1/2, 5, 6 or 7	100.00	104.00	
4 x 4 1/2, 5, 6, 7 or 8	112.50	117.00	
5 x 6, 7, 8, 9 or 10	140.00	145.00	

Tank Controller Type 27



It will control steam supply to pump according to accumulation of condensation in receiver tank, or if pump supplying tank, it will control pump and maintain a fixed uniform level. It can be installed on waterline to control water level or the outflow where tank is discharging into sewer or against no pressure.

It consists of a Fisher balanced lever valve, connecting rods with turnbuckle, bell crank, stuffing box and seamless copper low-pressure float. Tank end of stuffing box has standard pipe thread.

We must have sure information as to service, whether for steam, cold or hot water, and size of manhole in tank.

Controlling devices with angle or globe valves, screwed or flanged openings, take same list. Valves with screwed opening up to 4 inches, inclusive. Flanged valves, 1-inch and larger.

List Prices for Complete Device			
1 1/2-in. \$30.00	3-in. \$ 55.00		
2-in. 32.50	3 1/2-in. 60.00		
1-in. 35.00	4-in. 70.00		
1 1/4-in. 37.50	4 1/2-in. 80.00		
1 1/2-in. 40.00	5-in. 90.00		
2-in. 45.00	6-in. 100.00		
2 1/2-in. 50.00			

American Dead Weight Gauge Tester

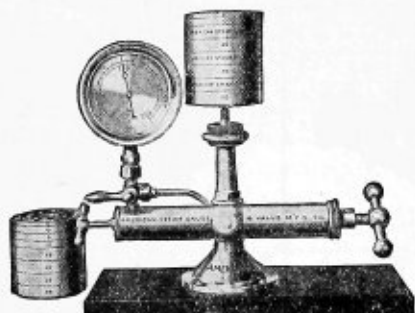


Fig. 312

As accurate as a mercury column, occupies much less space and costs little as compared to a mercury column.

Weights are used in units of 5 to 20 pounds and the reading on the gauge at all points on the dial is instantaneous. In a great many cases it is impossible, by the old fashioned testing apparatus, to hold the pressure on the gauge long enough to compare them.

It is the only instrument by which gauges can be tested accurately without the use of a mercury column.

Furnished complete with all necessary connections, wrenches, etc., for testing and adjusting gauges.

Put up in a neat, substantial box, weights in separate box. This instrument is equal to mercury column.

Pounds.....	200	300	500	800	1000
Price.....	\$100.00	\$120.00	\$140.00	\$170.00	\$200.00

Aprx. gross shpg. wt., pounds....	85	100	150	175	200
-----------------------------------------	----	-----	-----	-----	-----

American Inspectors Outfit



Fig. 325

Especially designed for the use of inspectors and traveling engineers.

This outfit furnished complete with 3½-inch nickel plated test gauge 300 pounds, one hand puller, one hand set, one pair pliers and one screw driver, brooches and files.

Put up in a neat mahogany velvet lined case.
Price.....\$40.00

American Test Pump

Portable test pump for pressures up to 500 pounds.

Pressure is indicated by screwing down the piston.

Can be easily carried in tool kit.

Test gauge furnished extra.
Price, brass.....\$12.00
Price, nickel plated.....14.00



The American-Thompson Improved Indicator

Its record is the most accurate of any indicator made, and by means of the new improved Detent motion several cards can be taken in the time ordinarily required for one. While the Detent motion is of great value on low speed engine indicating, its greatest value is in high speed work. Four cards in one minute have been taken in locomotive indicating.

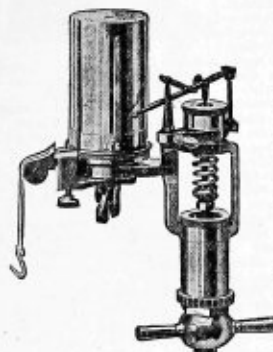
Each instrument is complete with two cylinder spring, any pressure. Two straightway cocks are necessary to make up right or left hand.

Steam engine indicator furnished with 2-inch drums.

Gas engine indicator furnished with 1½-inch drum.

Both packed in a neat mahogany case.

Steam engine indicator, any type. Price.....	\$55.00
Gas engine indicator, any type. Price.....	55.00
Ammonia engine indicator, any type. Price.....	75.00
New improved Detent motion on any type. Price.....	15.00
Ideal reducing wheel with bushings 18-72 inches. Price.....	11.25



Steam Traps

"Nason" or Standard Steam Trap

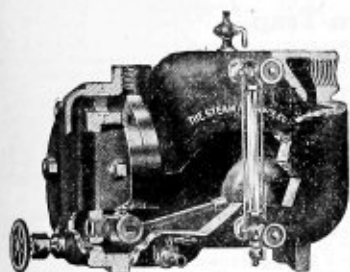


The Nason or Standard is one of the oldest and best known types of steam trap on the market and while we do not particularly recommend it, as the later types of traps have many improvements, there are many engineers who prefer it.

The Class B is for steam pressures not exceeding 20 pounds, the Class C for pressures to 70 pounds, and the "Side lug" for pressures from 40 to 150 pounds. Always state whether Class B, C, or Side lug.

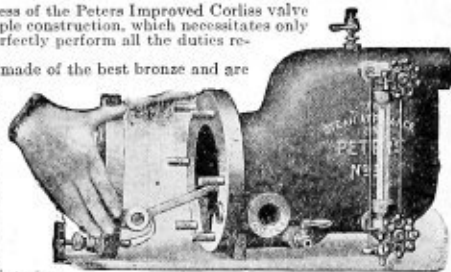
Number.....	1	2	3	4	5
Size pipe connections, inches.....	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{2}$	$1\frac{1}{2}$
Discharge per minute, pounds.....	4 $\frac{1}{2}$	6 $\frac{1}{2}$	10	15 $\frac{1}{2}$	23
Capacity, lineal feet of 1-inch pipe, feet.....	1500	3450	5250	7650	12000
Capacity, square feet, direct radiation.....	500	1150	1750	2550	4000
Approximate weight, pounds.....	44	86	119	191	238
Price each, Class B.....	\$16.00	\$20.00	\$27.50	\$42.50	\$70.00
Price each, Class C.....	16.00	20.00	27.50	42.50	70.00
Price each, Side lug.....	16.85	21.30	29.25	45.50	74.75

Peters Improved Corliss Valve Steam Trap



The secret of the success of the Peters Improved Corliss valve steam trap lies in its simple construction, which necessitates only two working parts to perfectly perform all the duties required of it.

All working parts are made of the best bronze and are interchangeable throughout. The working parts are easily accessible without breaking any pipe connections, by simply removing the head of trap. This operation brings the valve mechanism into plain view, as shown by the illustration on the right, and affords a close inspection of the trap interior.



To by-pass this trap, the by-pass stem is turned in until it bears on the float rod, which operates the Corliss valve and discharges the trap, thereby eliminating the necessity of the troublesome needle valve. The float is re-enforced seamless copper, tested to 500 pounds hydraulic pressure. Each trap is furnished complete with water gauge, air, frost or sediment cocks and by-pass. When ordering, state steam pressure with which trap will be used.

Number.....	1	2	3	4	5	6	7
Size pipe connection, inches.....	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{2}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$
Capacity, lineal feet of 1-inch pipe.....	3000	4000	6000	14000	18000	27000	40000
Capacity, square feet heating surface.....	1000	1350	2000	4500	6000	9000	13000
Capacity, pounds of water per hour.....	900	1500	2400	3500	5000	7500	15000
Weight, pounds.....	50	70	90	110	140	170	210
Price each.....	\$20.50	\$22.50	\$28.50	\$35.00	\$50.00	\$70.00	\$90.00

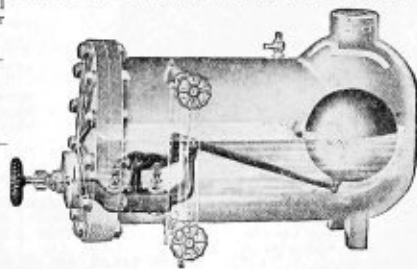
Davis Improved Steam Trap

For any working pressure up to 200 pounds

The Davis Improved steam trap will automatically relieve the water of condensation from a system of steam pipes without loss of steam. It has double cone shaped balanced valves, which are operated by a high pressure seamless copper float tested to 300 pounds pressure, and which are effectively sealed at all times by several inches of water, thus preventing all leakage of steam. It discharges continuously as fast as the water enters the trap, and due to the fact that the valves are balanced, it will operate equally well under any pressure—high, medium or low, without any alterations. Having two valves, the capacity of this trap is greater than a single valve trap, which, when not balanced, must have a small area. As the valves are cone shaped, they cannot stick or be affected in any way by oil, grease, sediment or foreign matter which may enter the trap.

The Davis Improved trap is provided with bosses which are tapped $\frac{3}{8}$ -inch so a gauge cock can be attached if wanted. It is also equipped with a $\frac{1}{4}$ -inch air cock, and a by-pass valve in the cover so steam can be given a free passage around the valves if desired. This trap will not return the water of condensation to the boiler, but it will discharge approximately two feet in height for every pound pressure under which it is operating or against any lower pressure.

No.	Price Each	Pipe Connections, Inches	Capacity		Weight, Pounds
			In Lin. Ft. of 1-inch Pipe	In Sq. Ft. of Radiat'g Surface	
00	\$15.00	$\frac{1}{2}$	1,500	500	25
0	20.00	$\frac{3}{4}$	3,000	1,000	40
1	30.00	1	6,500	2,175	60
2	45.00	$1\frac{1}{2}$	15,000	5,000	80
3	60.00	$1\frac{1}{2}$	20,000	6,675	125
4	80.00	2	30,000	10,000	135
5	100.00	$2\frac{1}{2}$	40,000	13,350	240
6	125.00	3	60,000	20,000	250



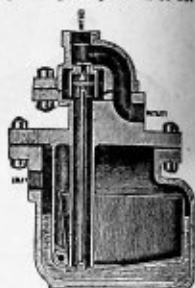
Strong Steam Trap

The Strong Steam Trap will automatically remove the condensation from any system operated above atmospheric pressure, whether steam, gas or air. The action is intermittent, which causes a pumping effect upon the condensation lying in sags or pockets or collected in drops on the inside of steam lines or coils, etc. It will discharge against any pressure less than the pressure of the trap; for example, if the gauge shows a pressure of 100 pounds the trap will discharge into any system carrying 99 pounds or less. When it is desired to lift the water from the trap to an elevation, the following formula may be used: One pound pressure will raise water two feet in height; therefore if the pressure of the trap is 25 pounds, the condensation may be discharged into a receiver 50 feet in height.

The Strong steam trap is furnished at the same price for four different pressures: Gravity for 10 pounds or less, low pressure for 10 to 30 pounds, standard pressure for 30 to 125 pounds and high and high pressure for 125 pounds and higher. Standard pressure is furnished unless otherwise ordered.

Number	0	1	2	3	4	5
Capacity, lineal feet of 1-inch pipe	3500	5000	7200	12000	17000	30000
Capacity, square feet of radiation	1100	1600	2400	4000	5500	9600
Capacity, pounds of water per hour	350	550	800	1500	2400	3500
Size of pipe connections, inches	$\frac{3}{4}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2
Price each	\$27.50	\$30.50	\$40.00	\$55.00	\$75.00	\$105.00

Important.—Be sure to state pressure when ordering.

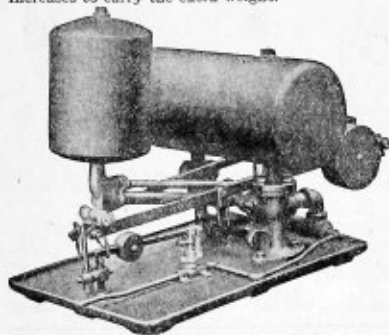


Chicago Return Tilting Steam Trap

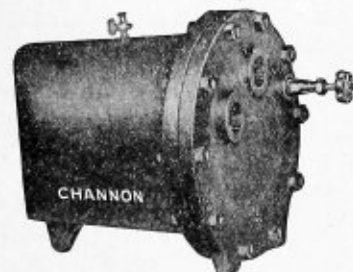
The Chicago Return Steam Trap is one of the greatest economizers of any trap at the present developed, having positive capacity and absolute surety of action. Unlike other tilting traps it differs in having unlimited capacity of the main body, which is fixed and unmovable, the operating tanks and trunnions are very small, and are packed with metallic packing which never burns out. The trunnions are perfectly balanced requiring a minimum amount of pressure on the glands to prevent leaking, and imposing only a trifle of weight on same as compared with all other tilting traps which have to enlarge trunnions and tanks as the capacity increases to carry the extra weight.

Hot condensed water is saved and returned to the boiler with this trap, using only the amount of steam necessary to displace the water in the fixed tank. This is equivalent to about one-tenth the steam required to operate a steam pump, besides saving the heat in the water.

The Chicago Return Steam Trap is applicable to working steam pressure up to 250 pounds, and is designed with a large factor of safety. As all working parts are on the outside, the trap is simply and easily inspected. The tanks are all acetylene welded and galvanized.



No.	Price Each	Pipe Connections, Inches		Capacity in Pounds per Hour
		Inlet	Steam	
A	\$ 90.00	1	1	1783
B	154.00	$1\frac{1}{4}$	1	3180
C	193.00	$1\frac{1}{2}$	1	4583
D	247.00	2	1	8158
E	383.00	$2\frac{1}{2}$	1	12750
F	495.00	3	1	18358

Kieley Standard Steam Trap
High and Low Pressure

No. 708. Low pressure, 0 to 30 pounds.
No. 710. High pressure, 30 to 125 pounds.

Number	1	2	3	4	5	6	7
Cap. lin. ft. of 1-in. pipe	4000	6000	10000	15000	25000	35000	50000
Cap. sq. ft. radiation	1000	2000	3300	5000	8300	11500	16500
Cap. lbs. water per hr.	500	725	1200	2000	3000	4000	6000
Size pipe conn., ins.	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3
Price each	\$25.00	\$35.00	\$45.00	\$60.00	\$80.00	\$100.00	\$125.00

For draining condensation from steam apparatus of all kinds, high or low pressures. Discharges condensation automatically into any receptacle and against any pressure, so long as the pressure on the discharge is lower than on the inlet of trap.

Should not be applied to pressures higher than stamped on the brass plate attached to each trap. Will work on lower pressures but at reduced capacities.

The capacity of a trap depends upon pressure on outlet and inlet together with size of discharge valve.

Sarco Steam Trap



The simplest trap made. It can be inserted anywhere in a steam pipe. A Sarco cartridge containing an expansive fluid is inserted into the body. This operates a corrugated hermetically sealed tombar tube.

Size Inches	Low Pressure 6 to 30 lbs. Price, Each	High Pressure 50 to 200 lbs. Price, Each
$\frac{3}{4}$	\$6.00	\$7.75
$1\frac{1}{2}$	6.00	7.75
$1\frac{1}{2}$	9.50	10.35
1	11.25	12.10
$1\frac{1}{4}$	24.15	28.45
$1\frac{1}{2}$	30.25	34.50
2	35.80	45.80
$2\frac{1}{2}$	51.75	60.40
3	60.40	77.65

When ordering steam traps always state the range of pressures.



The Burt

Exhaust Pipe Heads

These exhaust heads are attached to exhaust pipes to prevent the oil and wet steam from escaping upon the roofs of buildings, etc., and to reclaim the steam, as the same water used over and over is preferable to fresh water which contains lime and scale forming sediment.

The base and drips are of malleable iron. The seams being water tight prevent overloading and blowing up.

The operation is such that the steam coming up does not come in contact with the condensed steam, making it possible for only dry steam to escape.

Painted with anti-rust paint.



The Standard

The Burt.—The exhaust steam delivered through the pipe strikes the drum immediately over the inlet; this breaks up the steam into the smallest particles, condensing some of the vapor. The greatest volume rises to the small projector, is cast over to the flange, then forced down the inner wall, and coming out of the opening again rises to the top of the head and seeks its way out at the outlet pipe. When it comes in contact with the cold air, it is condensed into water, which drips down the wall, is caught on trough shaped lugs, drips down the tubes which carry it to the outlet pipe and thence out through the drip.

The Standard.—The separation is made by the utilization of centrifugal force, as the incoming steam is given a whirling motion at the top of the head, the water and oil strike the sides, flow down to the drip outlet at the bottom and do not come in contact with the incoming steam.

Sizes up to 5 inches have heavy screwed base. Larger sizes are fitted with heavy flanges.

Specifications and Prices

Size, Inches	Price Each	Burt Exhaust Head					Standard Exhaust Head				
		Height, Inches	Diameter, Inches	Size of Drip, Inches	Net Weight, Pounds	Shipping Weight, Pounds	Height, Inches	Diameter, Inches	Size of Drip, Inches	Net Weight, Pounds	Shipping Weight, Pounds
1 or 1½	\$ 8.00	16	10	¾	18	30	21	16	¾	27	33
2 or 2½	10.00	18	12	1	18	30	27	21	1	27	33
3 or 3½	12.00	20	14	1	35	50	31	25	1	41	56
4 or 4½	16.00	27	16	1	49	65	37	30	1	62	77
5	20.00	29	18	1½	72	89	40	32	1½	70	90
6	24.00	31	20	1½	90	125	43	35	1½	102	125
7	30.00	36	22	1½	95	130	47	39	1½	127	157
8	36.00	39	24	1½	125	152	50	42	1½	190	228
9	42.00	43	26	1½	160	210	53	45	1½	225	265
10	50.00	46	30	2	182	222	57	49	2	245	290
11	50.00	46	30	2	182	222					
12	60.00	48	32	2	270	435	64	55	2	345	375
13	70.00	51	34	2	305	470	67	58	2	375	405
14	80.00	56	36	2	385	550	71	62	2	400	490
15	94.00	59	39	2	500	659	74	65	2	460	545
16	100.00	62	42	2	559	799	77	69	2	525	620
17	108.00	69	45	3	610	840					
18	120.00	76	48	3	700	950	85	76	3	600	720
19	132.00	79	50	3½	785	1035					
20	144.00	82	52	3½	900	1150	95	82	3½	800	975



Improved Steam Condensing Exhaust Pipe Heads

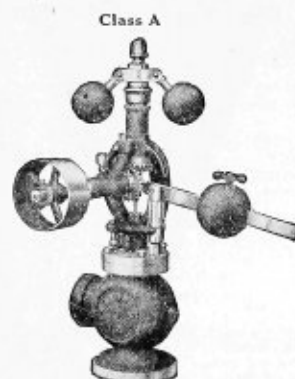
Escape Dry and Noiseless. No Back Pressure

These exhaust heads completely stop the emission of grease and water from the pipe, and save roofs and walls from deterioration.

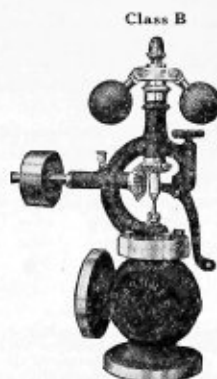
Made of galvanized steel, in all sizes from 1-inch to 48-inch diameter of pipe opening.

Pipe Size, Inches	Price Each	Pipe Size, Inches	Price Each
1 or 1½	\$ 20.00	10	\$125.00
2 or 2½	25.00	11 or 12	150.00
3 or 3½	30.00	13	175.00
4 or 4½	40.00	14	200.00
5	50.00	15	235.00
6	60.00	16	250.00
7	75.00	17	270.00
8	90.00	18	300.00
9	105.00		

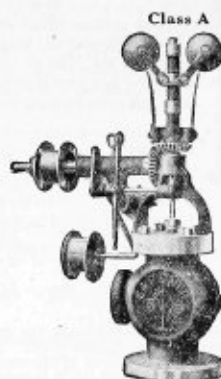
Gardner Engine Governors



Standard Governors



Standard Governors



Spring Governors



Class A is of the gravity action pattern and is especially adapted for the larger types of stationary engines. In this governor the centrifugal force of the balls is opposed by the resistance of a weighted lever and the speed is varied by the position of the weight on the lever. Has automatic safety stop, which is simple and reliable in action. If belt brakes or slips off pulley the valve is instantly closed. Made in sizes $1\frac{1}{4}$ to 16-inch, inclusive.

Class B combines both spring and gravity actions, and is adapted for all styles of slow and medium speed stationary engines. The centrifugal force of the balls operates against the resistance of a coiled steel spring. By means of a screw the compression on the spring can be changed to give a wide range of speed. A continuation of the speed lever makes a convenient sawyer's hand lever. Governor can be controlled from a distance by attaching a cord to speed lever.

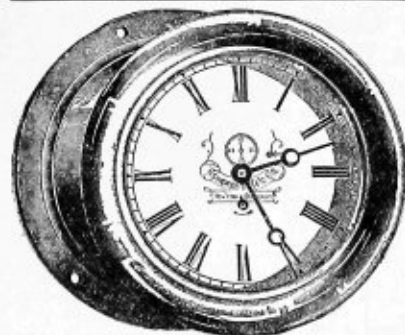
Spring Governors

Spring governors are recommended for traction and high speed stationary engines. They are quick and sensitive in action, responding instantly to changes of load. As the name implies, they are spring-action entirely and work in any position. Class A is fitted with speeder, sawyer's lever and automatic stop. Class B the same, but without automatic stop.

Connection

We regularly furnished the $1\frac{1}{4}$ -inch governors with screwed side and base, the $1\frac{1}{2}$ -inch and 2-inch screwed side and flanged base, and the $2\frac{1}{4}$ -inch and larger flanged side and base. All flanges are United States standard unless otherwise ordered.

Size of governor, Diameter of opening	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{4}$	$2\frac{3}{4}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5	6	7
Class B—plain, each	\$14.00	\$16.00	\$18.00	\$21.00	\$25.00	\$30.00	\$35.00	\$40.00	\$50.00	\$60.00	\$71.00	\$83.00	\$94.00	\$122.00	\$150.00
Class B—finished, ea	16.00	18.00	20.00	24.00	29.00	34.00	40.00	45.00	58.00	69.00	81.00	94.00	106.00	136.00	166.00
Weight, pounds	15	17	18	32	47	63	72	115	130	140	203	232	290	380	475
Class A—plain, each		\$18.50	\$21.00	\$24.50	\$29.50	\$36.00	\$42.00	\$48.00	\$59.00	\$71.00	\$83.00	\$96.00	\$109.00	\$140.00	\$170.00
Class A—finished, ea		20.50	23.00	27.50	33.50	40.00	47.00	53.00	67.00	80.00	93.00	107.00	121.00	154.00	188.00
Weight, pounds		19	20	36	51	70	80	120	140	150	220	230	300	400	500



Engine Room Clocks

Made with Heavy Brass or Nickel Plated Cases; Rings are Hinged and Furnished with Lock

Size Dial, Inches	Movement	Price Each	
		Brass Case	Nickel Plated Case
5	Seth Thomas or Boston	\$ 35.00	\$ 36.00
6	Seth Thomas or Boston	40.00	41.50
6 $\frac{1}{2}$	Seth Thomas or Boston	45.00	47.00
8 $\frac{1}{2}$	Seth Thomas or Boston	55.00	57.50
10	Seth Thomas or Boston	65.00	68.00
6 $\frac{1}{2}$	Howard	70.00	72.00
8 $\frac{1}{2}$	Howard	80.00	82.50
10	Howard	90.00	93.00
12	Howard	110.00	114.00

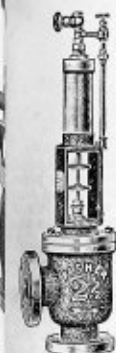
Fisher Pump Governors

Regular Pump Governor

Excess Pressure Governor

Vacuum Pump Governor

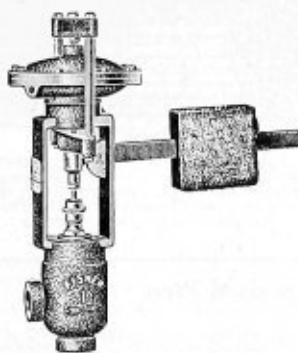
Diaphragm Regulator



No. 2



No. 4



No. 8



No. 55

No. 2. Regular pattern: This governor automatically starts and stops pumps working under pressure, and controls them so as to maintain a uniform pressure on discharge side at all times while in operation. Thousands are in daily use in waterworks, hydraulic elevators, and for fire, boiler feed railroad, mine pump and air compressor service. Simply constructed, easily operated and automatic in action. When ordering state Fig. number, size of pipe, whether angle or globe and screwed or flanged, minimum and maximum boiler and discharge pressure. If used with anything besides cold water name the liquid.

No. 4. Constant excess pressure governor. Guaranteed to maintain a constant over or excess pressure in the feed line at all times, regardless of variation of boiler pressure. Automatically controls and regulates the speed of the pump according to the requirements of the boiler. It is without exception the most durable, convenient, simple and easily operated machine of its kind. We recommend it for hard service where the most exacting duty and closest regulation is desired, and must be maintained. Be sure to give full information regarding pressures, style and working conditions when ordering.

No. 8. Vacuum pump governor. For use on all types of steam operated vacuum pumps used in connection with vacuum systems of heating or wherever a certain number of inches of vacuum must be maintained. It is absolutely automatic and easily adjusted. We guarantee this governor to be thoroughly reliable. Diaphragm and lever mechanism can be swiveled or turned in any direction desired. It is highly essential that we be given complete information regarding pressures, conditions, etc.

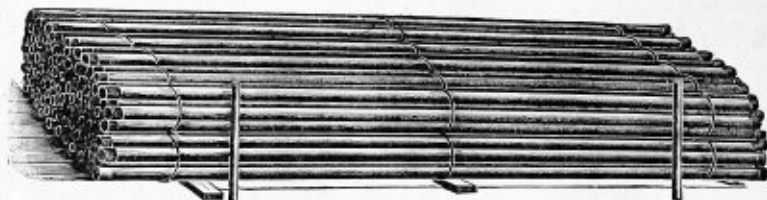
No. 55. Spring controlled diaphragm regulating valve. For controlling steam driven pumps operating on closed systems and especially adapted to low pressure pumps. When information is given we furnish a special oil diaphragm for fuel oil pumps.

It can be used as a pressure reducing valve in any position, but for vertical pipe line it should be fitted with pilot guide. Sizes $\frac{3}{4}$ to 1-inch have phosphor bronze bodies and inner parts; $1\frac{1}{4}$ -inch and larger have iron bodies and phosphor bronze valve seats. Also successfully used to control the flow of fuel oil or gas to boiler using the boiler pressure as controlling factor.

All flanged valves are furnished faced and drilled. These valves are for 125-pound steam working pressure. Prices on extra heavy valves furnished on application. Weights given below are for globe pattern, screwed up to $1\frac{1}{2}$ inches and flanged in larger sizes.

Regular Pump, and Excess Pressure, Governors, and Diaphragm Regulators						Vacuum Pump Governors				
Size, Inches	Angle or Globe Screwed	Angle		Globe		Size, Inches	Screwed		Flanged	
		Standard Flanged	Extra Heavy	Standard Flanged	Extra Heavy		Angle	Globe	Angle	Globe
$\frac{3}{4}$	\$25.00					$\frac{1}{2}$	\$30.00	\$30.50		
$\frac{1}{2}$	25.00					$\frac{3}{4}$	30.00	30.50		
$\frac{1}{4}$	27.50					1	35.00	36.00	\$40.50	\$42.50
1	30.00					$1\frac{1}{4}$	40.00	41.00	45.00	48.50
$1\frac{1}{4}$	35.00					$1\frac{1}{2}$	47.50	48.50	50.00	53.00
$1\frac{1}{2}$	42.50					2	55.00	56.00	55.00	58.50
2	50.00	\$50.00	\$52.00	\$52.50	\$54.50	$2\frac{1}{2}$	63.00	64.00	65.00	70.00
$2\frac{1}{4}$	58.00	60.00	62.50	63.00	65.00	3	75.00	76.00	80.00	88.00
3		75.00	78.00	78.50	81.50	$3\frac{1}{2}$			92.50	100.00
$3\frac{1}{2}$		87.50	92.00	90.00	94.50	4			105.00	115.00
4		100.00	105.00	105.00	110.00					
5		125.00	135.00	130.00	140.00					

Standard Wrought Pipe for Gas, Steam and Water



When ordering pipe, it should be clearly specified whether "Wrought Steel" or genuine "Wrought Iron" Pipe is wanted. A great many orders are received which merely call for pipe. On such orders we always ship black wrought steel pipe. A few years ago, owing to the competitive condition of the market, a cheaper pipe was placed on the market and was known as "Merchant or Standard Wrought Pipe." This grade is no longer made, however, and all pipe we sell is full "Card" or "Standard" weight, subject, however, to 5 per cent variation. All weights and dimensions given in the tables below are nominal.

Standard Pipe

Nominal Inside Diameter, Inches	Price per Foot	Nominal Thickness, Inches	Nominal Weight per Foot	No. of Threads per Inch of Screw
1/4	\$0.05 1/2	.068	.245	27
1/4	.06	.088	.425	18
1/2	.06	.091	.568	18
3/4	.08 1/2	.109	.852	14
1	.11 1/2	.113	1.134	14
1 1/4	.23	.135	1.684	11 1/2
1 1/2	.27 1/2	.140	2.281	11 1/2
2	.37	.145	2.731	11 1/2
2 1/2	.58 1/2	.154	3.678	11 1/2
3	.76 1/2	.203	5.819	8
3 1/2	.92	.216	7.616	8
4	1.09	.226	9.202	8
4 1/2	1.27	.237	10.889	8
5	1.48	.247	12.642	8
6	1.92	.258	14.810	8
7	2.38	.280	19.185	8
8	2.50	.301	23.769	8
9	2.88	.277	25.000	8
10	3.45	.322	28.809	8
11	3.45	.342	34.188	8
12	3.20	.279	32.000	8
13	3.50	.307	35.000	8
14	4.12	.365	41.132	8
15	4.63	.375	46.247	8
16	4.50	.330	45.000	8
17	5.07	.375	50.706	8
18	5.60	.375	55.824	8
19	6.10	.375	60.375	8
20	6.50	.375	64.500	8

The permissible variation in weight in 5 per cent above and 5 per cent below figures given in table above.

All weights given in pounds and all dimensions given in inches.

Unless otherwise ordered standard pipe is always furnished with threads and couplings in random lengths (16 to 20 feet).

For cut lengths, an extra charge will be made for cutting and threading.

For pipe smoothed on the inside, known as reamed and drifted, an extra charge will be made above standard pipe.

Prices For Cutting Standard Threads

Size, inches	1/4	1/2	3/4	1	1 1/4	1 1/2	2
Price each	\$0.05	\$0.05	\$0.05	\$0.05	\$0.05	\$0.06	\$0.07
Size, inches	1 1/2	2	2 1/2	3	3 1/2	4	4 1/2
Price each	.08	.10	.15	.20	.25	.35	.45
Size, inches	5	6	7	8	9	10	12
Price each	.55	.70	.85	1.00	1.25	1.50	2.50

Extra Strong and Double Extra Strong Wrought Pipe

Furnished in random lengths and with plain ends, unless otherwise specified. Random length Extra Strong and Double Extra Strong Pipe is considered to be 12 to 22 feet, but we reserve the right of supplying not exceeding 5 per cent of total order in lengths from 6 to 12 feet. For cut lengths, an extra charge will be made above random. For pipe fitted with threads and couplings and extra charge will be made above regular.

Extra Strong Wrought Pipe

Nominal Inside Diameter, Inches	Price per Foot	External Diameter, Inches	Thickness, Inches	Weight per Foot, Pounds
1/4	\$0.12	.405	.095	.314
1/4	.07 1/2	.540	.119	.535
1/2	.07 1/2	.675	.126	.738
3/4	.11	.840	.147	1.087
1	.22	1.050	.154	1.473
1 1/4	.30	1.315	.179	2.171
1 1/2	.36 1/2	1.660	.191	2.996
2	.50 1/2	1.900	.200	3.631
2 1/2	.77	2.375	.218	5.022
3	1.03	2.875	.276	7.661
3 1/2	1.25	3.500	.300	10.252
4	1.50	4.000	.318	12.506
4 1/2	1.80	4.500	.337	14.983
5	2.08	5.000	.355	17.611
6	2.86	5.563	.375	20.778
7	3.81	6.625	.432	28.673
8	4.34	7.625	.500	38.048
9	4.90	8.625	.500	48.728
10	5.48	10.750	.500	54.735
11	6.10	11.750	.500	60.075
12	6.55	12.750	.500	65.415

Permissible weight variation 5 per cent above and below.

Double Extra Strong Wrought Pipe

Nominal Inside Diameter, Inches	Price per Foot	External Diameter, Inches	Thickness, Inches	Weight per Foot, Pounds
1/4	\$0.32	.840	.252	1.714
3/4	.35	1.050	.434	2.440
1	.37	1.315	.599	3.659
1 1/4	.52 1/2	1.660	.896	5.214
1 1/2	.65	1.900	1.100	6.408
2	.91	2.375	1.503	9.029
2 1/2	1.37	2.875	1.771	13.695
3	1.86	3.500	2.300	18.583
3 1/2	2.30	4.000	2.728	22.850
4	2.76	4.500	3.152	27.541
4 1/2	3.26	5.000	3.580	32.530
5	3.86	5.563	4.063	38.552
6	5.32	6.625	4.897	53.160
7	6.35	7.625	5.875	63.079
8	7.25	8.625	6.875	72.424

Permissible weight variation 10 per cent above and below.

STANDARD RE-INFORCED SPIRAL PIPE

Section of Pipe with Flange Form of Coupling Welded on One End, Sleeve Coupling in Other End

The construction of reinforced steel pipe is such that the formed double lap seam has an enormous and uniform pressure resistance throughout. The reinforcing band, which follows the edge of the strip, is in fact a strengthening and stiffening rib.

There are no rivets nor lapped joints to interfere with the flow, or to allow substances to adhere and eventually clog the pipes. It therefore offers less frictional resistance than riveted pipe.



Showing Form of Interlocking Seam

It is smooth on the inside, has the reinforcing band running on the outside, its full length, and can be made any practical length. The strip is not welded or soldered onto the pipe but is interlocked in the form of a continuous seam.

Ample folds are made on both strips so that a large bearing surface, or contact is obtained at the seam. The advantages of this reinforcing band and smooth inside are appreciated by engineers who have had to contend with the frictional resistance in pipes having overlapping surfaces and projecting rivet heads.

A soft openhearth steel is used which will stand the required bending, and the steel is not weakened by being punched full of holes near the edge.

Nor is there as great a possibility of this pipe leaking as that of any riveted

construction. When winding the steel into spiral form, advantage is taken of all the tensile strength and stiffness in the material and consequently lighter gauges of pipe can be used for pressures than when other methods of construction are employed.

Tests show that it will stand close to the tensile strength limit of the steel used. The form of seam is such that the greater the internal pressure the tighter it becomes. There are four thicknesses of metal in the seam, and the pipe will withstand extreme pressure from within or without. The seam is its strongest part.

The methods of connecting lengths of this pipe is much the same as those used by makers of straight, riveted or spiral riveted pipe. Several forms of connection are used but the flanged joint is one of the best. It is easily and quickly assembled by laborers and allows of slight variations in grade of pipe line.

It is galvanized or asphalted after formation. The asphalt, or bitumite, coating is applied at high temperature and will not crack or peel off from handling or freezing.

Information Needed: In order to quote or advise intelligently as to gauges and diameters of pipe to use we should be informed as to:

- First—The purpose for which it is to be used.
- Second—The approximate working pressure or load.
- Third—If for water, flow line or pumping pressure.
- Fourth—If it is to be exposed to the air or buried underground, for blow pipe or vacuum.
- Fifth—The diameter and total number of feet required.
- Sixth—Style or kind of connections desired.
- Seventh—Diameter of flanges when pipe is to be connected up to pumps or special fittings.
- Eighth—Length of each piece preferred.



Showing Smooth Inside Surface

List Prices per foot and Estimated Weight per foot

Inside Dia., Ins.	U. S. Gauge	Price Plain End Galv.	Price Plain End Asphtd	Wgt. Plain End Lbs.	Wgt. with Flanges 20-ft.	Apprx. Bursting Press.	Areas	Inside Dia., Ins.	U. S. Gauge	Price Plain End Galv.	Price Plain End Asphtd	Wgt. Plain End Lbs.	Avg. Wgt. with Flanges 20-ft.	Apprx. Bursting Press.	Areas
3	18	\$0.49	\$0.37	185	210	2000	7.1	18	16	\$3.10	\$2.68	1550	1910	415	254
	20	.45	.32	150	175	1500			14	3.75	2.70	2000	2400	510	
4	18	.70	.64	325	350	1875	12.6		12	4.95	3.50	2800	3200	730	
	20	.65	.60	245	270	1500			10	6.05	4.30	3500	3900	930	
	20	.60	.46	200	228	1125		20	16	3.40	2.90	1675	2060	375	314.2
6	16	1.00	.75	500	550	1250	28.3		14	4.15	3.00	2300	2700	465	
	18	.85	.65	360	410	1000			12	5.45	3.90	3100	3500	655	
8	16	1.40	1.00	650	725	935	50.3		14	6.70	4.75	3900	4300	830	
	18	1.20	.86	460	535	750		22	14	4.55	3.30	2500	3000	415	380
9	16	1.50	1.20	750	844	820	63.6		12	6.00	4.25	3400	3900	595	
	18	1.30	.90	525	619	660		10	7.30	5.20	4300	4800	760		
	16	1.70	1.35	800	915	650	78.3	24	14	4.95	3.55	2700	3300	385	452
12	10	3.95	2.85	2300	2500	1400	113.1		12	6.50	4.50	3700	4300	540	
	12	3.25	2.35	1900	2000	1075			10	7.95	5.65	4600	5200	700	
	14	2.50	1.80	1400	1600	775		26	14	6.06	4.30	3500	4100	324	530
	16	2.05	1.67	1025	1155	625			12	7.00	5.00	4000	4600	500	
14	14	3.00	2.10	1600	1900	670	153.9		10	8.00	6.10	5000	5600	635	
	16	2.45	1.84	1200	1360	535		30	14	6.80	5.30	3800	4400	280	706
16	14	3.45	2.45	1800	2100	580	201		12	8.00	5.65	4700	5300	410	
	16	2.75	2.16	1375	1665	460			10	9.85	7.00	5800	6400	540	

H.Channon Company Chicago

Spiral Riveted Pipe



Galvanized Pipe is furnished in any lengths up to 20 feet and is used for Exhaust Steam, Suction Pipe, Paper and Pulp, Compressed Air, etc.

Asphalted Pipe is furnished in any lengths up to 30 feet and is used for Discharge Pipe, Dredging, Hydraulic Mining, Pump Mains, Flow Lines, etc.

Prices With Plain Ends, Without Connections

Inside Diameter, Inches	Thickness, U. S. Standard Gauge	Price per Foot		Approximate Weight per Foot	Approximate Bursting Strength, in Lbs. per sq. in.	Inside Diameter, Inches	Thickness, U. S. Standard Gauge	Price per Foot		Approximate Weight per Foot	Approximate Bursting Strength, in Lbs. per sq. in.
		Asphalt, Coated	Galvanized					Asphalt, Coated	Galvanized		
3	20	\$0.354	\$0.474	1.9	1500	20	14	\$ 2.92	\$ 4.06	22.1	470
	18	.392	.527	2.3	2000		12	3.82	5.37	30.6	660
4	18	.505	.680	3.0	1500	22	10	4.68	6.59	38.3	840
	16	.520	.728	3.7	1875		8	5.65	7.94	46.2	1030
5	18	.613	.826	3.7	1200	24	6	6.62	9.28	54.1	1220
	16	.631	.882	4.5	1500		12	4.21	5.91	33.7	595
6	16	.744	1.040	5.3	1250	26	10	5.15	7.26	42.2	765
	14	.867	1.207	6.6	1560		8	6.22	8.73	50.8	940
7	12	1.150	1.614	9.2	2170	28	6	7.28	10.21	59.5	1108
	16	.870	1.216	6.2	1070		12	4.47	6.41	36.5	540
8	14	1.012	1.410	7.7	1340	30	10	5.59	7.88	45.7	705
	12	1.340	1.880	10.7	1860		8	6.75	9.48	55.2	820
9	16	.995	1.395	7.1	935	32	6	7.90	11.09	64.6	1015
	14	1.161	1.620	8.8	1170		12	4.94	6.94	39.5	565
10	12	1.542	2.166	12.3	1640	34	10	6.05	8.53	49.5	650
	16	1.116	1.564	8.0	835		8	7.30	10.27	59.8	795
11	14	1.300	1.812	9.9	1045	36	6	8.56	12.01	70.0	935
	12	1.743	2.447	13.9	1460		3	10.38	14.54	84.9	1154
12	16	1.237	1.731	8.8	750	38	10	6.32	8.90	51.7	605
	14	1.445	2.013	11.0	935		8	7.78	10.93	63.6	735
13	12	1.914	2.688	15.3	1310	40	6	9.37	13.14	76.6	870
	16	1.354	1.897	9.7	680	42	3	11.05	15.48	90.4	1071
14	14	1.576	2.198	12.0	850		10	6.94	9.78	56.8	560
	12	2.080	2.922	16.6	1200	44	8	8.39	11.80	68.7	685
15	16	1.477	2.067	10.6	625		6	9.84	13.80	80.5	810
	14	1.719	2.395	13.0	780	46	3	11.94	16.72	97.7	1000
16	12	2.270	3.188	18.2	1080		10	7.53	10.60	61.6	525
17	16	1.60	2.25	11.4	575	48	8	9.10	12.76	74.3	645
	14	1.86	2.59	14.1	720		6	10.65	14.93	87.1	760
18	12	2.46	3.45	19.7	1010	50	3	12.94	18.11	105.8	940
	14	2.00	2.91	15.9	670	52	10	8.00	11.25	65.4	490
19	12	2.77	3.89	22.2	940		8	9.63	13.53	78.8	600
	10	3.38	4.75	27.6	1210	54	6	11.45	16.06	93.6	715
20	14	2.17	3.12	17.0	625		3	13.74	19.23	112.3	880
	12	2.97	4.16	23.7	875	56	10	8.45	11.90	69.1	470
21	10	3.62	5.10	29.6	1125		8	10.20	14.33	83.4	570
	14	2.36	3.33	18.1	585	58	6	11.96	16.77	97.8	680
22	12	3.15	4.43	25.2	820		3	14.53	20.34	118.8	830
	10	3.85	5.42	31.5	1050	60	10	9.37	13.20	76.7	420
23	14	2.63	3.66	19.9	520		8	11.29	15.87	92.4	515
	12	3.40	4.84	27.6	730	62	6	13.27	18.60	108.5	610
	10	4.22	5.95	34.5	940		3	16.10	22.56	131.8	750

Working pressure should not be more than 25% of the ultimate strength or bursting pressure.

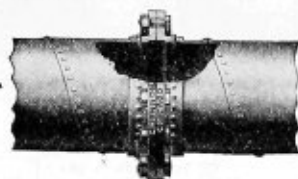
First gauge of thickness denotes Standard Pipe; second gauge, Extra Heavy Pipe, and third gauge is Double Extra Heavy Pipe.

Any gauge or diameter quoted upon request.

Flanges, Bolts and Gaskets

For Spiral Riveted Pipe

Flanges are Forged Steel with Spiral Pipe Standard Diameter and Drilling



Size Inches	Outside Diameter, Inches	Thickness of Flange, Inches	FLANGES—Price, each, with Bolt Holes				Dimensions of Drilling			Bolts, Per Set		Gask- ets, Each
			Black		Galvanized		N ^o of Bolts,	Size of Bolts, Inches	Diameter of Bolt Circle, Inches	Black	Galv.	
			Flange Not Attached	Flange Attached to Pipe	Flange Not Attached	Flange Attached to Pipe						
3	6	$\frac{5}{16}$	\$.90	\$ 1.75	\$ 1.10	\$ 1.90	4	$\frac{1}{8}$	4 $\frac{3}{4}$	\$.17	\$.23	\$.17
4	7	$\frac{5}{16}$	1.05	2.05	1.30	2.30	8	$\frac{1}{8}$	5 $\frac{1}{8}$	.35	.45	.20
5	8	$\frac{5}{16}$	1.35	2.40	1.60	2.70	8	$\frac{1}{8}$	6 $\frac{1}{8}$	.35	.45	.25
6	9	$\frac{3}{8}$	1.60	2.75	2.00	3.15	8	$\frac{1}{2}$	7 $\frac{7}{8}$	.45	.60	.30
7	10	$\frac{3}{8}$	1.70	2.95	2.15	3.40	8	$\frac{1}{2}$	9	.45	.60	.35
8	11	$\frac{3}{8}$	2.15	3.45	2.80	4.05	8	$\frac{1}{2}$	10	.45	.60	.45
9	13	$\frac{3}{8}$	2.65	4.10	3.50	4.90	8	$\frac{1}{2}$	11 $\frac{1}{4}$	.45	.60	.60
10	14	$\frac{3}{8}$	2.95	4.50	3.95	5.45	8	$\frac{1}{2}$	12 $\frac{1}{4}$	.45	.60	.80
11	15	$\frac{1}{2}$	3.10	4.65	4.15	5.65	12	$\frac{1}{2}$	13 $\frac{3}{8}$	.65	.90	.90
12	16	$\frac{1}{2}$	3.25	4.75	4.35	5.85	12	$\frac{1}{2}$	14 $\frac{1}{4}$	.65	.90	1.00
13	17	$\frac{1}{2}$	3.60	5.15	4.85	6.25	12	$\frac{1}{2}$	15 $\frac{1}{4}$	.65	.90	1.10
14	18	$\frac{1}{2}$	3.80	5.50	5.10	6.80	12	$\frac{1}{2}$	16 $\frac{1}{4}$	.65	.90	1.20
15	19	$\frac{1}{2}$	4.75	7.75	6.35	9.35	12	$\frac{1}{2}$	17 $\frac{1}{4}$	.70	.95	1.45
16	21 $\frac{1}{4}$	$\frac{5}{8}$	6.50	8.60	9.00	11.00	12	$\frac{1}{2}$	19 $\frac{1}{4}$	.70	.95	1.70
18	23 $\frac{1}{4}$	$\frac{5}{8}$	7.90	10.30	11.00	13.35	16	$\frac{5}{8}$	21 $\frac{3}{4}$	1.30	1.95	2.10
20	25 $\frac{1}{4}$	$\frac{5}{8}$	9.30	12.50	12.75	15.85	16	$\frac{5}{8}$	23 $\frac{3}{4}$	1.30	1.95	2.40
22	28 $\frac{1}{4}$	$\frac{1}{2}$	11.60	15.95	15.90	20.25	16	$\frac{5}{8}$	26	1.30	1.95	3.35
24	30	$\frac{1}{2}$	13.00	18.00	17.70	22.70	16	$\frac{5}{8}$	27 $\frac{3}{4}$	1.30	1.95	3.80

We furnish threaded companion flanges to match the above standard.

Flanged Fittings for Spiral Riveted Pipe

Cast Iron—Faced and Drilled with Spiral Pipe Standard

Size, Inches	90° Elbows		45° Elbows		Tees		Reducing Tees		Crosses		Y Branches	
	Black	Galvanized	Black	Galvanized	Black	Galvanized	Black	Galvanized	Black	Galvanized	Black	Galvanized
3	\$ 2.25	\$ 2.80	\$ 1.95	\$ 2.35	\$ 3.60	\$ 4.40	\$ 4.00	\$ 4.75	\$ 4.80	\$ 5.85	\$. . .	\$. . .
4	3.30	4.00	3.00	3.70	5.30	6.40	5.80	7.00	8.00	9.70	8.00	9.90
5	4.60	5.50	4.00	4.90	6.60	8.00	7.30	8.80	9.90	12.00	10.30	12.60
6	4.80	6.40	4.20	5.50	7.00	9.20	7.70	9.80	10.20	13.50	12.50	16.50
7	6.10	8.00	4.50	6.00	8.50	11.20	9.40	12.00	14.00	19.00	14.00	18.70
8	9.30	12.30	7.00	9.50	13.50	18.00	14.80	19.00	24.00	31.00	20.00	27.00
9	12.90	17.00	10.50	14.00	17.00	22.50	18.70	24.00	30.00	40.00	29.00	37.50
10	14.60	19.20	11.00	15.00	20.00	26.00	22.00	28.00	38.00	50.00	38.00	50.00
11	17.90	22.40	15.00	19.50	26.00	34.00	28.00	37.00	46.00	61.00	46.00	61.00
12	20.20	26.60	17.00	22.00	31.00	41.00	34.00	44.00	55.00	72.00	54.00	71.00
14	30.90	41.70	18.00	24.00	46.00	61.00	50.00	66.00	64.00	86.00	74.00	100.00
15	39.50	53.00	22.00	30.00	56.00	76.00	62.00	82.00	80.00	108.00	86.00	116.00
16	56.60	76.00	36.00	49.00	84.00	113.50	93.00	122.00	102.00	138.00	125.00	168.00
18	67.40	91.00	52.00	70.00	110.00	148.00	121.00	159.00	129.00	174.00	142.00	191.00
20	89.20	120.00	62.00	84.00	116.00	157.00	128.00	168.00	146.00	197.00	154.00	208.00
22	105.00	142.00	74.00	100.00	153.00	206.00	168.00	222.00	193.00	260.00	197.00	266.00
24	132.00	178.00	91.00	122.00	187.00	253.00	206.00	272.00	240.00	325.00	249.00	336.00

H.Channon Company Chicago

Special Pipe Cut to Order



Diagram Showing Screwed Valve and Fittings



Diagram Showing Flanged Valve and Fittings

We are equipped with improved facilities for cutting, threading and fitting all sizes of pipe to sketch.

In laying out work of this kind, great care should be taken in making sketches. All measurements should be given center to center, as shown in above diagrams. It is also necessary to know for what purpose the pipe is to be used and pressure required to stand.

Boiler Tubes

Lap Welded Steel and Charcoal Iron
Prices on Either Kind in Stock Length

Outside Diameter, Inches	Price per Foot	Thickness Nearest Birmingham Wire Gauge	Thickness, Inches	Nominal Weight per Foot, Pounds
1 1/2	\$0.27	13	.095	1.400
1 3/4	.22	13	.095	1.679
2	.20	13	.095	1.932
2 1/4	.22	13	.095	2.186
2 1/2	.28	12	.109	2.783
3	.34	12	.109	3.365
3 1/2	.43	11	.120	4.331
4	.55	10	.134	5.532

For tubes cut to special lengths, we shall be pleased to quote prices upon application.

For tubes 2 1/2 inches and smaller, over 18 feet, and for 2 3/4 inches and larger, over 22 feet, special prices will be made upon receipt of specifications.

Prices on extra wire gauge boiler tubes, stay tubes, arch pipes, dry pipes and water grates will be quoted upon application.

Seamless Copper Boiler Tube Ferrules

Price per 100

Inside Diameter	Width	Thickness, Inches	
		1/8	3/16
1 1/2	3 1/4	\$10.30	\$19.80
1 3/4	3 1/4	12.90	24.25
2	3 1/4	14.80	27.75
2 1/4	3 1/4	16.30	30.50
2 1/2	3 1/4	18.10	34.00
3	3 1/4	21.90	41.00
3 1/2	3 1/4	24.60	45.65
4	3 1/4	29.00	59.00

Wrought Well Casing



Screw and Socket Joint



Inserted Joint

All Weights and Dimensions Are Nominal

Size	Price per Foot	Diameters		Thickness	Wt. per Foot Plain Ends	No. of Turns per Inch of Screw	Inserted Joint	
		Ex-ternal	In-ternal				Length of Joint	Diameter of Joint
2	\$0.33	2.250	2.050	.100	2.296	14	.967	2.340
2 1/4	.33	2.500	2.284	.108	2.759	14	.992	2.606
2 1/2	.33	2.750	2.524	.113	3.182	14	1.017	2.866
2 3/4	.40	3.000	2.768	.116	3.572	14	1.042	3.122
3	.41	3.250	3.010	.120	4.011	14	1.067	3.380
3 1/4	.46	3.500	3.250	.125	4.505	14	1.092	3.640
3 1/2	.51	3.750	3.492	.129	4.988	14	1.117	3.898
3 3/4	.56 1/2	4.000	3.732	.134	5.532	14	1.142	4.158
4	.62	4.250	3.974	.138	6.060	14	1.167	4.416
4 1/4	.68 1/2	4.500	4.216	.142	6.609	14	1.192	4.674
4 1/2	.74	4.750	4.460	.145	7.131	14	1.217	4.930
4 3/4	.81	5.000	4.696	.152	7.870	14	1.242	5.194
5	.85	5.250	4.944	.153	8.328	14	1.267	5.446
5 1/2	.90	5.500	5.192	.154	8.792	14	1.292	5.698
5 3/4	1.05	6.000	5.672	.164	10.222	14	1.342	6.218
6	1.20	6.625	6.287	.169	11.652	14	1.405	6.833
6 1/4	1.35	7.000	6.652	.174	12.685	14	1.442	7.238
6 1/2	1.43	7.625	7.263	.181	14.390	14	1.505	7.877
7 1/4	1.60	8.000	7.628	.186	15.522	11 1/2	1.573	8.238
7 1/2	1.75	8.625	8.249	.188	16.940	11 1/2	1.636	8.867
8 1/4	1.90	9.000	8.608	.196	18.429	11 1/2	1.673	9.258
8 1/2	2.28	10.000	9.582	.209	21.855	11 1/2	1.773	10.284
10 1/2	2.68	11.000	10.552	.224	25.780	11 1/2	1.873	11.314
11 1/2	3.15	12.000	11.514	.243	30.512	11 1/2	1.973	12.352
12 1/2	3.65	13.000	12.482	.259	35.243	11 1/2	2.073	13.384
13 1/2	4.20	14.000	13.448	.276	40.454	11 1/2	2.173	14.418
14 1/2	4.75	15.000	14.418	.291	45.714	11 1/2	2.273	15.448
15 1/2	5.25	16.000	15.396	.302	50.632	11 1/2	2.373	16.470

The permissible variation in weight is 5 per cent above and 5 per cent below.

Furnished in random lengths, unless otherwise ordered.

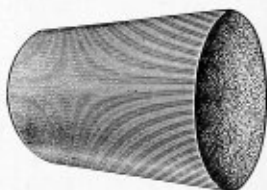
All weights given in pounds. All dimensions given in inches.

Thickness of walls makes it impracticable to cut threads of coarser pitch than shown on table.

For cut lengths an extra charge will be made above random.

For galvanized or coated casing, an extra charge will be made above black.

Grey Iron Flue Plugs



To be used for plugging flues in an emergency.

For flues 2 inches.	List price each.	\$0.40
For flues 2 1/2 inches.	List price each.	.50
For flues 3 inches.	List price each.	.60
For flues 3 1/2 inches.	List price each.	.80
For flues 4 inches.	List price each.	1.00

Malleable and Cast Iron Pipe Fittings

Elbows



Cast Iron, Price Each

Size, inches.....	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	1 $\frac{1}{4}$	1 $\frac{1}{2}$	2	2 $\frac{1}{2}$	3	4	5	6
Right hand.....	\$0.05	\$0.05	\$0.06	\$0.08	\$0.10	\$0.16	\$0.20	\$0.28	\$0.50	\$0.75	\$1.20	\$2.00	\$2.75
Right and left.....	.06	.06	.07	.09	.12	.18	.23	.32	.60	.85	1.50	2.40	3.50
R. H. galvanized.....	.10	.10	.12	.16	.21	.32	.40	.56	1.00	1.50	2.40	4.00	5.50
Reducing.....	.06	.07	.09	.12	.18	.23	.32	.40	.85	1.40	2.30	3.15	
Reducing, galvanized.....		.14	.18	.24	.36	.46	.64	1.20	1.70	2.80	4.60	6.30	
45° black.....	.06	.07	.10	.12	.19	.24	.34	.60	.90	1.45	2.50	3.45	
45° galvanized.....	.12	.14	.20	.24	.38	.48	.68	1.20	1.80	2.90	5.00	6.90	

Malleable Iron, Price Each

Size, inches	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	1 $\frac{1}{4}$	1 $\frac{1}{2}$	2	2 $\frac{1}{2}$	3	4	
R. H. straight and reducing	\$0.06	\$0.07	\$0.08	\$0.10	\$0.15	\$0.22	\$0.25	\$0.35	\$0.50	\$0.90	\$1.50	\$3.00
Right and left		.09	.11	.13	.17	.25	.30	.40	.65	.90	1.50	2.60
R. H. galvanized	.08	.09	.11	.14	.20	.32	.40	.60	.90	1.50	2.60	5.00
45° black		.08	.10	.12	.18	.26	.36	.54	.82	1.25	2.50	4.50
45° galvanized		.12	.15	.20	.25	.40	.50	.85	1.35	1.90	3.75	6.75
Street		.10	.10	.12	.20	.25	.40	.55	.90	1.50	2.25	3.50
Street, galvanized		.12	.12	.15	.28	.35	.55	.80	1.30	2.25	3.50	
Side outlet			.08	.10	.18	.30	.45	.60	1.00			

Tees



Cast Iron Straight

C. I. Straight & Red

Malleable St. & Red

Malleable 4-Way

Malleable Service

Cast Iron, Price Each

Size, inches.....	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	1 $\frac{1}{4}$	1 $\frac{1}{2}$	2	2 $\frac{1}{2}$	3	4	5	6
Straight.....	\$0.08	\$0.08	\$0.09	\$0.12	\$0.15	\$0.23	\$0.29	\$0.41	\$0.73	\$1.10	\$1.75	\$3.00	\$4.00
Straight, galvanized.....	.16	.16	.18	.24	.30	.46	.58	.82	1.46	2.20	3.50	6.00	8.00
Reducing.....		.10	.14	.17	.27	.33	.47	.83	1.25	2.00	3.50	4.60	
Reducing, galvanized.....		.20	.28	.34	.54	.66	.94	1.66	2.50	4.00	7.00	9.20	

Malleable Iron, Price Each

Weldable Iron Pipe												
Size, inches.....	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	1 $\frac{1}{4}$	1 $\frac{1}{2}$	2	2 $\frac{1}{2}$	3	4	
Straight and reducing.....	\$0.07	\$0.08	\$0.09	\$0.11	\$0.15	\$0.25	\$0.30	\$0.45	\$0.60	\$1.05	\$1.70	\$3.40
Straight and red, galvanized.....	.09	.10	.13	.16	.20	.38	.50	.70	1.00	1.90	3.00	5.75
Four way.....			.12	.14	.20	.35	.50	.80	1.25			
Four way, galvanized.....			.17	.20	.28	.50	.70	1.10	1.75			

Malleable Iron Service Tees, Price Each

Size, inches.....	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	1 $\frac{1}{4}$	1 $\frac{1}{2}$	2	2 $\frac{1}{2}$	3	3x2 $\frac{1}{2}$ x3	3x3x4
Black.....	\$0.12	\$0.15	\$0.25	\$0.35	\$0.50	\$0.75	\$1.15	\$2.00	\$2.50	\$2.50	\$4.00
Galvanized.....	.15	.20	.35	.50	.70	1.10	1.65				

Malleable Iron Drop Elbows

Price Each

Size, Inches	Female	Female, Galvanized	Male and Female	Male and Female, Galv.
$\frac{1}{4}$	\$0.06	\$0.09		
$\frac{3}{8}$	.08	.12	\$0.08	\$0.12
$\frac{1}{2}$	.12	.20	.12	.20
$\frac{3}{4}$	.20	.35		

Malleable Iron Drop Tees

Price-Each

Size, Inches	Female	Female, Galvanized	Male and Female	Male and Female, Galv.
$\frac{1}{4}$	\$0.10	\$0.15	\$0.10	\$0.15
$\frac{3}{8}$	.14	.25	.14	.25
$\frac{1}{2}$	.22	.40	.22	.40
1	.30		.30	

H. Channon Company Chicago

Cast Iron and Malleable Pipe Fittings

Malleable Iron Right and Left Nipples. Hex. Centers



Size, inches	1/4	3/8	1/2	3/4	1	1 1/4
Price each	\$0.20	\$0.20	\$0.20	\$0.25	\$0.30	\$0.40
Size, inches	1 1/2	2	2 1/2	3	3 1/2	4
Price each	\$0.50	\$0.70	\$1.10	\$1.50	\$1.90	\$2.40

Cast Iron and Malleable Y Bends



Cast Iron

Malleable Iron

Cast Iron, Price Each

Size, inches	1/2	3/4	1	1 1/4	1 1/2
Black	\$0.20	\$0.28	\$0.34	\$0.66	
Galvanized	.40	.56	.68	1.32	
Size, inches	2	2 1/2	3	4	5
Black	\$0.94	\$1.66	\$2.50	\$4.00	\$7.00
Galvanized	1.88	3.32	5.00	8.00	14.00
Size, inches	6	7	8	10	12
Black	\$9.20	\$15.60	\$22.50	\$45.00	\$67.00
Galvanized	18.40	31.20	45.00	90.00	134.00

Malleable Iron, Price Each

Straight and Reducing

Size, inches	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4
Black	\$0.40	\$0.50	\$0.60	\$0.80	\$1.00	\$1.70	\$2.00	\$4.00	\$5.50
Galvanized	.60	.78	.90	1.25	1.50	2.50	3.00	6.00	8.25

60° Y Bends

Malleable Iron Only

Price Each

Size, inches	2x2	2x1 1/2
Black	\$1.70	\$1.70
Galvanized	2.50	2.50

Malleable Iron Railing Fittings



No. 1 Elbow

No. 2 Elbow
Side Outlet

No. 3 Tee

No. 4 Tee
Side Outlet

No. 5 Cross

No. 6 Cross
Side OutletNo. 7 Floor
Flange SquareNo. 8 Ball
Ornament

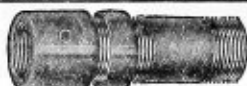
Price Each

Size	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2
No. 1	\$0.15	\$0.18	\$0.20	\$0.35	\$0.45	\$0.72	\$1.60
No. 2	.20	.23	.25	.40	.50	.80	1.75
No. 3	.20	.23	.25	.40	.50	.75	1.75
No. 4	.30	.33	.35	.45	.55	.90	1.90
No. 5	.30	.33	.35	.45	.55	1.00	1.90
No. 6	.35	.38	.40	.50	.65	1.35	2.60
No. 7	.16	.18	.20	.40	.50	.90	1.35
No. 8	.16	.18	.20	.25	.35	.90	1.35

Railing fittings are all tapped with right hand threads, except where left hand threads are indicated on the cut. We can furnish them, however, tapped all right hand at regular price. Tapped otherwise will be charged at 15 per cent additional net. Orders for railing fittings with special tapping must be accompanied by a sketch. Specially tapped fittings unreturnable.

Order by specifying number and size.
For galvanized railing fittings, add 50 per cent.

Long Screws With Coupling and Lock Nut Faced



Size, inches	1/4	3/8	1/2	3/4	1	1 1/4
Length, inches	2 1/2	3	3 1/2	4	4 1/2	5
Black, each	\$0.30	\$0.35	\$0.40	\$0.55	\$0.75	\$1.00
Galvanized, each	.35	.40	.50	.66	1.00	1.25
Size, inches	1 1/2	2	2 1/2	3	3 1/2	4
Length, inches	5 1/2	6	7	8	8 1/2	9
Black, each	\$1.30	\$1.70	\$2.70	\$3.70	\$5.40	\$6.60
Galvanized, each	1.60	2.10	3.10	4.70	6.50	7.75

Standard Wrought Iron Couplings

Size of Pipe, Inches	Black, Price Each	Galv. Price Each	Right and Left Black, Price Each	Nom. Outside Diameter, Inches	Length of Coupling, Inches	Aver. Weight of Coupling, Lbs.	No. of Threads per Inch of Screw
1/8	\$0.05	\$0.06		3/8	5/8	.03	27
1/4	.05	.06	\$0.07	1/2	1 1/8	.07	18
3/8	.06	.08	.08	3/4	1 1/4	.11	18
1/2	.07	.10	.11	1 1/8	1 3/4	.15	14
3/4	.10	.13	.15	1 1/2	2	.25	14
1	.13	.18	.20	1 3/4	2 1/4	.42	11 1/2
1 1/4	.17	.25	.25	2 1/8	2 1/2	.60	11 1/2
1 1/2	.21	.32	.30	2 1/4	2 3/4	.81	11 1/2
2	.28	.40	.50	2 3/4	3	1.18	8
2 1/2	.40	.55	.85	3 1/8	3 1/2	1.70	8
3	.60	.80	1.20	3 3/8	3 3/4	2.45	8
3 1/2	.80	1.05	1.60	4 1/8	4	3.40	8
4	1.00	1.40	2.00	4 1/2	4 1/2	3.50	8
4 1/2	1.50	2.00		5 1/8	5	4.70	8
5	1.65	2.25		5 1/2	5 1/2	8.50	8
6	2.40	3.25		6 1/4	6	9.70	8
7	3.25			7 1/4	7	11.10	8
8	4.25			8 1/4	8	13.60	8
9	5.50			10 1/8	9	17.40	8
10	7.50			11 3/8	10	31.10	8
12	10.00			13 3/8	12	44.20	8

Right and Left Malleable Iron Couplings Ribbed Price Each



Size, inches	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3
Black	\$0.04	\$0.06	\$0.08	\$0.12	\$0.16	\$0.25	\$0.36	\$0.52	\$0.70	\$1.00
Galvanized	.05	.09	.10	.17	.25	.35	.55	.75	1.05	1.50

Right Hand Malleable Iron Couplings Ribbed Price Each



Size, inches	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3
Black	\$0.03	\$0.05	\$0.07	\$0.10	\$0.14	\$0.20	\$0.25	\$0.35	\$0.60	\$0.90
Galvanized	.05	.07	.10	.17	.23	.30	.40	.55	.95	1.40

We carry a most complete line of pipe threading devices.

Return Bend


Malleable Iron
Close Pattern

Malleable Iron
Medium Pattern

Cast Iron
Close Pattern

Cast Iron
Open Pattern

Cast Iron
Back Outlet

Malleable Iron Close or Medium Pattern

Size, inches.....	1½	¾	1	1¼	1½	2
Right hand, black, each.....	\$0.18	\$0.25	\$0.35	\$0.50	\$0.75	\$1.00
Right hand, galv., each.....	.25	.35	.55	.75	1.15	1.65
Left hand, each.....	.23	.30	.45	.60	.90	1.25
Right and left, each.....	.23	.30	.45	.60	.90	1.25
Center to center, close, inches.....	1	1¼	1½	1¾	2¾	2½
Center to center, medium, inches.....	1¼	1½	1¾	2¼	2½	3

Malleable Iron Open Pattern

Size, inches.....	1½	¾	1	1¼	1½	2	2½	3
R.H. black, each.....	\$0.20	\$0.30	\$0.50	\$0.65	\$0.85	\$1.25	\$2.00	\$3.00
R.H. galv., each.....	.28	.45	.70	.90	1.25	2.00	3.50	5.00
Left hand, each.....	.25	.38	.60	.80	1.05	1.55	2.50	3.75
Right & left, ea.....	.25	.38	.60	.80	1.05	1.55	2.50	3.75
Center to center, inches.....	1½	2	2½	3	3½	4	4½	5

Malleable Iron Special Wide Pattern

Size, inches.....	$\frac{3}{8}$	$\frac{3}{4}$	$1\frac{1}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$
Price each.....	\$0.25	\$1.00	\$1.25	\$1.25	\$1.25	\$2.00
Center to Center, inches.....	$1\frac{1}{2}$	4	6	6	6	6
Size, inches.....		2	3	3	4	6
Price each.....	\$3.00	\$5.00	\$5.00	\$8.00	\$8.00	\$16.00
Center to Center, inches.....	5	$7\frac{1}{2}$	8	6	12	

Cast Iron Close Pattern

Size, in. . .	¾	¾	1	1¼	1½	2	2½	3	4
R.H. black.....	\$0.18	\$0.20	\$0.22	\$0.28	\$0.40	\$0.57	\$1.20	\$1.70	\$5.00
R.H. galv., each.....	.36	.40	.44	.56	.80	1.14	2.40	3.40	10.00
R. & L.....	.21	.23	.26	.33	.46	.66	1.40	1.95	5.25
Left.....	.21	.23	.26	.33	.46	.66	1.40	1.95	5.25
C to C in.....	1¼	1½	1¾	2¼	2½	3¼	3¾	4¼	6

Cast Iron Open Pattern

Size, inches.....	¾	1	1¼	1½	2	2½	3	4
R.H. black, each.....	\$0.26	\$0.30	\$0.40	\$0.55	\$0.80	\$1.35	\$2.20	\$6.50
R.H. galv., each.....	.52	.60	.80	1.10	1.60	2.70	4.40	10.00
Right and left.....	.30	.35	.46	.64	.92	1.55	2.50	.....
Center to center, inches.....	1½	2½	3	3½	4½	5½	6½	7½

Cast Iron Back Outlet

Size, inches.....	¾	1	1¼	1½	2	2½	3
R. H., black, each.....	\$0.38	\$0.42	\$0.60	\$0.80	\$1.15	\$2.00	\$3.00
R. H., galv., each.....	.76	.84	1.20	1.60	2.30	4.00	6.00
Right and left, each.....	.42	.48	.70	.95	1.30	2.30	3.50
Center to center, in.....	1½	2½	2¾	2½	3¼	3¾	4¼

Cast Iron Branch Tees

Both Ends Open


All Threads R. H.
No. 1 For Circulation

Branches R. H.


Outlet Open R. H.
No. 2 For Circulation

Both Ends Closed. Branches L. H.


Inlet Open R. H.
No. 3 For Box Coils

The run and back opening of branch tees are tapped the same size as branches unless otherwise ordered. Always order branch tees by size and number. **Back or side outlets charged as additional front outlets.**
1-inch branch tees, 1-inch or 1¼-inch run, are 1½ inches inside diameter. 1-inch branch tees, 1½-inch or 2-inch run are 2¼ inches inside diameter. 1¼-inch branch tees are all 2½ inches inside diameter. 1½-inch branch tees are all 2¾ inches inside diameter. 2-inch branch tees are all 3½ inches inside diameter.

Number of Branches	1-Inch Branch Tees 2½-Inch Center to Center			1¼-Inch Branch Tees 1¼-Inch Center to Center			1½-Inch Branch Tees 3½-Inch Center to Center			2-Inch Branch Tees 4½-Inch Center to Center		
	1-Inch or 1¼-Inch Run	1½-Inch Run	2-Inch Run	1¼-Inch or 1½-Inch Run	2-Inch Run	2½-Inch Run	1½-Inch or 2-Inch Run	2½-Inch Run	3-Inch Run	2-Inch Run	2½-Inch or 3-Inch Run	3½-Inch Run
2	\$0.90	\$1.00	\$1.15				\$2.70	\$3.45	\$3.80	\$5.25	\$5.75	\$6.25
3	1.05	1.15	1.35	\$1.65	\$1.90	\$2.40	2.85	3.35	4.15	4.60	7.00	7.75
4	1.15	1.30	1.60	2.00	2.40	2.90	3.55	4.00	5.00	5.50	8.50	9.25
5	1.35	1.45	1.85	2.40	2.90	3.35	3.95	4.65	5.75	6.25	9.75	10.75
6	1.60	1.75	2.10	2.80	3.30	3.90	4.20	5.25	6.50	7.25	10.60	11.75
7	1.90	2.20	2.45	3.20	3.90	4.50	4.95	5.85	7.00	7.75	11.50	12.75
8	2.20	2.45	2.75	3.60	4.50	5.25	6.15	6.50	8.25	9.00	12.25	13.50
9	2.65	2.90	3.40	4.30	5.25	6.00	6.85	7.60	9.25	10.00	13.50	15.00
10		3.30	4.00	4.80	5.85	6.75	8.00	9.75	10.75			
11		4.50	4.80	5.00	6.25	7.25	8.50	9.75				
12		4.75	5.10	5.25	6.50	7.65	8.50	10.50	11.50			
13		5.50	6.00	6.00	7.00	8.25						
14		7.00	7.25	6.75	7.75	9.00						
15		7.50	7.75	7.50	8.50	9.75						
16		8.00	8.25	8.50	9.50	10.75						

Crosses



Malleable Straight and Reducing

Cast Iron, Price Each

Size, inches.....	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	4	5	6
Straight.....	\$0.16	\$0.22	\$0.27	\$0.42	\$0.53	\$0.75	\$1.30	\$2.00	\$3.15	\$5.50	\$7.25
Straight, galvanized.....	.32	.44	.54	.84	1.06	1.50	2.60	4.00	6.30	11.00	14.50
Reducing.....	.18	.25	.30	.46	.60	.83	1.45	2.20	3.50	6.00	8.00
Reducing, early p.d.....	.36	.50	.60	.92	1.20	1.66	2.90	4.40	7.00	12.00	16.00

Size, inches.....	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4	5	6
Black.....	\$0.09	\$0.10	\$0.16	\$0.20	\$0.30	\$0.40	\$0.60	\$1.00	\$1.75	\$3.00	\$5.25	\$7.50	\$13.00
Galvanized.....	.12	.14	.25	.29	.46	.60	.90	1.50	2.75	4.50	8.00	.....	.....



Price Each

Square Head		Countersunk					
Size, inches	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1	$1\frac{1}{4}$
Square head	\$0.02	\$0.02	\$0.02	\$0.02	\$0.03	\$0.04	\$0.05
Square head, galv.		.04	.04	.04	.06	.08	.10
Countersunk				.04	.06	.08	.09
Size, inches	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	4	5	6
Square head	\$0.07	\$0.10	\$0.18	\$0.25	\$0.42	\$0.88	\$1.20
Square head, galv.	.14	.20	.36	.50	.84	1.76	2.40
Countersunk	.11	.15	.30	.40	1.10	2.00	3.00



Cast Iron, Price Each

Cast Iron				Malleable		
Size, inches....	4½	5	6	8	10	12
Black.....	\$1.85	\$2.00	\$2.70	\$6.75	\$10.00	\$15.00
Galvanized.....	3.70	4.00	5.40	13.50	20.00	30.00

Size, inches . . .	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$
Black	\$0.05	\$0.06	\$0.07	\$0.10	\$0.16	\$0.20
Galvanized . . . .	.08	.10	.10	.15	.25	.35
Size, inches . . .	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4
Black	\$0.28	\$0.45	\$0.70	\$1.00	\$1.50	\$1.85
Galvanized . . . .	.45	.75	1.05	1.65	2.40	3.05



Reducing 2 or more sizes up to 2½-inch, inclusive. Reducing one or more sizes, 3-inch and up.

Size, inches...	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$
Black	\$0.04	\$0.04	\$0.05	\$0.06	\$0.07	\$0.09
Galvanized...	.08	.08	.10	.12	.14	.18

Size, inches...	2	$2\frac{1}{2}$	3	4	5	6
Black	\$0.14	\$0.21	\$0.30	\$0.40	\$0.93	\$1.25
Galvanized...	.28	.42	.60	.80	1.86	2.50



Reducing One Size

Regular

Price Each

Size, inches.....	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	1 $\frac{1}{4}$	1 $\frac{1}{2}$
Regular.....	\$0.04	\$0.04	\$0.04	\$0.05	\$0.06	\$0.07	\$0.09
Regular, galvanized.....	.08	.08	.08	.10	.12	.14	.18
Faced.....		.08	.09	.11	.13	.17	.22
Faced, galvanized.....					.20	.25	.33

Size, inches.....	2	2 $\frac{1}{2}$	3	3 $\frac{1}{2}$	4	5	6
Regular.....	\$0.14	\$0.21					
Regular, galvanized.....	.28	.42					
Faced.....	.32	.48	\$0.70	\$1.20	\$1.50	\$2.60	\$3.75
Faced, galvanized.....	.48	.72	1.05	1.80	2.25		

**Price Each**

Malleable		Cast iron						
Size, inches.	1½	2	2½	3	4	5	6	8
Malleable, black	\$0.03	\$0.04	\$0.05	\$0.08	\$0.12	\$0.16	\$0.24	\$0.36
Malleable, galv.	.04	.06	.08	.12	.17	.24	.36	.54
Size, inches.	2	2½	3	3½	4	5	6	8
Malleable, black	\$0.32	\$0.45	\$0.55	\$1.00	\$1.20	\$2.50	\$3.50	\$5.00
Malleable, galv.	.52	.76	1.30	1.60	2.20	5.50	6.00	8.00
Cast iron, black					.87	1.20	1.50	1.80
Cast iron, galvanized.					1.74	2.40	3.00	3.60



Faced Lock Nuts Are Made in Malleable Iron Only

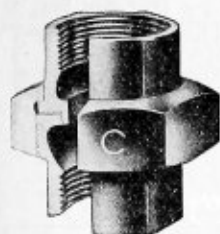
Price Each

Size, inches	$\frac{3}{8}$	$\frac{7}{8}$	$\frac{1}{2}$	1	1 $\frac{1}{2}$	1 $\frac{3}{4}$	2
Mall, black	\$0.02	\$0.03	\$0.04	\$0.05	\$0.07	\$0.09	\$0.11
Mall, galv . . . . .	.03	.04	.05	.07	.10	.14	.20
Faced, black . . . . .	.08	.09	.10	.12	.15	.20	.25
Faced, galv . . . . .	.11	.13	.15	.18	.22	.30	.35

Size, inches	2 $\frac{1}{2}$	3	4	5	6	8
Cast iron, black	\$0.27	\$0.34	\$0.64	\$0.90	\$1.30	\$2.35
Cast iron, galvanized . . . . .	.54	.68	1.28	1.80	2.60	4.70
Faced, black, malleable . . . . .	.35	.45				
Faced, galvanized, mall . . . . .	.60	.66				

Malleable Iron Unions

Standard
Malleable
Iron Union

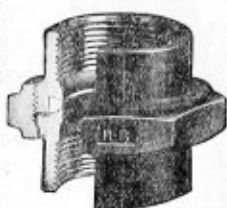


Standard malleable iron unions are suitable for all steam working pressures up to 125 pounds.

Railroad unions, brass to iron seat, are suitable for all steam working pressures up to 200 pounds. Examined and tested by the Underwriters' Laboratories and listed by the consulting engineers of the National Board of Fire Underwriters. They have non-corrosive ground joints, requiring no gaskets and are readily taken apart.

Size, inches	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	1 $\frac{1}{4}$	1 $\frac{1}{2}$	2	2 $\frac{1}{2}$	3
Black, each	\$0.18	\$0.18	\$0.20	\$0.22	\$0.27	\$0.33			
Galvanized, each	.27	.27	.30	.33	.40	.60			
Size, inches	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	1 $\frac{1}{4}$	1 $\frac{1}{2}$	2	2 $\frac{1}{2}$	3
Black, each	\$0.46	\$0.58	\$0.75	\$1.55	\$2.10				
Galvanized, each	.70	.90	1.15	2.35	3.15				

R. R. Unions
Brass to Iron Seat



Railroad Unions—Brass to Iron Seat

Size, inches	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	1 $\frac{1}{4}$	1 $\frac{1}{2}$	2	2 $\frac{1}{2}$	3
Black, each	\$0.30	\$0.30	\$0.40	\$0.50	\$0.60	\$0.80	\$1.20	\$1.60	\$2.00
Galvanized, each	.45	.45	.60	.75	.90	1.20	1.60	2.40	3.00

Dart Malleable Iron Unions

These unions have a non-corrosive seat of bronze which is fitted and ground together. Require no packing and are easily opened and replaced. In this union bronze rings are forced into recesses bored out and faced in both coupling ends of the union. The concave and convex pieces are turned and fitted together with ground joints to a true arch.



Size, inches	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	1 $\frac{1}{4}$	1 $\frac{1}{2}$	2	2 $\frac{1}{2}$	3
Black, each	\$0.30	\$0.30	\$0.40	\$0.50	\$0.60	\$0.80	\$1.20	\$1.60	\$2.00
Galvanized, each	.45	.45	.60	.75	.90	1.20	1.60	2.40	3.00

Mark Cold Drawn Steel Union

The Mark cold drawn steel union is composed of three parts—the bottom or male end, the thread or female end, and the coupling nut.

Being made of steel, and therefore having the same co-efficient of expansion as steel pipe, this union expands uniformly and does not have to be re-tightened when pipe becomes cold as in the case of malleable iron unions, nor does it become loose when pipe is hot as in the case of cast brass unions.

The Mark union is Sherardized throughout with the exception of the brass seat ring. This is done after threading, hence the threads are protected perfectly.

This union is made also in cold drawn brass.

Size, inches	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	1 $\frac{1}{4}$	1 $\frac{1}{2}$	2	2 $\frac{1}{2}$	3
Cold drawn steel	\$ 0.30	\$ 0.30	\$ 0.50	\$ 0.50	\$ 0.70	\$ 0.95	\$ 1.30	\$ 1.80	\$ 2.50
Cold drawn brass	1.25	1.50	2.00	3.00	4.00	5.00	7.00	10.00	12.00

Flanged Unions—Faced. Gasket Extra



Cast Iron



Malleable Iron



Cast Iron, Extra Heavy

Cast Iron—For Working Pressures up to 125 Pounds

Size, inches	$\frac{3}{8}$	$\frac{1}{2}$	1	1 $\frac{1}{4}$	1 $\frac{1}{2}$	2	2 $\frac{1}{2}$	3
Diameter of flanges, inches	3	3 $\frac{1}{2}$	3 $\frac{1}{2}$	4 $\frac{1}{2}$	4 $\frac{1}{2}$	5 $\frac{1}{2}$	6	6 $\frac{1}{2}$
Number of bolts	3	4	4	4	4	4	4	4
Price each	\$0.40	\$0.46	\$0.52	\$0.64	\$0.78	\$1.00	\$1.25	\$1.50

Malleable Iron—For Working Pressures up to 125 Pounds

Size, inches	$\frac{3}{8}$	$\frac{1}{2}$	1	1 $\frac{1}{4}$	1 $\frac{1}{2}$	2	2 $\frac{1}{2}$	3
Diameter of flanges, inches	2 $\frac{3}{4}$	3 $\frac{1}{4}$	3 $\frac{1}{4}$	4 $\frac{1}{2}$	4 $\frac{1}{2}$	5 $\frac{1}{2}$	6	6 $\frac{1}{2}$
Number of bolts	3	4	4	4	4	4	4	4
Price each	\$1.40	\$1.60	\$2.00	\$2.50	\$3.00	\$3.50	\$4.00	\$4.50

Cast Iron, Extra Heavy—For Working Pressures up to 250 Pounds

Size, inches	$\frac{3}{8}$	$\frac{1}{2}$	1	1 $\frac{1}{4}$	1 $\frac{1}{2}$	2	2 $\frac{1}{2}$	3	3 $\frac{1}{2}$	4	4 $\frac{1}{2}$	5	6
Diameter of flanges, ins.	3	3 $\frac{1}{2}$	3 $\frac{1}{2}$	4 $\frac{1}{2}$	4 $\frac{1}{2}$	5 $\frac{1}{2}$	6	6 $\frac{1}{2}$	7 $\frac{1}{2}$	8	8 $\frac{1}{2}$	9 $\frac{1}{2}$	10 $\frac{1}{2}$
Number of bolts	3	4	4	4	4	4	4	4	4	4	4	4	4
Price each	\$0.60	\$0.70	\$0.80	\$1.00	\$1.15	\$1.50	\$1.90	\$2.25	\$2.70	\$3.15	\$4.00	\$4.75	\$6.00

Prices on Galvanized Flanged Unions will be sent on request.

Barco Flexible Joint

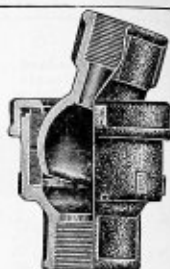
For Steam, Air, Gas and Liquids

For pipe lines conveying steam, compressed air, gas or liquids under any desired pressure. Have no ground seats or abrasive wearing parts in the joints.

The front and back gaskets are renewable and reversible, and are made of a hard-moulded non-metallic material, which is tough and has great wearing strength and when worn can be replaced at slight expense.



90° Angle Joint



Straight Joint, Female Ends

Standard Flexible Joints—Screw Ends

Size	Straight	Angle
1/4	\$ 6.75	\$ 7.25
3/8	7.00	7.50
1/2	7.50	8.00
3/4	8.80	9.30
1	9.90	10.40
1 1/4	12.30	12.80
1 1/2	14.00	14.50
2	17.50	19.50
2 1/2	21.00	23.00
3	26.30	28.30
4	35.10	38.10
5	43.90	47.90
6	58.50	63.50

Standard Flexible Joints—Flange Ends

Size	Price Each	Diameter of Flanges, Inches	Length Face to Face, Inches
4	\$ 45.00	9	11
5	52.00	10	12 1/2
6	58.50	11	13 3/4
7	85.00	12 1/2	14
8	100.00	13 1/2	20
10	132.00	16	21 1/2
12	164.50	19	22 3/4
14	198.00	21	24
16	230.00	23 1/2	28
18	297.00	25	30
20	336.00	27 1/2	31 1/2
24	400.00	32	36
30	676.00	38 3/4	42 3/4
36	1005.00	45 3/4	43 1/2

Brass joints made in sizes 1/4-inch to 2 1/2-inch, male and female ends. Iron joints made in sizes 1/4-inch to 6-inch, female ends only unless otherwise ordered; sizes up to 4-inch, made of malleable iron. Our standard joints made to stand 150 pounds pressure. Extra heavy joints made for high pressure according to requirements.

Standard Expansion Joints

Iron Body

Brass Sleeve



For Steam Working Pressures up to 125 Pounds

No. 398. Screwed, Standard Traverse

Size, inches	2	2 1/2	3	3 1/2	4
Traverse, inches	2 1/2	2 1/2	2 3/4	3	3 1/4
End to end, opened, inches	11 1/2	12 1/4	13 5/8	14 1/4	15 1/4
Price each	\$7.00	\$8.00	\$10.00	\$14.00	\$18.00

Size, inches	4 1/2	5	6	7
Traverse, inches	3 1/2	4	5	6
End to end, opened, inches	16	17 1/4	20 1/8	23 1/4
Price each	\$30.00	\$38.00	\$45.00	\$70.00

Size, inches	8	9	10	12
Traverse, inches	7	7	7	8
End to end, opened, inches	26 1/2	27	28	31 5/8
Price each	\$100.00	\$110.00	\$160.00	\$225.00

All Brass



For Steam Working Pressures up to 125 pounds

No. 404. Screwed, Standard Traverse

Size, inches	1 1/2	3 1/2	1	1 1/2
Traverse, inches	2	2 1/4	2 1/4	2 1/4
End to end, open, inches	6 5/8	7 1/4	7 3/8	7 3/8
Price each	\$1.60	\$2.20	\$2.75	\$4.00

Size, inches	1 1/2	2	2 1/2	3
Traverse, inches	2 1/4	2 1/2	2 1/2	2 3/4
End to end, open, inches	7 5/8	8 3/8	9 1/4	10 3/8
Price each	\$5.00	\$8.00	\$17.50	\$24.00

Steam Swing Joints Brass

For Steam Working Pressures up to 125 Pounds

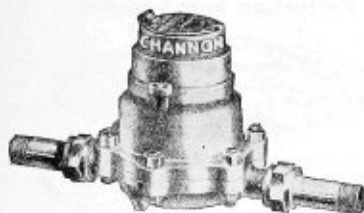


No. 300

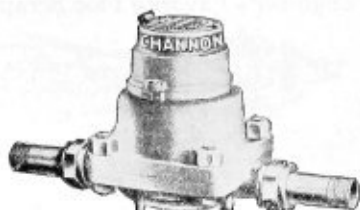
Size	Price Each	
	Rough	Finished
1 1/2 x 1 1/2	\$ 2.50	\$ 3.00
3/4 x 3/4	3.50	4.00
1 x 1	5.00	5.75
1 1/4 x 1 1/4	6.50	7.25
1 1/2 x 1 1/2	9.00	10.00
2 x 2	13.00	15.00

Finished swing joints are made to order only.

American and New Niagara Water Meters



3/4-inch American Meter



3/4-inch New Niagara Meter

The American meter and the New Niagara meter are of the disc type, and differ only in their outer cases, the works being alike and as shown in the sectional view on front cover.

The American meter has the main outer casing made of bronze with either a galvanized iron base or a bronze base. The galvanized iron base reduces the cost of the meter and also increases its rigidity.

The New Niagara meter has the outer casing made of a fine grade of cast iron, carefully galvanized. When a meter is frozen one-half of the outer case usually breaks, thus relieving the inner and more expensive parts from injurious strain. A new half of outer case for the 3/4 size costs but 50 cents.

The works are carefully made on the interchangeable plan from bronze composition, hard brass, hard rubber, and German silver; they are protected by an internal strainer.

The measuring chamber is of large capacity, and is fitted with an extra thick, strong hard rubber measuring disc.

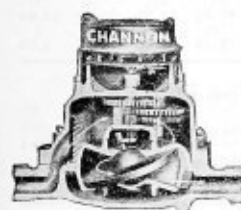
The intermediate gears revolve on protected jewel bearings which reduce friction and wear, and prevent dirt from entering the gear bearings.

The flow of water through the meter is downward, which tends to flush out all sediment and sand, and thus keeps the meter in an operative and sanitary condition.

All sizes may be regulated for unusual pressures by slightly rotating the measuring chamber upon its seat and thus covering more or less of the outlet in the meter base.

American and New Niagara meters contain few parts, and are wonderfully simple and accessible for inspection and repair.

Prices



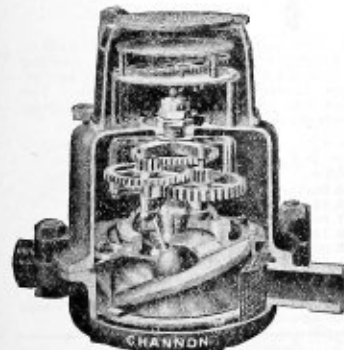
Size of Meter, Ins.	Greatest Proper Capacity Cu. Ft. per Minute	New Niagara Meter Only with all Galv. Iron Outside Case	American Meter Only with Bronze Main Case and Galv. Iron Base	American Meter Only with all Bronze Outside Case	Price of Brass Couplings, per Pair Extra	Wt. with Couplings Boxed, Lbs.
3/8x1 1/2	3	\$12.80	\$14.40	\$16.00	\$0.80	15
3/8x3/4	3	12.80	14.40	16.00	1.20	15
1/2	5	19.20	21.60	24.00	1.20	20
1 1/4	8	25.60	28.80	32.00	1.60	30
1 1/2	12	40.00	45.00	50.00	2.40	60
2	20	65.00	73.00	80.00	3.00	100
2 1/2	32	80.00	90.00	100.00	4.00	150

1/2, 3/4 and 1-inch quarter bend couplings, \$0.40, \$0.60 and \$0.80, respectively.



Keystone Water Meter

Prices and Specifications



Size, Inches	Prices		Safe Max. Deliv. per Min.		Dimensions			Weight	
	Meter	Con's	Cu. Ft.	U. S. Gals.	Length, Ins.	Width, Ins.	Height, Ins.	Net, Lbs.	Boxed, Lbs.
3/8	\$11.00	\$0.50	3 3/4	25	7 3/8	6 3/8	7 7/8	11	6-85
3/8x3/4	11.00	.75	4 3/4	35	9	6 3/8	8 1/2	15	4-80
1/2	16.50	.75	8 3/4	65	10 1/2	8 3/8	8 7/8	22	3-90
1 1/4	22.00	1.00	10	75	11 1/4	9 1/2	9 1/2	40	50
1 1/2	37.00	.....	14	105	12 3/8	10 3/8	12	50	65
2	43.00	.....	22	165	14	12 3/8	12 1/4	65	90
3	69.00	.....	40	300	24	18 3/8	17 1/4	225	315
4	215.00	.....	80	600	30	25 1/4	19 3/8	505	600
6	440.00	.....	120	900	36	31 1/4	25	1000	1150

Note.—3/8x3/4-inch meters are furnished with 3/4-inch connections as a convenience for installation on 3/4-inch domestic service.

Flue Cleaning Tools

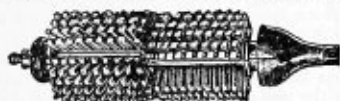
Engineer's Favorite Flue Scraper



The Engineer's Favorite is probably the most popular flue scraper on the market. It is so constructed that by turning the handle or rod, the ends or claws contract until the scraper will readily pass into the flue. Then by turning the rod in the opposite direction the claws are expanded until it fits the tube perfectly. Sizes given are the outside diameter of flue. Weights will average about 1 pound per diameter inch.

Size, inches.....	1 3/4	2	2 1/4	2 1/2	2 3/4	3	3 1/4
Price each.....	\$2.00	\$2.00	\$2.25	\$2.50	\$2.75	\$3.00	\$3.25
Size, inches.....	3 1/2	3 3/4	4	4 1/4	4 1/2	5	6
Price each.....	3.50	3.75	4.00	4.50	5.00	6.00	

Improved Expansion Flue Brush



The improvement of this flue brush consists of so arranging the sections that no open space extends the entire length of the brush, and thus cleans the entire inner surface of the flue each time it is pushed through. The ends and core are malleable iron and the brushes steel. Will not break with ordinary use. Made to fit all sizes of flues from 1 1/2 to 9 inches, but only sizes priced are carried in stock; other sizes being shipped direct from factory. Weights will average 3/4 pound per diameter inch.

Size, inches.....	2	2 1/4	2 1/2	2 3/4	3	3 1/4
Price each.....	\$2.00	\$2.25	\$2.50	\$2.75	\$3.00	\$3.25
Size, inches.....	3 1/2	3 3/4	4	4 1/4	4 1/2	5
Price each.....	3.50	3.75	4.00	4.50	5.00	6.00

Combination Flue Brush and Scraper



This flue cleaner combines the merits of the Engineer's Favorite Scraper and the Improved Expansion Brush, which are described above in detail. The scraper end is inserted in the flue first and the brush following leaves the tube absolutely clean. The brushes are easily replaced when worn. Made to fit all sizes of tubes from 2 to 6 inches. Sizes not priced below shipped direct from factory. Weights about 1 pound per diameter inch.

Size, inches.....	2	2 1/4	2 1/2	2 3/4	3	3 1/4
Price each.....	\$2.00	\$2.25	\$2.50	\$2.75	\$3.00	\$3.25
Size, inches.....	3 1/2	3 3/4	4	4 1/4	4 1/2	5
Price each.....	3.50	3.75	4.00	4.50	5.00	6.00

Spiral, Flat Wire Flue Brush



The simplest form of tube cleaner made. Weight, about 3/4 pound per diameter inch.

Size, inches.....	1 3/4	2	2 1/4	2 1/2	2 3/4	3	3 1/4
Price each.....	\$2.00	\$2.00	\$2.25	\$2.50	\$2.75	\$3.00	\$3.25
Size, inches.....	3 1/2	3 3/4	4	4 1/4	4 1/2	5	6
Price each.....	\$3.50	\$3.75	\$4.00	\$4.50	\$5.00	\$6.00	

The sizes given are for the outside, not inside diameter of flues

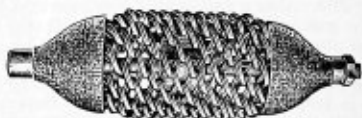
Perfection Flue Cleaner



This flue cleaner, as may be seen from the illustration consists of seven spring steel blades fastened to two malleable iron hubs, which are threaded with iron pipe thread. These steel blades are so fastened to the hubs that when they are pushed through the tube they have a shearing action on the soot and other foreign matter it is desired to remove. Made for all sizes of flues from 1 1/2 to 5 inches outside diameter. Weight, about 3/4 pounds per diameter inch.

Size, inches.....	1 3/4	2	2 1/4	2 1/2	2 3/4	3
Price each.....	\$2.00	\$2.00	\$2.25	\$2.50	\$2.75	\$3.00
Size, inches.....	3 1/2	3 3/4	4	4 1/4	4 1/2	5
Price each.....	3.25	3.50	4.00	4.50	5.00	6.00

Criss Cross Patent Flue Scraper



This scraper is conceded by most engineers to be one of the best boiler tube scrapers manufactured. It has hundreds of sharp cutting edges made from high carbon steel wire, which bear on the tube in a criss cross manner. It scrapes equally well both ways and because of its flexibility will conform to "off" size tubes. The 4 inch and larger sizes are fitted with 3/4 inch female pipe thread and the smaller sizes with 1/2 inch. Made for all size tubes, from 1 1/2 to 5 inches. Weights, about 1 pound per diameter inch.

Size, inches.....	2	2 1/4	2 1/2	2 3/4	3	3 1/4
Price each.....	\$2.00	\$2.25	\$2.50	\$2.75	\$3.00	\$3.25
Size, inches.....	3 1/2	3 3/4	4	4 1/4	4 1/2	5
Price each.....	3.50	3.75	4.00	4.50	5.00	6.00

Oval Spiral Fine Wire Flue Brush



Designed for cleaning hot-water and steam heaters. Size 2 1/2 inches. Approximate weight, 2 lbs. Price, each \$1.75

The Magic Steam Flue Blower



The "Magic" is a serviceable and reliable flue blower. It has been recently improved and provided with a stuffing box and valve, which prevent the escape of steam in operating, thus removing any danger of injury to operator. The price given below does not include steam hose. If steam hose is wanted it is necessary to specify it in order.

No. of Blower	Price with Clamps and Nipple	Outside Diam. of Tubes Inches	Shipping Weight Pounds
1	\$ 5.00	2 to 2 1/2	4
2	6.25	2 1/2 to 2 3/4	6
3	7.50	3 to 3 1/4	8 1/2
4	8.75	3 1/4 to 3 3/4	9
5	10.00	4 to 4 1/4	13
6	12.50	5 to 6	15

Bullock Steam Hose

For use on flue blowers we recommend our Bullock Steam Hose. In ordering be sure to state quantity wanted.

Dean Boiler Tube Cleaner

For Tubular and Water Tube Boilers, Locomotive, Arch and Superheater Tubes, Stirling Boilers, Evaporators and Condensers.

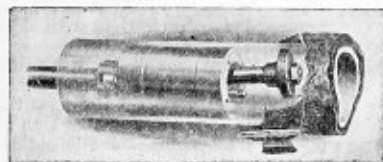


Fig. 1

The Dean Removing Scale from the Tube of a Return Tubular Boiler

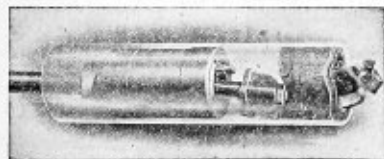


Fig. 2

The Dean Removing Scale from the Tube of a Water Tube Boiler

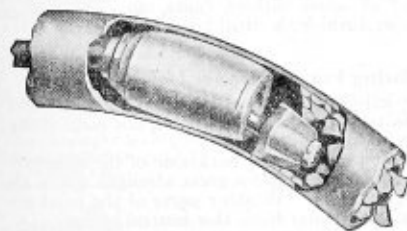


Fig. 3

The Dean Operating in a Stirling Tube

The Dean is a pneumatic or steam operated vibrator which removes scale from either the inside or the outside of tubes of boilers, condensers or evaporators.

The Dean is operated by air or steam and cleans from 10 to 30 tubes an hour. It removes scale by the well known principle of vibration. By a series of light, rapid taps, the force of which may be regulated regardless of the pressure employed, it loosens the scale from the tube surface.

Where the scale is on the outside of the tube, it falls in showers to the bottom of the boiler.

Where it is on the inside, it is broken into small pieces and driven out by the exhaust.

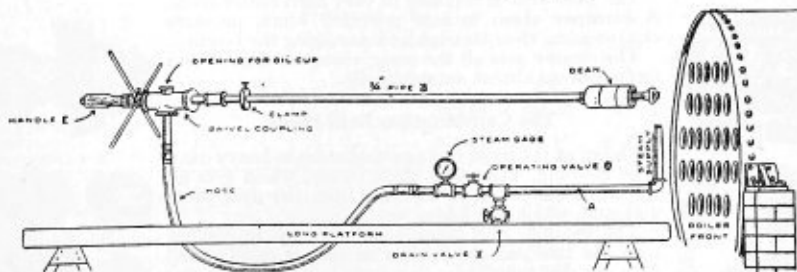
In cleaning the tubes of water tube boilers, the Dean will prove superior to other means, in thoroughness of work and durability. And besides removing the scale, it will remove the hard baked soot, which cannot be removed by any other means.

The same cleaner, by changing vibrator heads, may be used in both water tube and return tubular boilers. At a small extra cost, attachments making the cleaner suitable for operating in two or more different sizes, can be furnished.

The Dean will not injure sound tubes and is the one sure device for detecting weak and burned out tubes which need repairs.

Prices

No. 5 for 3 -in. tubes.....	Wt. 11 lbs.,	\$ 75.00 each
No. 6 for 3½-in. tubes.....	Wt. 14 lbs.,	75.00 each
No. 7 for 4 -in. tubes.....	Wt. 16 lbs.,	75.00 each
No. 8 for 4½-in. tubes.....	Wt. 19 lbs.,	80.00 each
No. 8-0 for 5 -in. tubes.....	Wt. 20 lbs.,	80.00 each
No. 8-1 for 5½-in. tubes.....	Wt. 22 lbs.,	85.00 each
No. 9 for 6 -in. tubes.....	Wt. 25 lbs.,	90.00 each
No. 10 for curved tubes (Stirling Boilers).....	Wt. 10 lbs.,	100.00 each
No. 11 for locomotive arch tubes.....	Wt. 10 lbs.,	100.00 each
No. 3 for 2 -in. tubes.....	Wt. 6 lbs.,	100.00 each
No. 4 for 2½-in. tubes.....	Wt. 10 lbs.,	100.00 each
No. 15 Swivel coupling, lightens work of operator		6.25 each



OPERATING THE DEAN WITH THE SWIVEL COUPLING

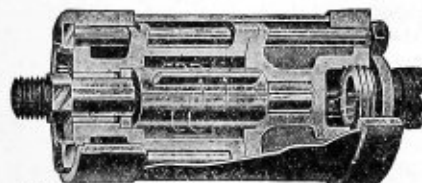
Fig. 4

"Roto" Power Boiler Tube Cleaners

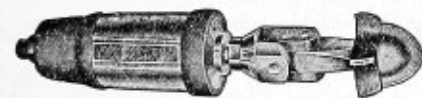
Operated by Positive Balanced Motor for Air, Steam and Water



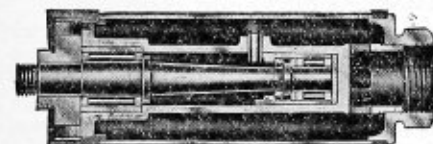
Type A. D. Roto Positive-Balanced Motor and Swing Frame Head.



Showing the rotary engine for steam or air machines. The cylinder bore is not circular—the single balanced blade fits across the bore in all positions.

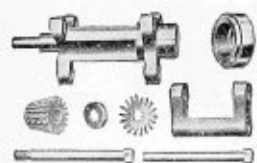


Type ADB for Bent Tubes For Sterling, Maxim and Locomotive Arch Tubes. Hardened steel armor rings.



Type WD—Water Driven Machine Casing is seamless phosphor bronze tubing with steel armor rings. Shaft is chrome nickel steel with nickel bronze wheel. Has ball and roller bearings.

The six arm spider or main frame is made from solid high grade forgings and machined all over. The cutters do not change angle and cannot gouge or cut the boiler tubes. The rivetless construction allows the hardening of every piece and there are no small pins, trunnions or rivets used.



The slow wear is confined to very hard cutter bolts. A bumper stem is now provided which prevents cleaner going clear through and damaging the beading. The cleaner gets all the scale, cleans as it goes, and feeds forward almost automatically.

The Combination Drill Head

Shown at the right, is a new departure in heavy duty tube cleaning. The four blade cutter, which gets all the work and wear, is separate from the drill point and stud, which last a long time.

The separate drill point does not come in contact with the tube, so any number of cutters can be used with one drill point.

This drill head with its plain, cheap and easily ground cutters has cut the cost of maintenance.

The latest development of the engine driven boiler flue cleaner. In large power plants where hard scale forms rapidly boiler tubes can now be cleaned in about one quarter of the time formerly required—getting all of the scale without injury to the tubes.

The air or steam supply required is much less than with older models and the pressure required is also lower.

The characteristics of the motor are great strength, speed and power, with small size and weight. Direct pressure of confined air or steam, on perfectly balanced rotary parts, combines the driving force of a piston engine with a speed almost as high as a turbine and gives greater power. The engine is double-acting, self-starting and perfectly balanced.

Hardened steel armor rings and a seamless jacket thoroughly protect the motor. The hand steel rings keep it straight, round, up to size and a correct fit for the boiler tube even after long use. It cannot pass over scale or get wedged or stuck in the boiler tube.

Prices

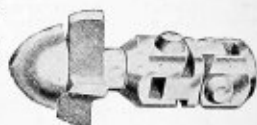
Air or Steam Driven:		For Tubes, Ins.	Each
No. 17 AD	Hard Steel Armored	2 1/4 to 4	\$135.00
No. 18 AD	Hard Steel Armored		
Sterling		3 to 4 Bent	135.00
No. 19 AD	Hard Bronze	2	120.00
Water Driven:			
No. 20 WD-E. H. D.	Hard Steel Armored	3 1/2 to 4	135.00
No. 21 WD-H. D. S.	Hard Steel Armored	3 to 4	97.50
No. 22 WD	Hard Steel Armored		
Sterling		3 to 4 Bent	97.50
No. 23 WD	Nickel Bronze	2 to 2 3/4	75.00

Regular Equipment furnished with above machines includes: One motor, complete with hose connection and all tools. One head, drill type, and a supply of spare cutters. One head, multiple cutter type (either swing frame or fixed pin) and a full set of spare cutters, bolts, etc. For sizes smaller than 3-inch we furnish the drill head only.

Roto Swing Frame Cleaner Head

Is shown in lower left-hand corner. Its great strength and light weight are due to the double ended supports of swing frames, hinge pins and cutter bolts.

The central stem of the spider is the backbone of the structure and its concave triangular form gives great strength while allowing the use of large cutters. All other parts of the head are double supported (at both ends) from this central stem.



Wiedeke Tube Expanders

Note.—List price shows smallest inside diameter any expander passes into and what it will expand to, enabling you to select an expander with proper range regardless if used on straight tubes, swedged tubes or pipe.

Standard Roller Expander

(Patented)



Fig. 3

The rolls and mandrel of this expander are made of good tool steel and tempered. The frame is one piece, always furnishing a good bearing to the guard. It has no collar or pin to get loose or lost throwing tool out of commission. This expander will give good ordinary service.

Size of expander for outside diameter tubes, inches.....	1	1 1/4	1 1/2	1 3/4	1 7/8	2	2 1/4	2 1/2	2 3/4
Will enter and expand tubes I. D. from, inches.....	3/8 to 1	1 1/8 to 1 1/4	1 1/4 to 1 1/2	1 1/2 to 1 3/4	1 3/4 to 1 7/8	1 7/8 to 2	1 3/4 to 2 1/4	2 1/4 to 2 1/2	2 1/2 to 2 3/4
Price complete.....	\$10.00	\$10.00	\$10.00	\$10.00	\$10.00	\$10.00	\$12.00	\$14.00	\$16.00
Approx. weight, boxed, lbs.....	2 1/2	3 1/4	3	4 1/4	4 1/2	5	6	7 1/2	8 1/2
Extra Mandrels, each.....	\$2.00	\$2.00	\$2.00	\$2.00	\$2.00	\$2.00	\$2.00	\$2.50	\$3.25
Extra rolls, each.....	.20	.20	.20	.20	.20	.20	.20	.20	.35

Size of expander for outside diameter tubes, inches.....	3	3 1/4	3 1/2	3 3/4	4	4 1/4	4 1/2	5	6
Will enter and expand tubes I. D. from, inches.....	2 5/8 to 3	2 7/8 to 3 1/4	3 1/4 to 3 1/2	3 3/4 to 3 3/4	3 3/4 to 4	3 3/4 to 4 1/4	4 1/4 to 4 1/2	4 1/2 to 5	5 1/4 to 6
Price complete.....	\$18.00	\$20.00	\$23.00	\$25.00	\$30.00	\$40.00	\$50.00	\$60.00	\$70.00
Approx. weight, boxed, lbs.....	10 1/2	14	17	17 1/2	20 1/2	24 1/2	25	34 1/2	49 1/2
Extra mandrels, each.....	\$ 3.75	\$ 4.25	\$ 4.75	\$ 5.50	\$ 5.75	\$ 6.50	\$ 8.50	\$10.00	\$11.00
Extra rolls, each.....	.35	.50	.50	.60	.60	.80	.80	1.00	1.75



Fig. 15

Dayton Roller Expander

The rolls and mandrel of this expander are made of the very best tool steel and tempered. The collar and frame is one piece and hardened making it the most economical expander of this class upon the market, having the fewest parts.

Size of expander for outside diameter tubes, inches.....	1	1 1/4	1 1/2	1 3/4	1 7/8	1 3/4	1 7/8	2
Will enter and expand tubes I. D. from, inches.....	3/8 to 1	1 1/8 to 1 1/4	1 1/4 to 1 1/2	1 1/2 to 1 3/4	1 3/4 to 1 7/8	1 3/4 to 1 7/8	1 3/4 to 1 7/8	1 3/4 to 2
Price complete.....	\$11.00	\$11.00	\$11.00	\$11.00	\$11.00	\$11.00	\$11.00	\$11.00
Approx. weight, boxed, lbs.....	3	3 1/4	3 1/4	3 1/4	4	5	5 1/2	6
Extra mandrels, each.....	\$ 3.50	\$ 3.50	\$ 3.50	\$ 3.50	\$ 3.50	\$ 3.50	\$ 3.50	\$ 3.50
Extra rolls, each.....	.30	.30	.30	.30	.30	.30	.30	.30

Size of expander for outside diameter tubes, inches.....	2 1/2	2 3/4	2 3/4	2 3/4	2 3/4	3	3 1/4	3 1/2	4
Will enter and expand tubes I. D. from, inches.....	1 3/4 to 2 1/2	1 3/4 to 2 1/2	2 1/4 to 2 3/4	2 1/4 to 2 3/4	2 1/4 to 2 3/4	2 1/4 to 3	2 1/4 to 3 1/4	3 1/4 to 3 1/2	3 1/2 to 4
Price complete.....	\$13.00	\$13.00	\$15.00	\$15.00	\$17.00	\$17.00	\$18.00	\$20.00	\$22.00
Approx. weight, boxed, lbs.....	6 1/2	6 1/2	7	7 1/2	8 1/2	13	13 1/2	16	23
Extra mandrels, each.....	\$ 3.50	\$ 3.50	\$ 4.50	\$ 4.50	\$ 4.50	\$ 5.50	\$ 6.50	\$ 6.50	\$ 7.50
Extra rolls, each.....	.30	.30	.30	.30	.60	.60	.70	.70	.80



Fig. 150

Standard Sectional Expander

This expander is made completely of steel and hardened. It is for hand use only. Used mostly on fire boxes of thrasher engines and for repair work and gives good ordinary service. When ordering always state thickness of tube sheet; 3/8-inch plate for 3/8-inch thickness tube sheet and 1/2-inch plate for 1/2-inch thickness tube sheet carried in stock. All other plates are special.

Size of expander for outside diameter tubes, inches.....	1	1 1/4	1 1/2	1 3/4	2	2 1/4
Will enter and expand tubes I. D. from, inches.....	3/8 to 1	1 1/8 to 1 1/4	1 1/4 to 1 1/2	1 1/2 to 1 3/4	1 3/4 to 2	1 3/4 to 2 1/4
Price complete.....	\$12.00	\$12.00	\$12.00	\$12.00	\$12.00	\$13.00
Approximate weight, boxed, pounds.....	3	3 1/2	4	4 1/2	5	5 1/2
Extra round pins, each.....	\$ 2.50	\$ 2.50	\$ 2.50	\$ 2.50	\$ 2.50	\$ 2.50
Extra coil steel springs, each.....	.40	.40	.40	.40	.40	.40

Size of expander for outside diameter tubes, inches.....	2 1/2	2 3/4	3	3 1/4	3 1/2	4
Will enter and expand tubes I. D. from, inches.....	1 3/4 to 2 1/2	2 1/4 to 2 3/4	2 1/4 to 2 3/4	2 1/4 to 2 3/4	2 1/4 to 2 3/4	2 1/4 to 3
Price complete.....	\$15.00	\$18.00	\$22.00	\$26.00	\$30.00	\$33.00
Approximate weight, boxed, pounds.....	7	8 1/2	13	13 1/2	14	16
Extra round pins, each.....	\$ 3.00	\$ 5.00	\$ 5.00	\$ 7.00	\$ 7.00	\$ 7.00
Extra coil steel springs, each.....	.40	.75	.75	1.00	1.00	1.00

Wiedeke Tube Cutters

Note.—Price list shows smallest inside diameter any tube cutter passes into, enabling you to select a tube cutter with proper range, regardless if used on straight tubes, swaged tubes or pipe.

Ideal Self Feed Tube Cutter

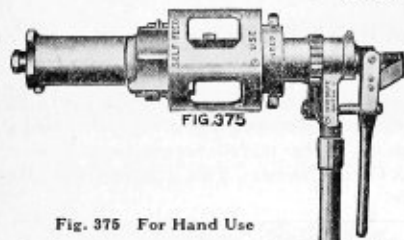


Fig. 375 For Hand Use

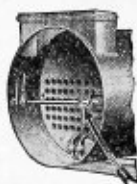


Fig. 375-K

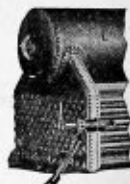


Fig. 375-L

Is the only cutter upon the market that solved the problem of cutting off new steel tubes with a bevel ready for beading without cracking them, generally caused by turning them outward with a ball-faced hammer. By moving guard back, which requires a minute you can cut out old tubes inside of boiler head of water tube boiler. (Note illustrations above.) All wearing parts made of steel and tempered, making a first-class tool.

Sizes of tube cutter for outside diameter	2	2 1/4	2 1/2	2 3/4	3	3 1/4	3 1/2	4	4 1/2	5	5 1/2	6
Cuts tubes I. D., inches	1 1/2	1 3/4	2	2 1/4	2 1/2	2 3/4	3	3 1/4	3 1/2	4	4 1/2	5 1/2
Price complete	\$15.00	\$16.00	\$17.00	\$18.00	\$22.00	\$22.50	\$23.00	\$24.00	\$27.00	\$39.00	\$39.50	\$40.00
Approximate weight, boxed, pounds	18	19	19 1/2	20	29	29 1/2	31 1/2	33	50 1/2	54	55	55 1/2
Extra cutters, per piece	\$.30	\$.30	\$.30	\$.30	\$.30	\$.30	\$.30	\$.30	\$.60	\$.80	\$.80	\$.80
Extra cutters, per dozen	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	6.00	8.00	8.00	8.00

Ideal Tube Cutter Extension



Fig. 377

Connect proper length extension and you stand upright, outside of a smoke box, vertical, submerged, B. & W. Heine, Sterling Water Tube or any other boilers, enabling you to do more work.

Number of extension	D-1 1/2	D-3	D-6	D-8	E-1 1/2	E-3	E-6	E-8	F-1 1/2	F-3
Price complete	\$ 4.00	\$ 8.50	\$14.00	\$16.00	\$ 5.50	\$11.00	\$16.00	\$20.00	\$ 9.00	\$20.00
Approximate weight, boxed, pounds	8 1/2	25	37	49	12	41	55	65	25	35
Length of extension	19 ins.	38 ins.	6 ft.	8 ft.	19 ins.	38 ins.	6 ft.	8 ft.	19 ins.	38 ins.
Fits tube cutters, Fig. 375, inches	2	2 1/4	2 1/2	2 3/4	3	3 1/4	3 1/2	4	4 1/2	5 1/2



Fig. 40

Ideal All Steel Self Feed Expander

It is self feeding and for power use; can also be used by hand. Furnished with frictionless phosphor bronze, bearing, impossible to get out of order, reducing friction to a minimum.

All expanders have a right hand feed and are furnished with standard, detachable combination square shank mandrels.

Sizes 1 -inch to 1 1/2-inch, inclusive, 1/2-inch square.										
Sizes 1 1/2-inch to 2 1/4-inch, inclusive, 3/4-inch square.										
Sizes 3 -inch to 6 -inch, inclusive, 1 -inch square.										
Size of expander for outside diameter tubes, inches	1	1 1/4	1 1/2	1 3/4	1 1/2	1 3/4	1 1/2	1 3/4	1 1/2	2
Will enter and expand tubes I. D. from, inches	3/4 to 1	1 to 1 1/4	1 1/4 to 1 1/2	1 1/2 to 1 3/4	1 1/2 to 1 3/4	1 3/4 to 1 1/2	1 3/4 to 1 1/2	1 1/2 to 1 3/4	1 1/2 to 1 3/4	1 1/2 to 2
Price complete	\$16.00	\$16.00	\$16.00	\$16.00	\$16.00	\$16.00	\$16.00	\$16.00	\$16.00	\$16.00
Approx. weight, boxed, lbs.	3 1/2	4	4	4 1/2	4 1/2	4 1/2	4 1/2	4 1/2	4 1/2	4 1/2
Extra mandrels, each	\$ 3.50	\$ 3.50	\$ 3.50	\$ 3.50	\$ 3.50	\$ 3.50	\$ 3.50	\$ 3.50	\$ 3.50	\$ 3.50
Extra rolls, each	.30	.30	.30	.30	.30	.30	.30	.30	.30	.30
Size of expander for outside diameter tubes, inches	2 1/4	2 1/4	2 3/4	2 3/4	2 3/4	2 3/4	3	3 1/4	3 1/4	3 1/2
Will enter and expand tubes I. D. from, inches	1 1/2 to 2 1/4	1 1/2 to 2 1/4	2 1/4 to 2 3/4	2 3/4 to 2 3/4	2 3/4 to 2 3/4	2 3/4 to 2 3/4	2 3/4 to 3	2 3/4 to 3 1/4	2 3/4 to 3 1/4	3 1/4 to 3 1/2
Price complete	\$18.00	\$18.00	\$19.50	\$19.50	\$22.00	\$22.00	\$22.00	\$24.50	\$24.50	\$24.50
Approx. weight, boxed, lbs.	8 1/2	9	10 1/2	11	13 1/2	14 1/2	17	18 1/2	21	21
Extra mandrels, each	\$ 3.50	\$ 3.50	\$ 4.50	\$ 4.50	\$ 4.50	\$ 4.50	\$ 5.50	\$ 5.50	\$ 5.50	\$ 5.50
Extra rolls, each	.30	.30	.30	.30	.60	.60	.60	.70	.70	.70
Size of expander for outside diameter tubes, inches	3 1/4	4	4 1/4	4 1/4	4 1/4	4 1/4	5	5 1/2	5 1/2	6
Will enter and expand tubes I. D. from, inches	3 1/4 to 3 1/4	3 1/4 to 4	3 1/4 to 4 1/4	4 1/4 to 4 1/4	4 1/4 to 4 1/4	4 1/4 to 4 1/4	4 1/4 to 5 1/2	4 1/4 to 5 1/2	4 1/4 to 5 1/2	5 1/2 to 6
Price complete	\$27.00	\$27.00	\$40.00	\$50.00	\$55.00	\$55.00	\$60.00	\$60.00	\$60.00	\$65.00
Approx. weight, boxed, lbs.	23	28	31	32	35	39 1/2	40 1/2	51	55	55
Extra mandrels, each	\$ 6.50	\$ 7.50	\$10.00	\$10.00	\$15.00	\$15.00	\$18.00	\$18.00	\$18.00	\$20.00
Extra rolls, each	.80	.80	1.10	1.10	2.00	2.00	2.50	2.50	2.50	3.00



Flue Beading Tool

For beading the ends of boiler tubes after they have been expanded. Made of good tool steel. Length, 8 inches, weight, 1 lb. Price each.....\$1.00



Caulking Tool

Rounded point, 8 inches long. Price each.....\$1.20

Bullock Heating Stoves

For Railroad Stations
Construction Sheds, Riggers,
Tool Houses, etc.
Neatly Designed and Serviceable



Solid Base



Caboose Leg Base



Regular Leg Base



Bullock Heating Stove with Sheet Steel Drum

Bullock Stoves are made to burn any kind of fuel—hard or soft coal, wood or natural gas, and have great heating capacity.

They are well made from high grade iron castings and all parts are carefully fitted together.

All stoves are furnished with ash pan, shaking and dumping grate, lever shelf and damper. If desired, we can also supply sheet-iron drums, water bowls and attachments for bolting to floor.

The general design of Bullock Stoves is neat and attractive, while the shape has, for many years, proved the best for all practical purposes.

They are built for—and will give—long and satisfactory service, as is testified by the thousands in use every cold day.

The Regular Pattern is for general heating, as in construction sheds, tool houses, store rooms, railway stations, etc.

The Caboose Pattern is regularly furnished with fastenings for door and ash pan and lugs for bolting to the floor of caboose. In all other respects it is similar to the regular pattern.

Buda Giant Stove

The Largest Stove Built

Made from a substantial grade of iron and well constructed throughout.

This stove radiates a tremendous amount of heat and is particularly adapted for heating roundhouses, railway stations and similar places.

Height.....60 inches
Largest inside diameter of fire pot, 26 inches
Size of pipe.....8 inches
Weight.....1100 pounds
Price.....\$98.00

Dimensions and Prices for Bullock Stoves

Number.....	1	2	3
Diameter, inches.....	15	17	19
Height, inches.....	40	45	50
Weight, pounds.....	250	350	450
Price, each.....	\$28.00	\$32.00	\$40.00

Special Note.—We keep Solid and Leg Base Stoves in Chicago stock. Caboose Pattern Stoves will be shipped direct from factory.

Caboose Fittings, extra.....\$2.50
Sheet Steel Drums, extra.....2.00
Water Bowls, extra.....2.20



H. Channon Company Chicago

The Channon Sand Drier

Used by Railroads, Electric Lines, Contractors, Coal Companies, etc. The stove is simple in design and massive for rough use. The wet sand is shoveled into the skirting or hopper, and as it dries, the dry sand runs through the holes in the perforated ring near the bottom. Most any kind of fuel can be used; hard or soft coal, coke or wood.

The amount of sand the stove will dry varies in proportion to the amount of moisture in the sand and the intensity of the heat in the stove.

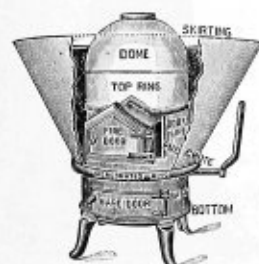
Clear sand only can be dried, as earth or clay will bake hard, and so fail to run through the holes in the ring. The fire should be burning before the sand is put into the hopper, otherwise, the sand might bake and cake and fail to discharge itself.

Up-right Grating. We are now supplying a cast iron upright grating at extra price (see repair prices below). This grating surrounds the main body of the stove to prevent the wet sand from coming into immediate contact with the hot furnace. There is an open air space of about 1½ inches between grating and stove. The grating dries the sand more rapidly and increases the capacity considerably. **This grating is not furnished unless specially ordered.**



No.	Price	Approx. Weight pounds	Cap'ty per Day in Tons	Approx. Cap. Cu. Ft. of Sand	Extreme Height inches	Height Base to Top inches	Height of Legs inches	Size of Fire Door inches	Inside Diam. inches	Hopper at Top Diam.	Grate Diam., inches	Thick. of Castings, inches
1	\$120.00	1200	10	18½	58	48	10	10x12	23	52	22	1¼
2	76.00	700	5	8½	49½	40	10	10x12	17	40	15	¾
3	64.00	475	3	7½	48¾	38½	10	11x11	15	39	12½	¾

Capacity given is with hopper, level full—one-third can be added by heaping the sand around smoke pipe.



Showing Names of Parts

REPAIR PARTS	No. 1	No. 2	No. 3
Skirting or Sand Hopper	\$17.60	\$14.40	\$12.80
Upright Grating (see cut at right)	32.00	19.20	16.00
Top or Dome	13.60	8.30	6.40
Top Ring or Upper Barrel	21.20	12.00	8.00
Door Barrel or Fire Pot	24.00	12.80	8.32
Feed Chute with Feed Door	9.60	8.80	8.00
Feed Door only	1.92	1.92	1.60
Perforated Ring	6.40	4.80	4.80
Grate	8.80	4.80	3.20
Grate Handle or Shaker	.80	.80	.80
Base or Seat with Ash Door	12.80	6.40	5.60
Bottom or Bottom Plate	6.40	4.00	3.20
Foot	1.12	1.12	1.16
Ash Pit Door only	1.60	1.28	.96



Showing Upright Grating

The "Union" Steel Sand Drier

A light weight portable sand stove or drier. It is shipped knocked down in four pieces; barrel, hopper, top and grate. Will dry enough sand for two to four locomotives and is a favorite with railroad contractors on account of its portability. It is also used by traction and small steam lines.

Stove is made of steel plates throughout and securely riveted together. The weight of the sand in the hopper is supported by the legs of the stove, so that should the barrel of the stove become too hot it will not buckle. Will burn either wood or coal as desired. The grate fits on lugs riveted to the legs at the bottom. Furnished with doors as shown.

The stove is 20½ inches in diameter and 36 inches high. Hopper holds about 5 bushels of sand and will dry enough sand for two to four locomotives, under ordinary conditions. Principle of operation is the same as the Channon Sand Drier.

Approximate weight 250 pounds, price each.....\$64.00



Gripwell Tires are guaranteed 3500 miles and their price is right



Sugar or Wash Kettles

With Bails. Milled and Painted

Kettles may be had tapped for outlet pipes at extra charge of \$2.50 net.

Number.....	1	2	3	4	5	6	7	8
Inside Diam., inches...	16	18	20 1/2	22	23	25	26	29
Depth, inches.....	11	12	13 1/2	13 3/4	14 3/4	15 1/2	16	18
Cap'ty, gals., actual...	8	10 1/2	15	18 1/4	21 1/2	25 1/2	29 1/2	39
Cap'ty, gals., usual rating.....	10	13	18	20	25	30	32	40
Weight, pounds.....	25	32	40	56	60	67	83	140
Price each.....	\$2.20	\$2.80	\$3.50	\$4.50	\$5.00	\$6.00	\$7.00	\$10.50

Caldron Kettles

For Melting Metals, etc.

All sizes above 75 gallons are cast without lugs or rims unless specially ordered. Tapped for outlet pipes, \$4.00 extra. Sizes up to 90 gallons coated with grey enamel, \$17.00 to \$19.50 extra.

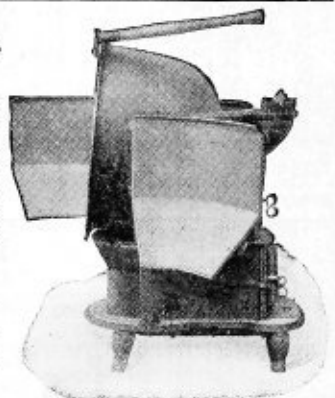
Capacity, Gals., actual...	25	33	41	48	53	65	75	90	110	170	230	500
O. D. of Flange, inches...	28	31	34	35	36	39	41	43	46	61	62 1/2	80
I. D. of Flange, inches...	24	28	30	31	32	34	36	38	42	54	55	72
Depth, inches.....	16	16	19	19	20	20 1/2	22	22	23	26	31	40
Weight, pounds.....	90	100	140	150	160	205	235	235	360	880	980	2500
Price each.....	\$6.00	\$8.00	\$10.00	\$12.00	\$13.00	\$14.00	\$18.00	\$25.00	\$30.00	\$60.00	\$70.00	\$150.00



The Profit Farm Boiler

The Profit Farm Boiler is a simple furnace, with a caldron which dumps, as shown by the cut. The contents can be emptied in one minute, doing away with the slow and disagreeable task of dipping it out. It is thoroughly constructed of the best cast-iron. The kettle is cast very smooth and has an extra thick bottom. Burns coal or wood. The price for wood and coal burning boilers is the same. Be sure to specify which is wanted.

No.	Cap., Gals.	Price Each	Add for Enamel'g	Wgt., Lbs.
1	25	\$23.00	\$17.00	275
2	48	34.00	21.25	450
3	53	38.00	27.50	480
4	75	46.00	29.75	500



Showing Dumping Process

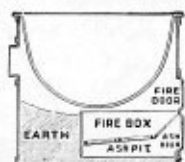
Plain Steel Boilers

Farmers, butchers, contractors and others who want a steel boiler, good, as well as low in price, will find it in this line, which should not be confused with those of similar appearing construction, but made of stove pipe.

The jacket or shell is made from heavy sheet steel, with edges banded, and has no bottom, as the stove is intended to be used on the earth, or to be filled with brick or clay up to the bottom of the feed door. It is provided with double doors so that it can be conveniently used as a coal burner when supplied with coal fixtures.

No.	Cap., Gals.	Wt., Lbs.	Price Each	No.	Cap., Gals.	Wt., Lbs.	Price Each
1	25	165	\$12.00	6	58	260	\$19.50
2	35	190	14.00	7	65	335	22.00
3	40	225	15.00	8	75	375	26.00
4	48	240	16.50	9	90	470	32.00
5	53	255	18.00	10	110	500	36.00

Coal Fixtures for Nos. 1, 2, 3, \$7.00. Nos. 4, 6, 7, \$8.00. For Nos. 8, 9, 10, \$9.00.



Cross Section Showing Coal Fixtures



Cross Section Showing Earth Lining



Steam Jacket Kettles and Agitator

These kettles are made of very thick metal, put together without stay bolts, have ample steam space, are packed with asbestos sheet packing, tapped for inlet and drip pipes, and unless ordered for higher pressure are tested to 75 pounds hydraulic pressure to the square inch.

The inner and outer sections are cast separately, so that the inner kettle may be replaced when worn out from use of acids or any corrosive material.

Either style may be had with any size outlet pipe, or any special attachment may be made to order.

The single action agitator illustrated below can be applied to any of the steam kettles. Simple and convenient and operated by either hand or machine power.



With Raised Curb



Cap'ty Gals.	Price Each	Inside Diameter by Depth, Inches	Wt., Lbs.
5	\$ 20.00	14x10	255
10	28.00	18x12	410
15	32.00	21x14	525
20	40.00	22x15	550
30	55.00	28x16	750
40	65.00	29x17	1690
90	110.00	38x22	2095

Cap'ty Gals.	Price Each	Inside Diameter by Depth, Inches	Wt., Lbs.
34	\$ 60.00	24x21	1000
54	75.00	29x22	1135
114	125.00	38x27	2390



Price agitator only, single action, with
paddle.....\$15.00
Approximate weight.....115 lbs

Hinged covers \$18.00 extra.

These capacities vary somewhat, as the extra thickness of metal used for the heavier steam pressures decreases the capacity slightly.

The smaller sizes of either style can be furnished coated with gray enamel at an extra cost of from \$50.00 to \$60.00.

Lead Melting Furnaces

Capacity of Kettle, 750 Pounds Lead

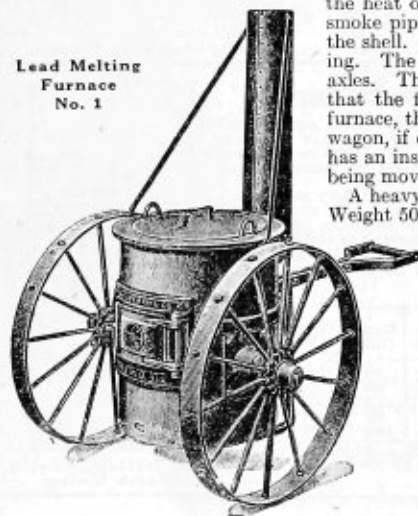
These furnaces are constructed of $\frac{3}{8}$ -inch boiler steel, strongly riveted and braced, with cast iron dumping and shaking grate.

Has a heavy cast iron fire pot setting inside the shell, which protects it from the heat of the fire. The grate is arranged to both dump and shake. The smoke pipe is made of heavy steel and is attached to a cast iron bonnet on the shell. The fire door is very strong, and is supplied with a draught opening. The wheels are made of steel of ample strength and revolve on steel axles. The handle is provided with a folding rest that locks in position so that the furnace always stands solid on three points. When moving the furnace, the rest folds up so that the handle may be attached to the rear of a wagon, if convenient to move in this manner. The kettle is very heavy and has an inside flange to prevent the molten lead slopping when the furnace is being moved.

A heavy steel cover is supplied without extra charge.

Weight 500 pounds, price each.....\$50.00

Lead Melting
Furnace
No. 1



Furnaces Nos. 2 and 3

This furnace is made of $\frac{3}{8}$ -inch steel, with cast iron dumping and shaking grate. The furnace rests on three heavy steel legs, and has four carrying loops riveted to shell so that it can be easily carried about by means of two pieces of pipe or iron bars.

A heavy steel cover for kettle is supplied without extra charge.

Price

No. 2. 750 lbs., weight 340 lbs. . \$32.00
No. 3. 300 lbs., weight 240 lbs. . 20.00

Lead Melting Furnaces
Nos. 2 and 3



Fire Pots and Soldering Furnaces

Nos. 1 and 5 Gasoline Fire Pot



Like illustration, except that the tank is now made of heavy seamless drawn steel. It is adapted to a greater number of uses than any other. Burner is made of special generator metal and produces an ideal blue flame working perfectly in cold or windy weather. Will heat two coppers and melt a pot of lead at the same time. Capacity 7 pints.
List price each.....\$16.00

No. 5. Same as above, except with smaller tank, holding 5 pints of fuel.
List price each.....\$12.50

Nos. 10 and 20 Coil Fire Pot

These fire pots hold a gallon of fuel and are exactly the same except the way in which the air pressure is produced.

No. 20. Has a brass air pump, as shown, and No. 10 a rubber bulb.

They have a great generating power, combining marked economy of fuel consumption with the great heat produced.

Tanks are made of galvanized iron, well braced to withstand rough usage.

No. 10. With rubber bulb.....\$7.00
No. 20. With air pump.....8.00



No. 221 Kerosene Fire Pot

1 Gallon Capacity

It contains many improvements, is perfect in construction and remarkable in heat producing qualities, using but little fuel. The tank is made of heavy gauge, seamless drawn steel, with bottom and all fittings welded in, not soldered, making it extra strong and serviceable. A large automatic brass pump quickly and easily supplies all needed air pressure. The burner has a powerful generator and superheats the kerosene gas before it is burned, producing perfect combustion and a clear, blue flame, free from smoke and odor. The filler plug at the top of the tank is made with an air valve screw which releases the air pressure and extinguishes the flame. All parts are made strong and easily accessible. Weight each, 12 pounds.
Price each.....\$18.00

Superior Furnace

For Natural, Illuminating or Produced Gas



Burns about 92% of air and 8% of gas.
The fire brick keeps the heat from radiating.
Maximum capacity is four large size coppers at a time, but gives better service with only two.

List Price Each

No. 1. Single burner, with cast iron top.....\$3.00
No. 2. Double burner, with cast iron top.....4.00
No. 3. Single burner, with firebrick.....4.00
No. 4. Double burner, with firebrick.....5.00

Gasoline Fire Pot Nos. 71 and 72

Like illustration, except that the tank is now made of heavy seamless drawn steel. Noiseless, smokeless and odorless. Has a sub-flame for generator which permits heated flame to be turned very low. Superheated gas and double heating surfaces produce intensely hot blue flames, which burn from each side to center. No. 72 is similar to No. 71, but a size smaller. The burner will heat a pair of 8-pound coppers and a pot of metal at the same time.

No.	Capacity Pints	Weight, Pounds	Price, Each
71	7	15	\$16.00
72	5	14½	12.50



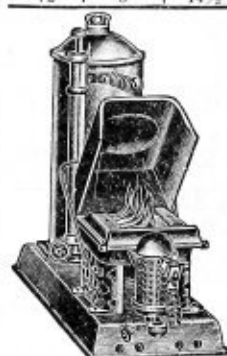
The "Double Blast" Fire Pot

Heats the Irons Rapidly with a Very Low Consumption of Gasoline

The blast is from the outside to the center, so that when one soldering copper is being used, both hot blasts are forced upon the one remaining.

Can be readily carried about on roofs or any place where a soldering furnace is used.

Tank is galvanized steel, 5x12 inches, with 1x10-inch brass pump. Furnace will heat two 12-pound coppers at one time.
List price each.....\$16.50



Babbitt Melting Ladles

Diam. of Bowl, In.	Lead Capacity, Lbs.	Price per Doz.
3	1½	\$ 3.50
4	4	5.00
5	8½	6.50
6	15	10.00
7	26	12.00
8	45	15.00
9	57	20.00
10	80	24.00
12	130	45.00

Drop forged of extra heavy mild steel.

Soldering and Pouring Pots

Solder Pots

Size, Inches	Lead Capacity, Pounds	Price Each
5	12	\$0.80
6	16	1.20
8	50	1.60
10	100	3.30
12	130	5.50

Pouring Pot

Outside diameter, 8 inches. Inside diameter, 7 inches. Depth, 6 inches.
Price each.....\$5.00

Pouring Pots

Solder Pot

Gas Heater for Soldering Coppers



A efficient heater at a low price. Dimensions, 14½x7x3½ inches wide. Weight each, 3 pounds.

List price each.....\$2.50

Blow Torches and Brazing Forges

Gasoline Blow Torches
Nos. 31 and 32

These two blow torches are, perhaps, the most popular torches on the market.

They have no equal where intense heat is necessary and produce a perfect blue flame, indoors or out, in hard wind or extreme cold. Generating chamber superheats the gas before it is burned.

No. 32 as shown. No. 31 exactly the same, except without soldering iron hook. Capacity, 1 quart of fuel.

No. 31. Price each.....	\$9.00
No. 32. Price each.....	9.50

Gasoline Blow Torches Nos. 29 and 30



Nos. 29 and 30 are popular priced torches and while not having the improved type of burner used with the Nos. 31 and 32 torches, they are well made and serviceable. Tank is made of 18 gauge brass, reinforced. Pump is located in handle.

No. 30 has soldering iron hook; No. 29 has not.

Capacity, 1 quart.

No. 29. Price each.....	\$8.50
No. 30. Price each.....	9.00

Gasoline Blow Torches
Nos. 37 and 38

Nos. 37 and No. 38 are the best pint torches made and are exactly the same as the No. 31 and No. 32, except in the capacity of the tank.

For many purposes a small torch is much more convenient than a quart size. No. 37 with and No. 38 without soldering iron holder.

No. 37. Price each.....	\$6.00
No. 38. Price each.....	8.50

No. 10 Torch



A polished brass blow pipe or alcohol torch, possessing many exclusive features. A closely fitting cap screwed down firmly over the wick makes the tank air-tight, which positively prevents evaporation of alcohol. The blow pipe is fitted to a threaded nut, which may be run up or down to adjust it for the work in hand.

Shipping weight, each, $\frac{3}{4}$ pound.
Price each.....\$4.00

Gasoline Brazing Forge
No. 88

The two special double-jet burners with which this forge is fitted, are mounted on swivel connections at points marked S, so that flames can be turned in any direction. Fire brick shown in illustration retains the heat around the part to be brazed. The fire brick table can be raised or lowered as desired, bringing it closer to the work or lowering it away from the work. Its wide range of adjustment makes it adaptable for general work in garages, repair shops, etc. For brazing cast iron, brass and other metals, it cannot be excelled. The double-jet construction causes perfect combustion of the fuel and produces intense heat.

The tank is made of boiler steel, tested to 125 pounds pressure, holding 8 gallons of fuel. Height of forge, 55 inches, diameter 12 $\frac{1}{4}$ inches, shipping weight, 125 pounds.

No. 88. Brazing Forge.....	\$70.50
No. 230. Floor Pump.....	

Gasoline Blow Torches
Nos. 47 and 48

These torches are oblong in shape, 1 $\frac{1}{2}$ inches thick and are convenient for working in cramped places, as well as packing in the repair boxes of automobiles, etc., better than the regular round-shaped torch. No. 48 with and No. 47 without soldering iron hook. Hinged support, prevents tipping over.

Capacity, 1 pint.

No. 47. Price each.....	\$10.50
No. 48. Price each.....	11.00

No. 93 Double Jet Blow Torch

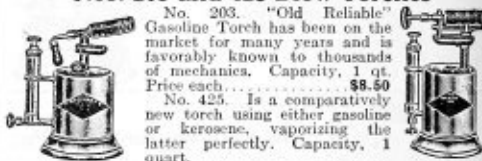


This torch has a double blast, the burners producing an intensely hot flame suitable for light brazing, annealing, tempering or drawing the temper of small tools. The burner is mounted on a swivel and can be turned in any direction.

Capacity, 1 quart.

No. 93. Price each.....	\$14.50
No. 92. Exactly same as above, except burner does not swivel, but remains upright.	
Price each.....	\$14.00

Nos. 203 and 425 Blow Torches



No. 203. "Old Reliable" Gasoline Torch has been on the market for many years and is favorably known to thousands of mechanics. Capacity, 1 qt. Price each.....\$8.50

No. 425. Is a comparatively new torch using either gasoline or kerosene, vaporizing the latter perfectly. Capacity, 1 quart.

No. 203. Price each.....	\$10.50
No. 425. Price each.....	11.00

Note:—Nos. 203 and 425 torches are furnished with a detachable soldering iron hook.

Gasoline Brazing Forge
No. 105

Double Jet



This forge will produce an exceptionally high degree of heat with small burners. The double jet construction causes perfect combustion and consequently the maximum degree of heat is obtained with the minimum consumption of fuel. Flames are regulated by means of valves. With the burner valves turned on full, the flame is much larger and can be used for brazing heavier work in cast iron, brass and other metals.

Size of flame at burner, 1 $\frac{1}{4}$ inches. Length of flame, 10 inches. Consumption about 2 quarts. Weight about 74 pounds.

Style	Cap. gals.	Hght. inches	Diam. inches	Price Each
No. 105	8	50	12 $\frac{1}{4}$	\$63.00

Pipe Joint
Lead Melting Machine

Designed especially for melting lead in pipe joints of water and gas mains or where it is desirable to bring the flame to the work. Burner is made of special bronze metal, attached to a three-foot iron pipe with handle. Generator produces a perfect blue flame of about 2,800 degrees Fahrenheit. A blow torch is furnished with each machine for generating the burner. Six feet of special oil hose accompanies each machine. Size of flame at burner, 2 inches; length about 2 inches; consumption about 3 quarts per hour; capacity 8 gallons; height 27 inches; diameter 12 $\frac{1}{4}$ inches; weight 90 pounds.

No. 82. For gasoline.....	\$107.00
No. 82A. For kerosene.....	116.50



Foot Blowers



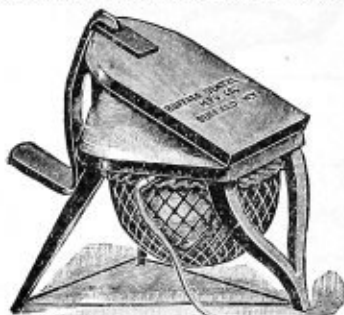
Nos. 9, 9A or 9B

The best foot blower ever constructed for laboratory purposes. Of excellent workmanship and the best material obtainable. We guarantee them to be as durable as any article of the kind made.

A rubber disk forms the air reservoir and equalizes the pressure by its elasticity. By increasing the number of disks, a greater air pressure is obtained. Can be operated anywhere, even upon a dust heap, without picking up dust or lint.

No. 10 is mounted upon legs, the blowers being reversed so as to bring the air reservoir below instead of above. This obviates the risk of injury to the rubber disk or its containing net, by dropping tools or corrosive liquids upon them.

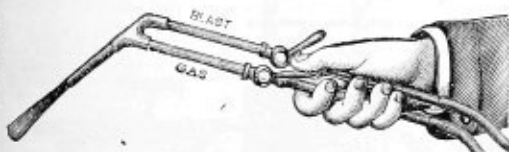
No. 10B has detachable legs.



Nos. 10, 10A or 10B

No.	No. of Disks	Size Boards	Diameter Air Reservoir	Pressure of Blast per Inch Pounds	Cu. Ft. of Air per Hour	Price Each
9	1	7 $\frac{3}{4}$ x 9	7 $\frac{1}{4}$	1	190	\$ 5.00
9A	2	10 x 11	9	1 $\frac{1}{2}$	330	7.00
9B	3	11 $\frac{1}{2}$ x 13 $\frac{1}{4}$	11	1 $\frac{3}{4}$	625	11.50
10	1	7 $\frac{3}{4}$ x 9	7 $\frac{1}{4}$	1	190	6.00
10A	2	10 x 11	9	1 $\frac{1}{2}$	330	8.00
10B	3	11 $\frac{1}{2}$ x 13 $\frac{1}{4}$	11	1 $\frac{3}{4}$	625	12.50

Extra nets. Each \$0.35



No. 8C Brazing Blow Pipe

Requires $\frac{3}{8}$ -inch gas supply pipe and tap $\frac{1}{8}$ -inch air jet, with stop-cocks. Operate with No. 9A or No. 10A foot blower. Can be supplied to burn natural gas or gasoline gas, if desired, without extra charge. Furnished for illuminating gas unless otherwise specified.

Price each \$3.00

No. 8E Brazing Blow Pipe

$\frac{1}{2}$ -inch air jet, $\frac{1}{2}$ -inch gas opening, with stop-cocks. Requires $\frac{1}{2}$ -inch gas supply pipe and tap. For illuminating gas unless otherwise specified. Adapted to burn natural gas or gasoline gas without extra charge.

Price each \$4.25



No. 8F Brazing Blow Pipe

$\frac{1}{2}$ -inch air jet, 1-inch gas opening, gas nozzle of steel tubing, with stop-cocks. Requires $\frac{1}{2}$ -inch gas supply pipe and tap. For illuminating gas only. Stop-cocks are both under perfect control of the thumb of the hand holding blowpipe. Nos. 8E and 8F require Nos. 9B and 10B foot blower.

Price each \$5.25



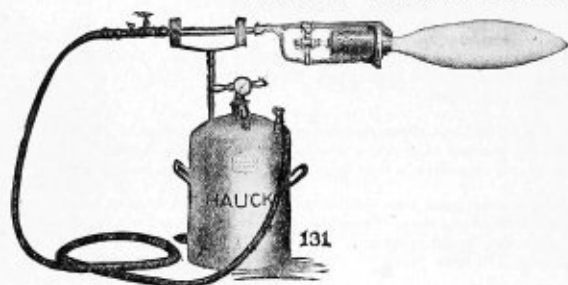
No. 8G Brazing Blow Pipe

For natural gas, non-extinguishable. Made of iron throughout, except brass cocks. Will work equally well with illuminating gas. Power and capacity same as No. 8F.

Price each \$5.00



Hauck Portable Kerosene Burner



Hand Pump Type

No Compressed Air Required

For kerosene only; having a quick acting hand air pump built inside the tank. It was designed for field and shop work where compressed air is not available or convenient for use. The flame is intense and easily regulated. The burner operates approximately five hours with a few strokes of pumping.

Stands as shown, holding above burner, are furnished when ordered.

No.	Capacity of Seamless Tank, Gallons	Length of Hose, Feet	Oil Consumption per Hour, Gallons	Shipping Weight, Pounds	Weight of Burner, Pounds	Price Complete
7a	5	6	$\frac{1}{2}$	60	3	\$ 73.50
7	10	12	1	80	5	87.00
8	12	12	2	95	6	100.00
9	15	12	3	110	8	120.00

Hauck Portable Kerosene Lead Melting Furnace

The standard type furnace, made entirely of steel and iron, with a cast iron melting pot and bar. It is equipped with a Hauck burner of the latest improved type attached to the furnace shell and 10-gallon capacity seamless drawn steel tank, equipped with a quick acting and powerful hand air pump; also pressure gauge and necessary valves.

Only a few strokes are necessary to obtain the required pressure. The burner operates approximately five hours with a few strokes of pumping.

The furnace is well balanced and easily portable. Note the wide rims on wheels.

450 pounds of lead can be melted within 20 minutes and kept in molten condition at a few cents per hour. Additions of new lead will melt instantly.

The oil tank and burner are securely attached to the furnace and always ready for immediate use. Made in three sizes.

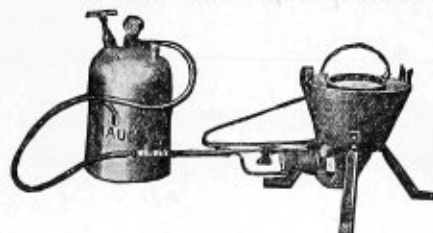
Also furnaces of the No. 122 type, mounted on three legs, furnished with a bracket to hold any type of portable burner.

No.	Capacity of Pot, Pounds	Oil Consumption per Hour, Gallons	Price
21	200	1	\$100.00
22	450	$1\frac{1}{2}$	113.50
23	850	2	127.00



Portable Kerosene Lead Melting Furnace

Hauck Combination Melting Furnace and Portable Heater



Hauck portable burner used in connection with a melting furnace; 200 pounds of babbitt metal melted in fifteen minutes and the molten metal kept at a proper temperature at little cost.

The burner may be detached from furnace and used for numerous other heating requirements.

Special furnaces and burners for melting brass, copper, iron, aluminum, bearing metal, lead, etc.

Price with No. 7 burner..... \$ 93.50

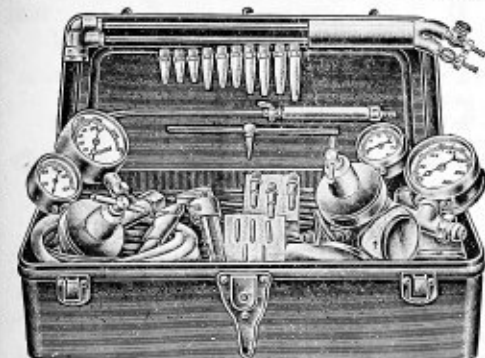
Price with No. 8 burner..... 107.00

Extra burner with base like No. 131 without tank, for attaching to above furnaces, \$33.50 additional.

Channon Oxy-Acetylene Supplies

No. 2 Outfit

This apparatus is designed for use in large welding shops, for general repairs in mills, factories, large foundries, boiler shops, railroad shops, etc. Its capacity for welding and cutting is exceptional. The welding torch will weld up to 1½ inch thickness of steel and 4 inch thickness of cast iron.



List of Equipment

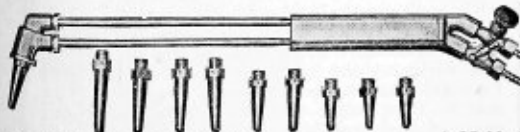
One No. 2 torch nicked throughout with ten copper tips. Torch is 22 inches long and weighs 30 ounces.

One No. 2 long arm oxygen regulating pressure valve nicked throughout and fitted with a 3,000 pound safety back, tool steel spring gauge to show the tank pressure and a 150 pound line gauge to show the working pressure. Also a needle valve and hose connection outlet from ¼ to ½-inch hose as specified.

One No. 2 long arm acetylene regulating pressure valve, gun metal finish, fitted with a 300-pound tank pressure gauge and 50-pound line pressure gauge, needle valve outlet with ¼ to ½-inch hose connections are supplied as specified.

NOTE: This valve contains a Silver Bronze Diaphragm, as required by the U. S. Bureau of Safety Transportation of Explosives.

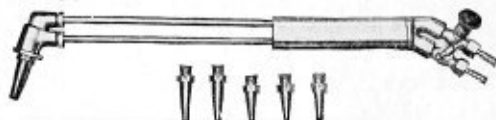
10 feet white high-pressure hose for oxygen. 10 feet black high-pressure hose for acetylene. 1 large nicked wrench. 1 small nicked wrench. 1 pair welder's goggles, large oval lenses of amber olive glass and metal gauze spark protector. 1 carbon removing torch. 2 instruction books. 1 steel shipping case. 10 pounds assorted cast iron welding rod (¾ to 1½ inch diameter). 10 pounds ¼ to ½-inch low carbon steel welding rod. 5 pounds ¼-inch to ¾-inch Norway Iron Welding Rod. Three pounds cast bronze welding rod (for brass or bronze). 2 pounds ½ and ¾-inch cast aluminum welding rods. 1 pound cast manganese bronze rods (for malleable iron brazing, etc.). 1 pound ¼ and ½-inch cast copper welding rods. 2 pounds cast iron flux. 1 pound brass and copper flux. 3 bottles (12 oz.) aluminum flux.



No. 2 Channon torch (10 tips) \$ 25.00
No. 2 Channon outfit, complete with cutting attach. 100.00
No. 2 Channon outfit, without cutting attach. 85.00

No. 1 Torch and 6 Tips

This apparatus is designed for use in garages, repair shops, small mills, machine shops, foundries, etc. It will weld any steel job up to 5/8-inch thick and cast iron 1½-inches thick if pre-heated. Will do excellent work on engine parts, frames, cases, dies, tools, forgings, castings, brazings, etc.



List of Equipment

One No. 1 torch nicked throughout with six copper tips. Torch is 19 inches long, weighs 30 ounces and will be supplied in 90, 50 or 15 degree heads as ordered.

One No. 1 oxygen regulating pressure valve nicked throughout with one 50-pound nicked line pressure gauge or one 150-pound gauge if ordered with cutting attachment (see below).

One No. 1 acetylene regulating pressure valve, gun metal finish with one 50-pound black line gauge.

10 feet white 150-pound high-pressure hose. 10 feet black 150-pound high-pressure hose. 1 9-inch nicked monkey wrench. 1 7-inch nicked monkey wrench. 1 set olive green oval welder's goggles with gauze face protector. 1 carbon removing torch. 2 instruction books. 1 steel shipping case. 5 pounds beryllium C. I. welding rod. 5 pounds low carbon steel welding rod. 2 pounds Norway iron welding rod. 1 pound cast bronze rod (for brass or bronze welding). 1 pound cast aluminum welding rod. 1 stick aluminum solder. 2 pounds cast iron flux. 1 pound brass and copper flux. 1 bottle aluminum flux.

No. 1 Channon torch (6 tips) \$20.00
No. 1 Channon outfit, complete 50.00

Channon No. 0 Oxy-Acetylene Welding Outfit

For garages, small machine shops, repair shops, etc., where cast iron welds will not be over ½ inch thick.

List of Equipment

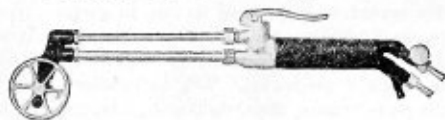
1 pressure welding torch, nickel plated throughout with 5 tips. 1 oxygen pressure regulator with 50-pound line gauge. 1 acetylene pressure regulator with 50-pound line gauge. 18 feet high pressure welding hose with clamps. Steel carrying case and 2 instruction books. 1 nickel plated wrench. 1 pair welder's goggles.



No. 0 Channon torch (5 tips) \$15.00
No. 0 Channon outfit, complete 38.00

Channon Oxy-Acetylene Supplies

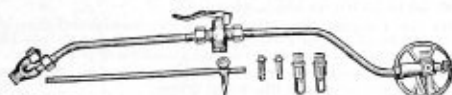
Channon Cutting Torch



This torch will cut steel or iron from $\frac{1}{8}$ inch to 6 inches thick in any direction. It is valuable where the job to be cut is over 3 inches long.

Cutting torch (3 tips and wheel guide).....\$40.00

Cutting Attachment



Any outfit can be supplied with a cutting attachment, which will cut straight or circular cuts from $\frac{1}{8}$ inch to 3 inches thick.

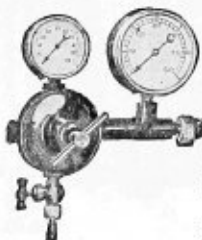
This attachment is very desirable for small structural iron shops.

Price each.....\$15.00

Channon Regulators



No. 2 Oxygen, Hydrogen, CO₂, or air regulating pressure valve with 3000 lb. steel spring, safety back, pressure tank gauge and 50, 150 or 200 lb. line gauge. Needle shut off hose connection. Valve and gauges nickel plated. Oxygen regulator (long arm style).....\$ 7.00
3000-lb. gauge.....11.00
50-lb., 150-lb. or 200-lb. gauge.....2.00
Price complete.....\$20.00



No. 2 Acetylene Regulating Pressure Valve with 300 lb. tank pressure gauge and 50 lb. line pressure gauge. Valve and gauges black nickel or gun metal finish. (This valve is special for acetylene gas.) Acetylene regulator (long arm style).....\$ 7.00
300-lb. gauge.....3.00
50-lb. gauge.....2.00
Price complete.....\$12.00



No. 1 Low Pressure Oxygen, Hydrogen, CO₂, and air Regulating valve with 50-lb. line pressure gauge. Valve and gauge nickel plated throughout. Oxygen regulator 3-inch diaphragm.....\$ 6.50
50-lb. gauge.....2.00

Price complete.....\$8.50

No. 1 Acetylene Regulator with 50-lb. line gauge, gun metal or black nickel finish. Acetylene regulator 3-inch diaphragm.....\$6.50
50-lb. gauge.....2.00

Price complete.....\$8.50



No. 0 Oxygen, Hydrogen, CO₂, or air regulator with 50-lb. line gauge, nickel plated (smaller size than No. 2 and No. 1). Oxygen regulator 2½-inch diaphragm.....\$6.00
50-lb. gauge.....2.00
Price complete.....\$8.00

Welding Material

Cast iron rod ($\frac{3}{16}$, $\frac{1}{4}$, $\frac{5}{16}$, $\frac{3}{8}$ -inch), per lb.....\$0.13
Norway iron rod ($\frac{1}{8}$, $\frac{3}{16}$, $\frac{1}{4}$ -inch), per lb......13
Carbon steel rod ($\frac{1}{8}$, $\frac{3}{16}$, $\frac{1}{4}$ -inch), per lb......13
Cast bronze rod ($\frac{3}{16}$, $\frac{1}{4}$ -inch), per lb......56
Cast manganese bronze ($\frac{3}{16}$, $\frac{1}{4}$ -inch), per lb......62
Tobin bronze rod ($\frac{3}{16}$, $\frac{1}{4}$ -inch), per lb......66
Cast copper rod ($\frac{3}{16}$, $\frac{1}{4}$ -inch), per lb......64
Aluminum rod.....1.38
Cast iron flux ($\frac{1}{2}$ or 1-lb. boxes), per lb......44
Bronze or copper flux, per lb......60
Aluminum flux, per lb.....1.50

All rods in above list are cast 16 to 18-inch except Norway and low carbon steel.

Decarbonizing Outfit

No. 0 Acetylene Regulator with 50-lb. line gauge, black finish (smaller than No. 2 and No. 1). Acetylene regulator 2½-inch diaphragm.....\$6.00
50-lb. gauge.....2.00
Price complete.....\$8.00

The most practical and profitable way of removing carbon deposit from gas engine cylinders. Recognized as the best device at the lowest price. The Universal Carbon Burning Outfit consists of 1 regulating valve with 50-lb. gauge, 6 feet high pressure hose with clamps, 1 all brass torch with pet cock and copper tube. Price each, complete.....\$10.00



The Neway Bottom Draw Melting Furnace

Burns Coal, Coke or Wood

These furnaces are thoroughly practical in design and are especially durable in construction. All metal parts are of heavy cast iron and steel (not sheet iron) and the lining is a superior quality of fire brick with an insulated backing of asbestos.

The Melting Pot has an internal automatic and adjustable valve device whereby the metal is drawn directly from the bottom of the pot where it is always clean and pure.

It saves time and material because the surface of the metal is never disturbed.

The Valve Stem is of the same material as the melting pot, insuring the same expansion and contraction. By an adjustable locking device it is regulated to any wear that may occur at stem or seat.

The Furnace Hood eliminates all fumes and smoke and is a very important factor in keeping the metal at uniform temperature, and protecting it from the air. Contact with cold air causes oxidation and every pound of oxidation is a pound of loss in material.

Fig. 1 For Burning Coal, Wood or Coke

Shows the furnace equipped with iron pot for making and refining all kinds of babbitt metal, solder and all other white metal mixtures.

Fig. 2 shows the furnace equipped for burning gas.

The iron melting pot may be removed and a crucible inserted for making bronzes,

brasses, etc. To do this it is only necessary to remove the two cap screws which fasten hood to top plate. Remove the hood and substitute a cover plate furnished for that purpose.

Specifications

Capacity melting pot, 500 pounds. Daily capacity, 5000 pounds. Outside diameter, 22 inches. Height over all, 40 inches. Height to top of rim, 31 inches. From floor to draw pipe, 20 inches. Diameter of melting pot, 15 inches. Height, 11 inches. Made for all size crucibles from 0 to 45 inches. Weight complete, 600 pounds.

Prices

One ladle stand, one metal mixer and one metal fluxer, as shown, furnished with each furnace.

Furnace complete for burning coal, coke or wood. Price \$134.00

Furnace complete for burning coal, coke, wood or gas. Price \$167.00

Furnace complete for burning gas only. Price \$167.00

Cast iron crucible covers. Each. 2.70

Thermometers registering 100 degrees. Each. 10.70



Fig. 1

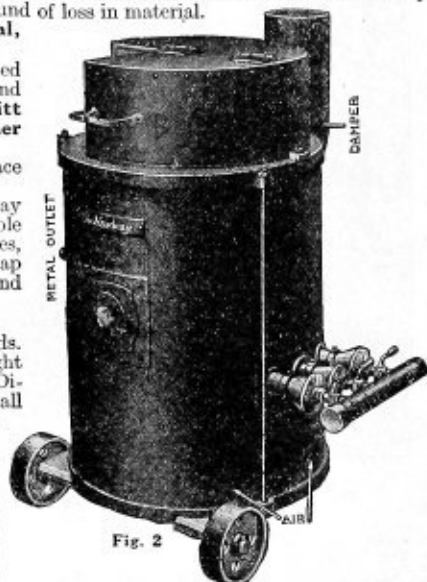


Fig. 2

The Neway Bottom Pour Self Skimming Ladles

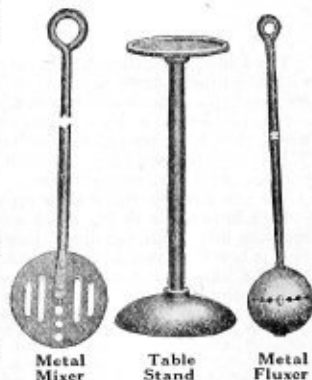
When pouring from ordinary ladles it is always necessary to first skim the impurities from the surface. With these ladles the metal is poured from the bottom.

The impurities cannot enter the port, but remain on the surface as a protection against oxidation and cooling.

Made in Five Sizes

Number.....	4	5	6	7	8
Diam., inches	4	5	6	7	8
Depth, inches	2	2½	3	3½	4
Lead capacity, pounds....	4½	9	18	25	40
Water Cap'ty. pounds....	½	1	2	3	4
Weight complete, lbs....	2¼	4½	7½	9½	13½
Lgth. handle, inches.....	14	24	30	31	31
Dia. Handle, inches.....	⅞	⅞	⅞	⅞	⅞
Price each.....	\$2.00	\$2.00	\$2.70	\$2.70	\$3.80

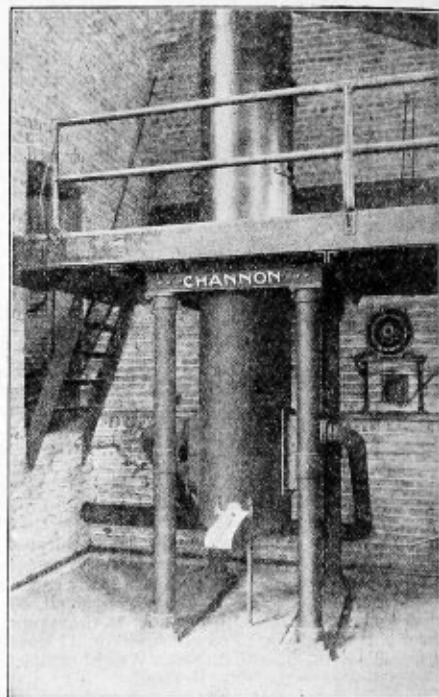
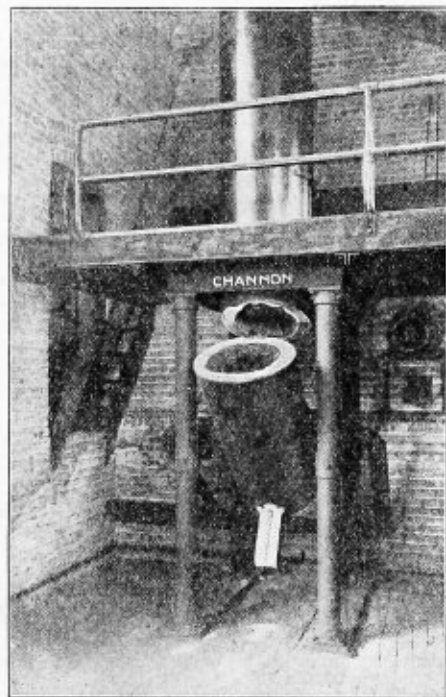
The handle is of Swedes iron with steel check nut and cast iron slide hand protector.



Metal Mixer

Table Stand

Metal Fluxer



The Channon Tilting Cupola Furnace

For Small Foundries and Technical Schools

The Channon tilting cupola furnace was designed for small foundries where it is desired to run off small heats with the minimum of expense and labor. With one of these installed, it is possible for small manufacturers to economically make their own castings, and thus save time and trouble by getting castings when they are needed.

It is invaluable in large foundries for running test or special heats. Many are now in use in Technical Schools, where they have proven themselves indispensable.

It is built in two sizes—16-inch and 18-inch, inside the lining with a melting capacity of about 1500 and 2000 pounds per hour, respectively.

We can furnish the cupola only, or complete with platform as illustrated.

It is impossible to list a price in this catalogue, as conditions differ. When writing for price, give drawing, showing floor plan, openings, height of ceiling, and what is above if more than a one-story building.

It is better to run a straight stack, but it is possible to turn into a flue, if flue is sufficiently large.

The Channon tilting Cupola can be installed under almost any conditions, but we must know the conditions before quoting.

If interested, write for special booklet.

Foundry Ladles



Hand Ladle Complete With Shanks
Handles Are Hollow and Furnished With Ring

No. 122. Flat Bottom Welded Steel Bowl

Capacity Pounds	Weight Each, lbs.	Price Each	Capacity Pounds	Weight Each, lbs.	Price Each
30	12	\$3.90	60	15	\$4.80
40	13	4.00	70	17	5.25
50	15	4.20			

No. 126. Flat Bottom, Steel Bowl, Bull Ladle, Complete With Shank, One End Straight



Capacity Pounds	Weight Each, lbs.	Price Each	Capacity Pounds	Weight Each, lbs.	Price Each
80	50	\$6.30	350	110	\$ 9.80
100	55	6.30	500	125	11.90
150	60	7.00	800	160	16.10
250	80	8.40	1000	175	18.90

Bull Sulky Ladle

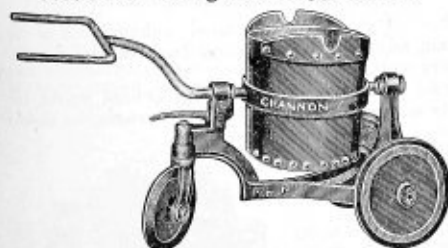


No 126½ With Steel Bowl

Capacity Pounds	Price Each	Capacity Pounds	Price Each
100	\$25.00	350	\$35.00
150	25.00	400	44.00
200	27.00	450	49.50
250	27.00	500	55.00
300	30.00	600	67.00

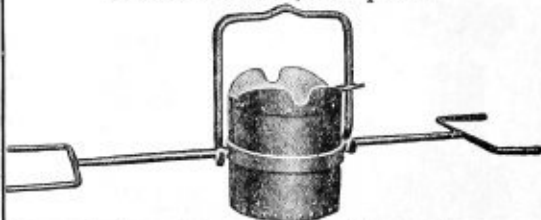
Wheels 16 to 24 inches Diameter. Counterbalance furnished on 400 capacity and larger.

No. 143. Dirigible Buggy Ladle



Capacity Pounds	Price Each	Capacity Pounds	Price Each
500	\$73.00	800	\$77.00
600	74.00	1000	80.00
700	75.00		

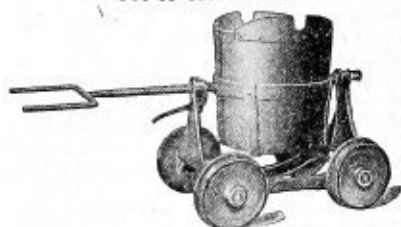
No. 128. Steel Bowl, Crane Ladle, With Shank and Bail, Complete



Capacity Pounds	Approx. Weight Each, Pounds	Price Each	Capacity Pounds	Approx. Weight Each, Pounds	Price Each
400	115	\$22.50	1000	190	\$32.50
600	150	25.50	1200	220	37.00
800	170	29.00	1500	270	43.00

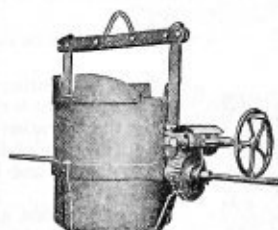
No. 142. Four-Wheeled Buggy Ladle, Not Geared, Double End Shank

This Ladle May Be Lifted Free From Buggy by Use of Crane Bail



Capacity Pounds	Approx. Weight Each, Pounds	Price Each	Capacity Pounds	Approx. Weight Each, Pounds	Price Each
1000	550	\$82.00	3000	900	\$102.00
1500	650	87.00	3500	1000	107.00
2000	750	92.00	4000	1150	112.00

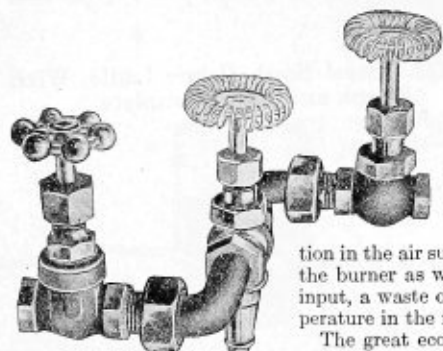
Ladles less than 2,000 lbs. capacity made without basket. Ladles 2,000 lbs. capacity and over made with basket. Always give gauge of track and minimum height above track.



No. 150½. Geared Crane Ladle

Capacity Pounds	Approx. Weight Each, Pounds	Price Each	Capacity Pounds	Approx. Weight Each, Pounds	Price Each
1000	375	\$ 68.00	8000	1300	\$229.50
2000	525	98.50	10000	1900	255.00
3000	725	121.00	12000	2100	282.00
5000	925	183.50	16000	2800	374.00

Ladles less than 2,000 lbs. capacity made without basket. Ladles 2,000 lbs. capacity and over made with basket. In sizes above 8,000 lbs. capacity bail is made with channel cross-bars.



No. 1 High Pressure Burner

at boiler pressure of 80 pounds or over (the higher and dryer the better) or with compressed air pressures of 5 pounds per square inch or over.

The steam or compressed air is employed principally for atomizing the oil. Most of the air to support combustion is induced from the atmosphere by, but regulated independently of, the blast from the burner.

The best results are obtained when these burners are installed with the burner plates illustrated below—and a combustion chamber set with the special tiles, also shown, properly adapted to the operating requirements. By means of the burner plates provision is made to light, and to observe the condition of the fire without cooling the combustion chamber, and for regulating the supply of induced air without exposing the hot brick work to the cold air after the fire is shut off, as where large ungoverned burner ports are employed.

The plates also maintain the correct position and alignment of burners and with the proper combination of tiles insure efficient and economical combustion of oil.

We carry hundreds of sizes and styles of tile to meet all requirements, and designed to lay with ordinary fire brick. The proper tile to employ being governed by the construction of furnace and operating conditions.

No. 1 burner illustrated above, is most generally used, and covers a wide range, from small tool forges to the largest annealing and heating furnaces. **No. 2** is the same excepting that the valve arrangement is different and the discharge is at right angles. It is generally used where the location is not very accessible and with extension stems to facilitate operation. Shipping weight, Nos. 1 and 2 Burners, 10 pounds.

No. 4 low pressure oil burner is for operation with an air blast from positive pressure blower at from 8 ounces to 2 pounds, depending upon character of furnace and work. It is an excellent burner for high temperatures and welding heat.

The burner includes valves, union and stop cock as illustrated. All parts are accessible and interchangeable. Shipping weight, 20 pounds.

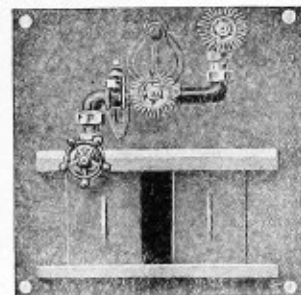


Fig 8. Burner Plate

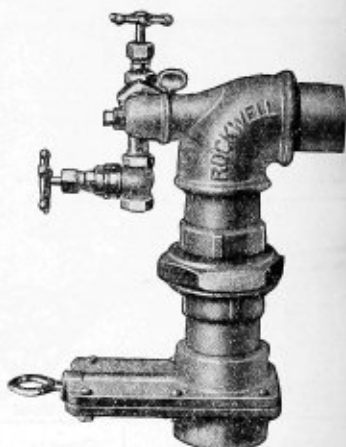
Rockwell Oil Burners

The combustion of oil is governed by the same principles as that of gas, coal or other fuel and unless the supply of air is proportioned to the quantity of oil consumed improper combustion results whether the amount of air is insufficient or excessive.

As the supply of oil varies from the time of starting until the furnace is in operating condition a corresponding variation in the air supply should be effected—and unless the supply of air induced by the burner as well as that supplied under pressure is proportioned to the full input, a waste of fuel from poor combustion or of material from improper temperature in the furnace chamber results.

The great economy and efficiency of the Rockwell burners is due to the accuracy with which the air supply may be proportioned and regulated.

Oil burners Nos. 1 and 2 are designed for operation with dry steam



No. 4 Low Pressure Burner

Special connecting and shut off valves are provided, independent of the regulating valves for cleaning, adjusting or removing burners without disturbing the operation of others on the same line.

All fittings are of hard brass. Union connections with ground joints, adjustable clamps and brackets are supplied for attaching burners, as shown by Fig. 8.

Pipe connections are $\frac{1}{2}$ -inch, made large for sturdy construction.

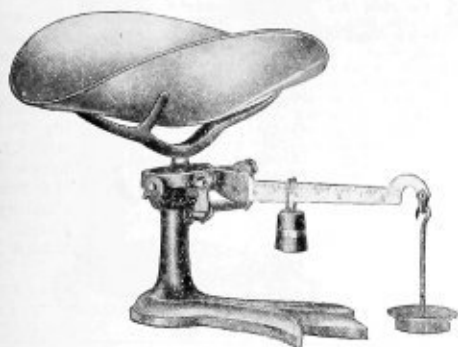
Prices

No. 1 burner.	Each.....	\$30.00
No. 2 burner.	Each.....	35.00
No. 4 burner, 2 -inch.	Each.....	30.00
No. 4 burner, 2½-inch.	Each.....	33.00
No. 4 burner, 3 -inch.	Each.....	35.00
No. 4 burner, 4 -inch.	Each.....	40.00



Fig. 9. Special Tiles

Grocer Scales



This scale is very popular with grocers and also used by hardware and supply stores. Can be furnished with scoop or small platform. Beam graduated $\frac{1}{2}$ ounce to 3 pounds. Tare or double beam has same graduations. Weights 1 to 4 pounds.

Capacity, $\frac{1}{2}$ Ounce to 36 Pounds

- No. 554. Single beam, seamless tin scoop. Price each... \$10.00
 No. 556. Single beam, seamless brass scoop. Price each... 10.50
 No. 558. Double beam, seamless tin scoop. Price each... 11.00
 No. 560. Double beam, seamless brass scoop. Price each... 12.50

Capacity, $\frac{1}{2}$ Ounce to 62 Pounds

- No. 536. Single beam, seamless tin scoop. Price each... \$12.00
 No. 538. Single beam, seamless brass scoop. Price each... 13.50
 No. 540. Double beam, seamless tin scoop. Price each... 13.00
 No. 542. Double beam, seamless brass scoop. Price each... 14.50

Grocers' Even Balance Trip Scales



"The Standard" even balance scales are the only even balance scales equipped with hardened steel bearings in center support, and can be depended on as the most durable and accurate.

No.	Description	Capacity, Lbs.	Price Without Weights	With Iron Weights
701	Tin scoop and iron plate	18	\$9.00	\$12.00
702	Tin scoop and iron plate	10	7.00	9.00
703	Tin scoop and iron plate	6	5.50	7.00
704	Tin scoop and iron plate	4	4.50	5.50
709	Brass scoop and iron plate	18	10.50	13.50
710	Brass scoop and iron plate	10	8.00	10.00
711	Brass scoop and iron plate	6	6.50	8.00
712	Brass scoop and iron plate	4	5.50	6.50
733	Brass scoop and brass plate	18	12.50	15.50
734	Brass scoop and brass plate	10	9.75	11.75
735	Brass scoop and brass plate	6	8.00	9.50
736	Brass scoop and brass plate	4	6.50	7.50

Union or Family Scales

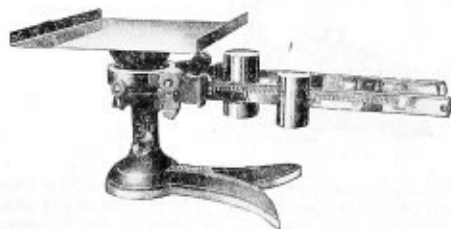


A good general scale, combining capacity and fine weighing in one. Furnished with single or double beam, scoop or small platform.

Capacity 240 pounds by $\frac{1}{4}$ -pound marks on large platform or 30 pounds by $\frac{1}{2}$ ounces on scoops or small platform. Weights, $1\frac{1}{2}$ to 80 pounds. Size of large platform, $10\frac{1}{2} \times 13\frac{1}{2}$ inches.

No.	Equipment	Price Each
500	Single beam, tin scoop	\$14.00
502	Single beam, brass scoop	15.00
504	Double beam, tin scoop	15.00
506	Double beam, brass scoop	16.00
508	Single beam, tin scoop, 2 platforms	14.50
510	Single beam, brass scoop, 2 platforms	15.50
512	Double beam, tin scoop, 2 platforms	15.50
514	Double beam, brass scoop, 2 platforms	16.50

Parcel Post Scale

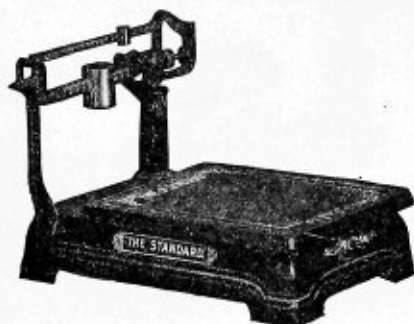


The parcel post scale is furnished with double brass beam, one bar graduated to 5 pounds by $\frac{1}{2}$ -ounce divisions, other bar graduated to 10 pounds by 1-pound divisions; brass sliding poises with dent to fit notches on beam. Galvanized steel pan $10\frac{1}{2}$ inches square with two edges turned up vertically $\frac{3}{4}$ inch, securely fastened to carrier.

- No. 615. Capacity, 15 pounds. Price each... \$15.00
 No. 616. Capacity, 20 pounds. Price each... 18.00

H. Channon Company Chicago

Express Package Scale



Full capacity on beam. Extensively used by express companies and others for weighing packages. Upper bar marked 5 pounds by 1 ounce. Lower bar, 1 pound to 50 pounds. Capacity, 55 pounds by 1 ounce. Platform, 10½ x 12 inches. No. 532. Price, each.....\$15.00

Boston Grocer Scales



A handsomely finished scale, designed to bring beam opposite the eye where it can be easily read. Upper bar is graduated 11 pounds by 1 ounce; lower bar, 50 pounds by ½-pound marks, with weights, 1½ pound per 100. Platform, 10½ x 14½ inches. Double brass beam nickel-plated. Capacity, 250 pounds.

No.		Price, Each
518	With heavy tin scoop.....	\$24.00
520	With heavy brass scoop.....	25.00
521	With enameled platform.....	27.00
522	With seamless tin scoop.....	25.00
524	With seamless brass scoop.....	27.00

Portable Platform Scale

Suitable for weighing merchandise of any line. Scales of 1000 pounds capacity and larger have pillar braced with iron. Beams graduated by ¼ pound marks on scales having 400 and 600 pound capacity; larger sizes, 100 pounds by ½ pound divisions. Weights, 1 to 100 pounds.

These scales are made of best material throughout, with well tempered steel bearings and pivots where both strength and extreme hardness are needed.



Brass Beam, Sliding Poise with Set Screw, Hardwood Platform, Panel Board.

With Wheels		Without Wheels		Capacity, Pounds	Platform, Inches
No.	Price Each	No.	Price Each		
1116	\$85.00	1100	\$80.00	2500	26 x 34
1118	75.00	1102	70.00	2000	25 x 33
1120	56.00	1104	52.00	1500	21 x 28
1122	49.00	1106	45.00	1200	20 x 28
1124	43.00	1108	39.00	1000	17 x 26
1126	38.00	1110	34.00	800	17 x 26
1128	33.00	1112	30.00	600	16 x 25
1130	26.00	1114	23.00	400	15 x 21

"Excelsior" Portable Platform Scales

Brass Beam, Sliding Poise

Somewhat cheaper than those listed above, but a reliable scale.

No.	Capacity, Lbs.	Platform, Inches	With Wheel Price Each
600 Ex	600 x ½	16 x 23	\$24.00
800 Ex	800 x ½	16 x 26	27.00
1000 Ex	1000 x ½	16 x 26	30.00
1200 Ex	1200 x ½	17½ x 26	37.50
1500 Ex	1500 x ½	18 x 26	46.00
1800 Ex	1800 x ½	20 x 28	50.00

Sometimes furnished with double beam at \$2.25 net extra.

Platform Counting Scale

This machine is designed for weighing small articles which are sold by the pound and piece, but can also be used as a regular scale by using the sliding poises and weights. We make any scale shown above in two ratios as selected—1 to 200 and 1 to 50 to count thousands, or 1 to 144 and 1 to 48 to count dozens, or 1 to 100 and 1 to 20 to count hundreds.



For Counting Small Articles Like Nuts, Nails, Screws, Bolts, Etc.

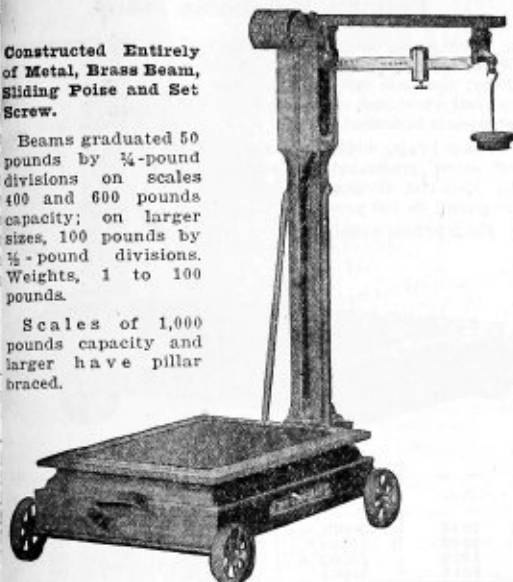
To estimate price, add \$20.00 to list price of 1100 Series Portable Platform Scales in size wanted.

Portable Platform Scales

Constructed Entirely of Metal, Brass Beam, Sliding Poise and Set Screw.

Beams graduated 50 pounds by $\frac{1}{4}$ -pound divisions on scales 400 and 600 pounds capacity; on larger sizes, 100 pounds by $\frac{1}{2}$ -pound divisions. Weights, 1 to 100 pounds.

Scales of 1,000 pounds capacity and larger have pillar braced.



No.	Capacity Pounds	Platform Inches	Price Each
1117.....	2,500 x $\frac{1}{2}$	26 x 34	\$95.00
1119.....	2,000 x $\frac{1}{2}$	25 x 33	83.50
1121.....	1,500 x $\frac{1}{2}$	21 x 28	63.50
1123.....	1,200 x $\frac{1}{2}$	20 x 28	56.00
1125.....	1,000 x $\frac{1}{2}$	17 x 26	49.50
1127.....	800 x $\frac{1}{2}$	17 x 26	44.00
1129.....	600 x $\frac{1}{2}$	16 x 25	39.00
1131.....	400 x $\frac{1}{2}$	15 x 21	31.00

Portable Platform Scales

With Wheels and Drop Lever Brass Beam and Sliding Poise.

By means of drop lever all bearings are relieved from wear and danger of breaking the scale mechanism when loading or removing heavy articles from platform.

Beams have set screws in poises, and graduations same as corresponding sizes of regular portable scales.

Beams graduated 50 pounds by $\frac{1}{4}$ lb. divisions on scales 400 and 600 pounds capacity, and on larger sizes 100 pounds by $\frac{1}{2}$ -pound divisions. Weights 1 to 100 pounds.

Scales 1,000 pounds and larger have pillar brace.



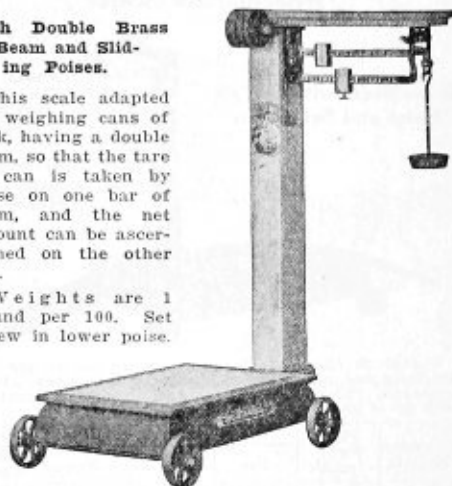
No.	Capacity Pounds	Platform Inches	Price Each
1166.....	2,500 x $\frac{1}{2}$	26 x 34	\$94.00
1168.....	2,000 x $\frac{1}{2}$	25 x 33	82.00
1170.....	1,500 x $\frac{1}{2}$	21 x 28	70.00
1172.....	1,200 x $\frac{1}{2}$	20 x 28	59.00
1174.....	1,000 x $\frac{1}{2}$	17 x 26	51.00
1176.....	800 x $\frac{1}{2}$	17 x 26	46.00
1178.....	600 x $\frac{1}{2}$	16 x 25	41.00
1180.....	400 x $\frac{1}{2}$	15 x 21	34.00

Dairy Scales

With Double Brass Beam and Sliding Poises.

This scale adapted for weighing cans of milk, having a double beam, so that the tare of can is taken by poise on one bar of beam, and the net amount can be ascertained on the other bar.

Weights are 1 pound per 100. Set screw in lower poise.



No.	Capacity Pounds	Platform Inches	Price Each
1270 Without wheels....	400 x $\frac{1}{2}$	15 x 21	\$27.00
1271 Without wheels....	400 x $\frac{1}{2}$	15 x 21	27.00
1272 Without wheels....	600 x $\frac{1}{2}$	16 x 25	34.00
1273 Without wheels....	600 x $\frac{1}{2}$	16 x 25	34.00
1274 Without wheels....	1,000 x $\frac{1}{2}$	17 x 26	43.00
1276 With wheels....	400 x $\frac{1}{2}$	15 x 21	30.00
1277 With wheels....	400 x $\frac{1}{2}$	15 x 21	30.00
1278 With wheels....	600 x $\frac{1}{2}$	16 x 25	37.00
1279 With wheels....	600 x $\frac{1}{2}$	16 x 25	37.00
1280 With wheels....	1,000 x $\frac{1}{2}$	17 x 26	47.00

Wool Scales

Large Platform to Accommodate Large Bales or Bundles.



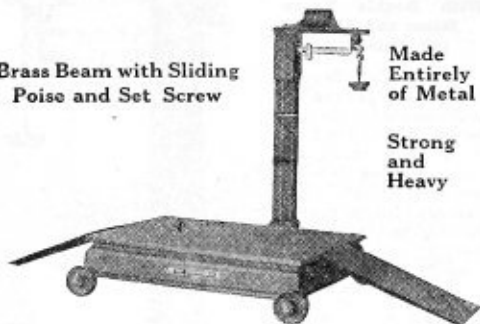
No.	Capacity Pounds	Platform Inches	Price Each
5415.....	1,000 x $\frac{1}{2}$	30 x 30	\$ 62.00
5417.....	1,500 x $\frac{1}{2}$	42 x 30	82.00
5419.....	2,000 x $\frac{1}{2}$	46 x 32	102.00

Wheelbarrow Scales

Brass Beam with Sliding Poise and Set Screw

Made Entirely of Metal

Strong and Heavy



Useful on charging platforms, boiler rooms, etc., for weighing coal, ore or other substances in barrows. Beam graduated 100 pounds by 1-pound divisions. Furnished with set of inclines.

Capacity Pounds	Platform Inches	With Wheels		Without Wheels	
		No.	Price Each	No.	Price Each
1000x1	42x30	1384	\$ 75.00	1382	\$ 70.00
1500x1	42x30	5389	85.00	5387	80.00
2000x1	44x35	1390	100.00	1389	93.00
2400x1	44x35	1393	125.00	1391	115.00

Ice scales with double beam 800x1 and 200x1 pound. Extra, \$27.00.

Extra Heavy Portable Foundry Scales

For general foundry, factory and mill use. Brass beam with sliding poise and set screw and graduated 100 pounds by 1/2-pound divisions.

Mounted on wheels 9 1/2 in. in diameter, making platform at a convenient height.

Also furnished with drop lever for relieving the bearings when load is being placed on platform.

Face of pillar protected part way with iron plate and pillar braced.



With Wheels

No.	Capacity Pounds	Platform Inches	Price Each
1208	3000x 1/2	31x40	\$125.00
5209	4000x 1/2	31x40	140.00

With Wheels and Drop Lever

No.	Capacity Pounds	Platform Inches	Price Each
1164	3000x 1/2	31x40	\$125.00
5165	4000x 1/2	31x40	140.00

Portable Warehouse Scales

These scales designed for heavy work which requires a large platform; they are well adapted for general warehouse use where portable scale is desired.

Brass beam, sliding poise with set screw, graduated 100 pounds by 1/2-pound divisions. Weights, 1/2 pound to 100 pounds.

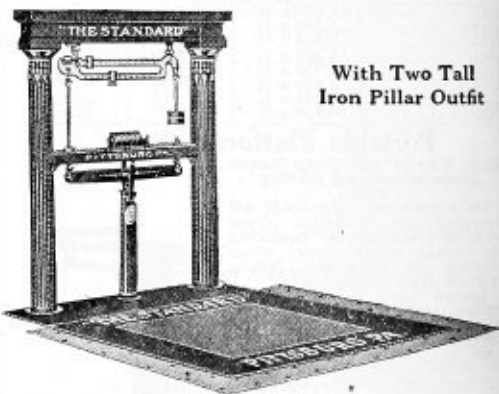
Pillar braced with iron.



No.	Capacity Pounds	Platform Inches	Price Each
1006	5000x 1/2	48x48	\$185.00
1008	3500x 1/2	42x44	125.00
1010	2500x 1/2	46x37	105.00
6011	1500x 1/2	41x32	100.00

Dormant Warehouse Scales

With Two Tall Iron Pillar Outfit



Double brass beam, sliding poise and lower poise with set screw. Double beam is convenient to take tare of trucks or cases. Weights, 1/2 pound to 100 pounds.

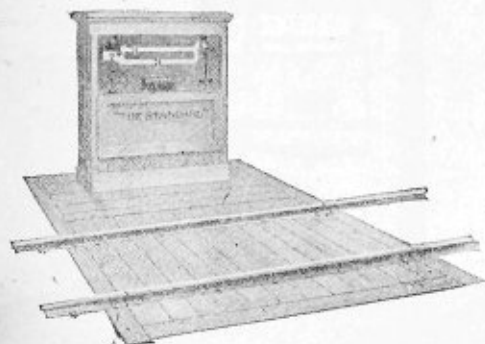
These scales same as preceding, but are fitted with two tall iron pillars.

When ordered with scale, a full capacity beam to dispense with loose weights will be furnished at an additional list price of \$20.00.

Furnished with set of marginal irons to protect wood floor surrounding platform.

No.	Capacity Pounds	Platform Inches	Platform to Pillar Inches	Price Each
996	6000x 1/2	60x54	21	\$260.00
1046	5000x 1/2	48x48	22	180.00
1048	3500x 1/2	42x44	12	133.00
1050	2500x 1/2	46x27	12	113.00
5054	1500x 1/2	41x32	8 1/2	103.00
		42x44		
1052	3500x 1/2	With extra long neck	20	141.00

Warehouse and Factory Scales Improved Loop Bearing Pattern

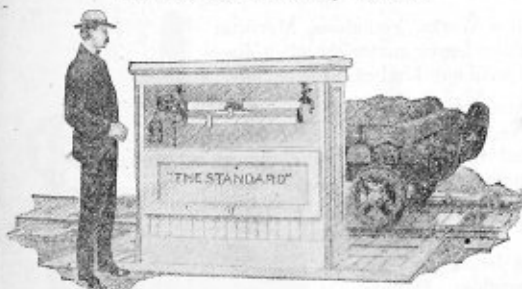


Many superior points of merit are found in our loop bearing pattern scales—simplicity of construction, greater accuracy and durability in manner of supporting levers and load. Sizes of platforms of the scales may be varied somewhat from given dimensions without increasing cost. Fifteen-ton scales have full capacity beam.

Prices are exclusive of lumber and foundation, which are furnished by the purchaser. Beam boxes extra, \$25.00.

No.	Cap. Tons	Size of Platform	Distance from Edge of Platform to Beam Rod	Price Single Beam	Price Double Beam
6170	15	7x5 ft. 1 1/2 in.	2 ft. 5 1/4 in.	\$350.00	\$365.00
6182	6	12x2 ft. 3 in.	2 ft. 5 1/2 in.	225.00	235.00
6183	6	8x2 ft. 3 in.	2 ft. 5 1/2 in.	205.00	215.00
6186	5	6x5 ft.	1 ft. 9 3/4 in.	185.00	195.00
6188	4	6x5 ft.	1 ft. 9 3/4 in.	170.00	180.00
6194	3	8x2 ft. 3 in.	2 ft. 5 1/2 in.	155.00	165.00
6195	2	5x2 ft. 3 in.	2 ft. 5 1/2 in.	125.00	135.00

Industrial Railway Scales



This scale is used at factories in weighing materials and products in transportation. Tracks of narrow gauge are laid on platform to suit requirements of plant. Sizes of platforms of these scales may be varied somewhat from dimensions given without increasing cost. Prices are exclusive of lumber and foundation, which are to be furnished by the purchaser.

No.	Cap. Tons	Platform	Price Single Beam	Price Double Beam
2192	2	5 x4 ft. 10 in.	\$135.00	\$143.50
2156	3	6 x4 ft. 10 in.	155.00	163.50
2190	3	8 x4 ft. 6 1/2 in.	155.00	163.50
2164	4	5 x4 ft.	170.00	180.00
2188	4	6 x4 ft. 11 1/4 in.	170.00	180.00
2186	5	5 x4 ft.	185.00	195.00
2162	5	6 x4 ft. 11 1/4 in.	185.00	195.00
2184	6	7 x4 ft. 9 1/2 in.	205.00	215.00
2158	8	6 1/2 x4 ft. 10 3/4 in.	240.00	250.00
2156	10	6 x4 ft. 11 1/4 in.	270.00	280.00

Wagon Scales Trussed Lever Pattern



The sizes of platform of these scales may be varied somewhat from the above dimensions without increasing the cost of the scales.

All the prices are exclusive of the timber, steel, beam box and foundation, which are to be furnished by purchaser.

Suspension Scales furnished to order when required.

No.	Cap. Tons	Size of Platform	Distance from Edge of Platform to Beam Rod	Price Single Beam	Price Double Beam
1800	20	22x10 ft. 3 3/4 in.	2 ft. 1 in.	\$570.00	\$585.00
1836	20	20x7 ft. 9 1/2 in.	4 ft. 1 1/4 in.	520.00	535.00
1922	20	16x7 ft. 10 in.	1 ft. 10 1/2 in.	450.00	465.00
1802	15	22x10 ft. 3 3/4 in.	2 ft. 1 in.	440.00	454.00
1833	15	18x8 ft. 3 in.	4 ft. 5 1/2 in.	420.00	435.00
1924	15	14x8 ft. 4 1/4 in.	2 ft. 1 in.	390.00	405.00
1806	10	22x10 ft. 3 3/4 in.	2 ft. 1 in.	365.00	380.00
1843	10	18x8 ft. 3 in.	4 ft. 5 1/2 in.	350.00	365.00
1928	10	14x8 ft. 4 1/4 in.	2 ft. 1 in.	300.00	315.00
1845	8	20x7 ft. 9 1/2 in.	4 ft. 1 1/4 in.	315.00	330.00
1930	8	16x7 ft. 10 in.	1 ft. 10 1/2 in.	275.00	290.00
1846	6	18x8 ft. 2 in.	4 ft. 5 1/2 in.	275.00	290.00
1932	6	14x8 ft. 4 1/4 in.	2 ft. 1 in.	250.00	265.00
2100	6	22x8 ft.	2 ft. 0 in.	250.00	265.00
2112	5	14x8 ft.	2 ft. 2 1/2 in.	200.00	210.00
2114	4	14x8 ft.	2 ft. 2 1/2 in.	170.00	180.00

Shallow Pit Pattern with Improved Loop Bearings

They embody in their construction the advantages of suspension scales, while cost of building is no more than regular pit scales.

No.	Cap. Tons	Size of Platform	Distance from Edge of Platform to Beam Rod	Price Single Beam	Price Double Beam
6000	10	15x7 ft.	2 ft. 7 in.	\$290.00	\$305.00
6002	8	14x7 ft. 2 1/4 in.	2 ft. 8 1/4 in.	265.00	280.00
6004	6	15x7 ft.	2 ft. 7 in.	240.00	255.00
6005	6	14x7 ft. 2 1/4 in.	2 ft. 8 1/4 in.	240.00	255.00
6006	5	15x7 ft.	2 ft. 7 in.	205.00	215.00

Auto Truck Scales

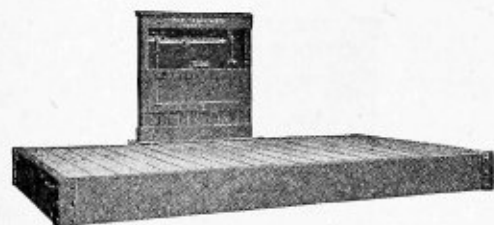
Extra Heavy Iron Frame Railroad Pattern

Platforms wider than 8 feet increase list \$4.00 per inch. All prices are exclusive of the timber, steel, beam box and foundations, which are to be furnished by purchaser. Full capacity Double Beam. Tare bar, 6 tons.

No.	Capacity, Tons	Platform Feet	Price
6580	15	14x8	\$450.00
6582	20	14x8	475.00
6602	20	16x8	500.00
6622	20	18x8	525.00
6624	30	18x8	550.00
6642	20	20x8	600.00
6644	30	20x8	625.00
6682	25	24x8	700.00

Quotations on scales of any size for every purpose upon application.

Pitless Wagon Scales

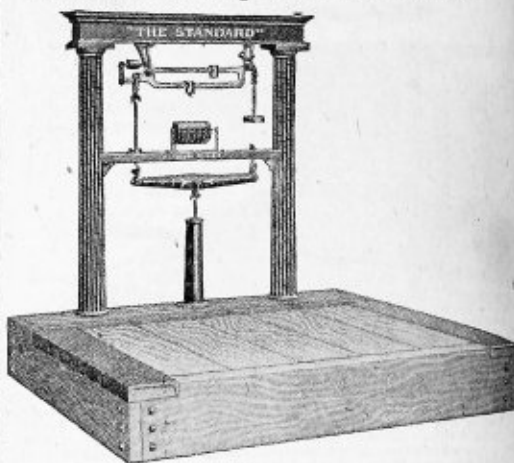


Erected in a steel frame with wood platform. Self-contained, requiring no pit. For accuracy, strength and durability these scales cannot be excelled. Always sold complete with steel frame and beam box ready to place in position. Purchaser furnishes lumber for platform and supports.

Compound, instead of double beam, extra, \$15.00.

No.	Capacity, Tons	Size of Platform, Feet	Depth, Inches	Price Double Beam
6031	3	12x6½	10	\$360.00
6033	6	14x7	12	500.00
6035	10	14x8	15	800.00

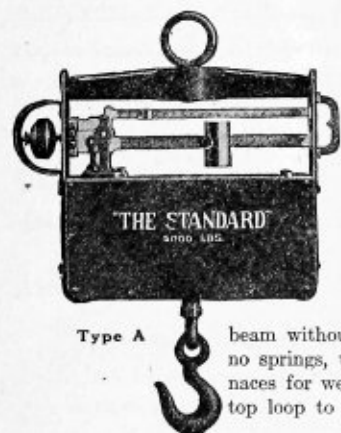
Pitless Transportation Scales



Similar to our Dormant Warehouse Scales, but self-contained, requiring no pit, and with larger platform. Framed complete. Weights, 4 pounds per ton.

No.	Capacity, Tons	Platform, Inches	Price Single Beam	Price Double Beam
7025	2	72x48	\$280.00	\$290.00
7026	2	72x60	290.00	300.00
7027	2	96x72	320.00	330.00

Suspension Crane Scales

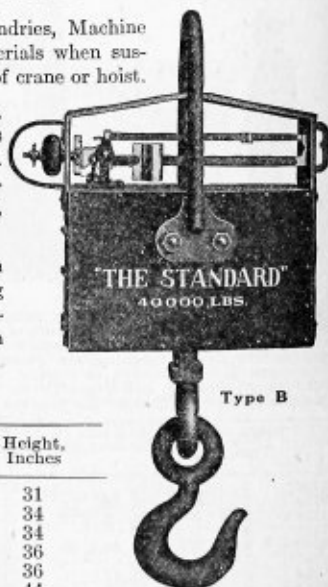


Type A

Used largely by Steel Works, Foundries, Machine Shops, etc., for weighing heavy materials when suspended. Can be used with any kind of crane or hoist.

Working parts contain no springs, but built upon a leverage principle as used by platform and wagon scales. A strong steel case encloses the working parts, protecting them from dirt, wet and breakage.

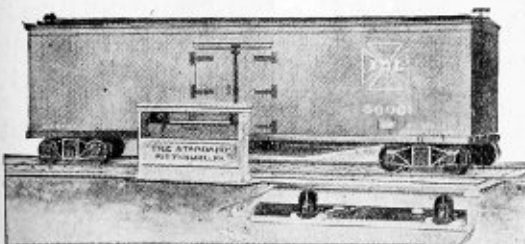
The entire load can be weighed on beam without the use of loose weights. Having no springs, these scales may be used near furnaces for weighing hot ingots. "Height" is from top loop to bottom hook.



Type B

No.	Price Each F. O. B. Factory	Capacity, Pounds	Type	Height, Inches
SCS2	\$100.00	2500x2	A	31
SCS5	160.00	5000x2	A	34
SCS6	180.00	6000x2	A	34
SCS8	220.00	8000x2	B	36
SCS10	260.00	10000x5	B	36
SCS20	330.00	20000x5	B	44
SCS30	390.00	30000x5	B	44
SCS40	490.00	40000x5	B	44

Railroad Track Scales



Our latest extra heavy iron frame "The Standard" track scales are everywhere known as durable, accurate and well adapted for railway use and large industries.

The standard gauge of track is 4 feet 8½ inches, and will be understood to be desired unless other gauge is specified.

They may be installed with steel construction instead of timber, especially suitable for use in hot climates and other localities.

These scales are usually fitted with improved single beam, but double, triple or gridiron beams, which are the various types

Prices do not include foundation or material for framing scales, which are furnished by purchaser.

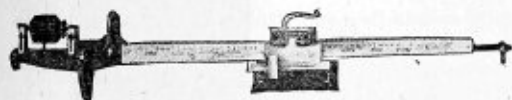
Short iron pillar beam fixtures, or beam box furnished when desired at extra price.

Railroad scales furnished to be built with third or dead rail when so ordered, at extra price for metal supports, upon application.

Number	Platform, Feet	Capacity, Tons	Price
4104	6	30	\$400.00
4108	6	50	450.00
4112	6	70	500.00
4114	8	80	525.00

Prices on larger or smaller sizes quoted on application.

Reed Recording Beam

[illegible]

United States Standard Weights

Weights for Even Balance Scales

Weights for Even Balance Scales



Test Weights

Nest and Handle Weights

Test weights 50 pounds United States standard	\$5.00
---------------------------------------------------------	--------

Nest Weights for Even Balance Scales

Capacity	Sealed Iron	Sealed Zinc	Solid Brass
8 pounds and down.....	\$2.75	\$5.50	\$11.00
4 pounds and down.....	1.75	3.50	6.00
2 pounds and down.....	1.25	2.50	3.50
1 pound and down.....	1.00	1.75	2.00
8 ounces and down.....	.75	1.25	1.50

Single Nest Weights Separate from Full Sets

Capacity	Cast Iron	Zinc	Solid Brass
1½ ounce, each	\$0.15	\$0.15	\$0.25
1½ ounce, each	.15	.15	.30
1 ounce, each	.15	.20	.35
2 ounces, each	.15	.25	.60
4 ounces, each	.15	.30	.65
8 ounces, each	.30	.60	.85
1 pound, each	.30	.65	1.00
2 pounds, each	.45	1.00	2.00
4 pounds, each	.75	1.50	3.50
Handle weights, 5 lbs. and 7 lbs.			2.00
Handle weights, 10 lbs.			1.50

Weights Priced by Actual Weight

Iron Weights

1/4 Lb. or less	1 Lb.	2 Lbs.	3 Lbs.	4 Lbs.	5 Lbs.	6 Lbs. or less
\$0.15	\$0.30	\$0.45	\$0.60	\$0.75	\$0.90	\$1.05

Zinc Weights

$\frac{1}{4}$ Lb. or less	$\frac{1}{2}$ Lb.	1 Lb.	2 Lbs.	3 Lbs.	4 Lbs.	5 Lbs.	6 Lbs. or less
\$0.30	\$0.50	\$0.65	\$1.00	\$1.40	\$1.75	\$2.00	\$2.25

Brass Weights

$\frac{1}{4}$ Lb. or less	$\frac{1}{2}$ Lb.	1 Lb.	$1\frac{1}{2}$ Lbs.	2 Lbs.	3 Lbs.	4 Lbs. or less
\$0.50	\$0.75	\$1.50	\$2.25	\$3.00	\$4.50	\$6.00

For Railroad Track and Wagon Scales

The recording beam shown in this illustration is the most satisfactory device yet invented for obtaining a correct record of weights. Its simplicity of construction, absolute accuracy of record of weight at one operation cannot be surpassed. Movement is not affected by wear, dirt or weather.

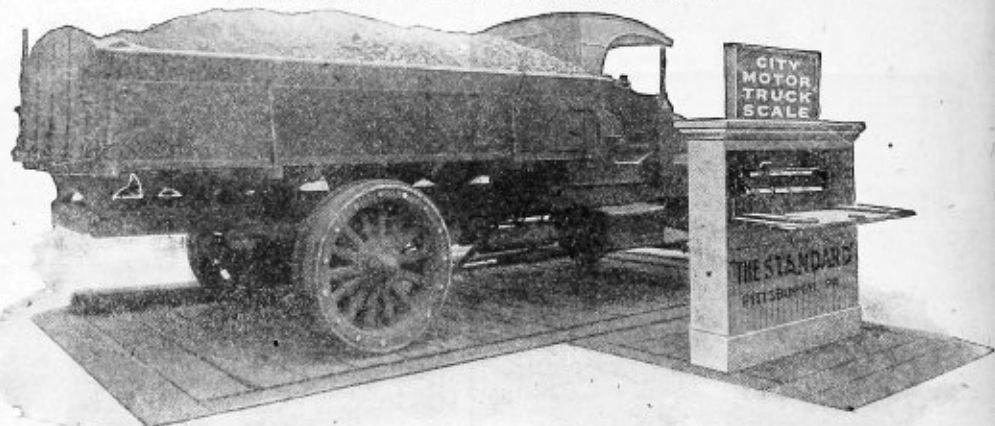
Correct weight can be had in less time than by reading beam, and record obtained can be referred to at any time, which is valuable evidence in case of disputed weights.

Our beam with attachment can be applied to any make of scales.

Recording Ticket

Cut shows ticket (reduced size) for 100-ton full capacity beam for railroad track scales. Ticket is placed before beam in receiver, and when correct position of poise is attained a touch of the ticket holder will make a hole in ticket, indicating number of pounds in unmistakable manner. The tickets for other scales are arranged upon the same principle, differing only in size and capacity.

Standard Motor Truck Scales



Note the Load on Rear Axle

The use of Auto Trucks for carrying heavy loads has created a demand for a much heavier type of scale than wagon scales. This is necessary for accurate weighing and to guard against accidents which may occur on the scales of insufficient capacity.

These scales are of railroad type, having self-aligning pendulum bearings with big adjustment; self-centering blocks on top of pivot and at supporting point on the pendulum. Length of pendulum is sufficient to be effective in absorbing shocks, thrusts and deflections, therefore, oscillation on the knife edges is practically nothing. The yokes that bear upon the bearing links are braced laterally.

The "Standard" Wagon Scale is not suitable for weighing auto trucks, due to the fact that about 70% of the load on a motor truck is carried on the rear axle, which will usually crush an ordinary wagon scale, which is designed for loads distributed equally.

Full capacity Double Beam. Tare bar, 6 tons.

No.	Capacity Tons	Platform Feet	Price	No.	Capacity Tons	Platform Feet	Price
6580	15	14x8	\$450.00	6642	20	20x8	\$575.00
6582	20	14x8	475.00	6644	30	20x8	600.00
6602	20	16x8	500.00	6662	20	22x8	700.00
6622	20	18x8	525.00	6682	25	24x8	737.50
6624	30	18x8	550.00				

Platforms wider than 9 feet increase price \$4.00 per inch. All prices are exclusive of the timber, steel, beam box and foundations, which are to be furnished by purchaser.

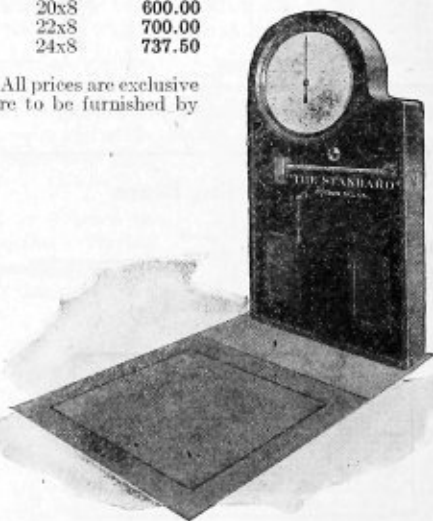
Standard Automatic Dial Scales

Constructed entirely of metal, self-contained and ready to place on foundation.

The bearing surfaces in dial are rolling in links which eliminates practically all wear and jar, an essential in automatic scales.

Sizes and Specifications

Total Capacity in pounds	Dial Circle indicate in pounds	Attachment to make Dial Circle Indi- cate in pounds	Tare Beam in pounds	Platform in inches
3,500	1,000x2	2,000x2	500x2	48x36
3,500	1,000x2	2,000x2	500x2	48x48
3,500	1,000x2	2,000x2	500x2	72x48
8,750	2,500x5	5,000x5	1,250x5	48x48
8,750	2,500x5	5,000x5	1,250x5	72x48
8,750	2,500x5	5,000x5	1,250x5	96x72
17,500	5,000x10	10,000x10	2,500x5	72x48
18,500	5,000x10	10,000x10	2,500x5	96x72



Standard Automatic Dial Scale

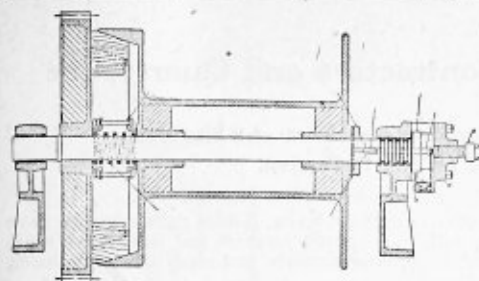


Fig. G1400 The Mundy Perfect Friction Drum

The "Mundy" Hoisting Engine The Original Friction Drum Hoist

For Forty Years the Standard of All
Hoisting Machines
We are the Western Selling Agents
Large Stock Carried in Chicago

More good material, honest and skillful workmanship goes into the manufacture of Mundy Engines than into any other—none excepted.

The Mundy Patent Cone Friction Drum has proven itself to be the best device ever applied to a hoisting engine, to which thousands of bridge builders, contractors and mining companies and others in all parts of the world are ready to testify.

Referring to the line illustration, the drum, loose or free on the shaft, is clutched or thrown into engagement, by means of a hand lever and screw thrust, forcing the drum laterally along the shaft against the wooden friction blocks attached to the gear. When the hand lever is released the drum is forced back and off the friction by the heavy recoil spring.

The essential features of the Mundy Single Cone Friction are low angle (18 degrees) and large area, ease and rapidity of taking and releasing friction, freedom from liability to stick, and a perfect control by the operator, of the required intensity of pressure, under the varying conditions of load and speed, so that the drum may be made to revolve quickly or slowly, with the engine running at the same speed, hold fast and revolve with the shaft, or go slower than the shaft, or let go and turn, either fast or slow, in a direction contrary to the revolution of the shaft, thus giving the operator, by the sense of feeling conveyed by the hand lever, absolute knowledge of what is needed to perfectly control the load. This friction has survived hundreds of other forms and is still the most popular today, the hardwood friction blocks take end wear across the grain, will last a long time and are easily replaceable and the simplest to adjust.

Every part entering into the construction is made of the best material obtainable. The steam cylinders have large ports, thereby making the engines very quick and saving back pressure in the exhaust. The pistons are fitted with self-adjusting packing rings, always perfectly tight and requiring no attention. A plain slide valve is used that can be adjusted or set by any engineer. The guides and cross-heads are of the locomotive type, having large wearing surface and from iron-cut pattern and are impossible to get out of line. The gears are cast cast steel. All terms and are perfectly true, the pinions are made of shafts are large and the bearings generous in size.

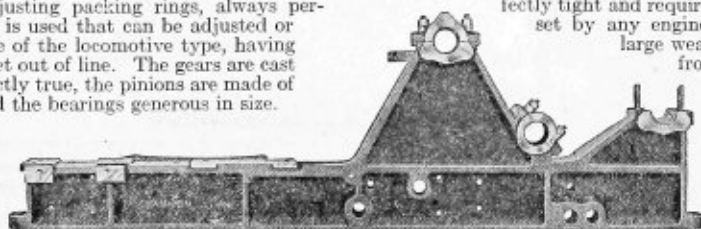


Fig. G1401 The well known Mundy "One-Piece" Engine Side Frame

The engines are all of the long-stroke type giving greater leverage, slower engine speeds, greater fuel economy, less wear and consequently longer life.

All Mundy hoists have the "one-piece" side frames—the brackets or stands, for carrying the drums and main shaft, are cast solid with the lower frame, doing away with joints and bolts.

The lower halves of the boxes are cast integral with the stands and frame.

The boilers are easy steamers and have the Jerrold Patent Tube Setting in the top heads which are extra heavy and warranted not to leak even if the tubes should be fired to a red-hot heat.

The "Mundy" has the record for long service in constant use. It is pre-eminently "The Contractors' Hoist." It will stand more use and abuse and it requires fewer repairs than any engine made. We show only a few standard styles in this book.

Send for complete special catalog.

Standard Engine for Railway, Contractors and Quarry Use

This is the Most Popular Style of Contractors Hoist and the Best Selling Sizes are Nos. 232 to 242, Inclusive.

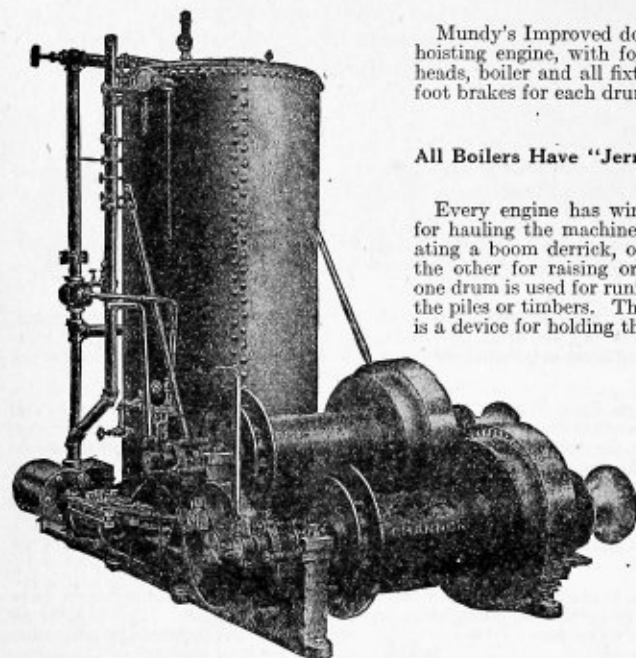


Fig. G 1402

Mundy's Improved double cylinder, double patent friction drum hoisting engine, with foot brakes, ratchets and pawls, two winch heads, boiler and all fixtures complete and ready to run, including foot brakes for each drum.

All Boilers Have "Jerrold" Patent Leakless Tube Setting in Top Head.

Every engine has winch head on the end of each drum shaft for hauling the machine, piles, timber, etc. When used for operating a boom derrick, one drum is used for raising the load, and the other for raising or lowering the boom. When pile-driving, one drum is used for running the hammer and the other for hoisting the piles or timbers. The ratchet and pawl on the end of the drum is a device for holding the weight with one drum while the boom is being lowered or swung to its desired position.

This engine has been adopted by the United States Government engineers, the largest contractors and iron bridge builders in the United States, and many railroad companies, as the best standard hoisting engine made.

In pile-driving a 6½x12 or 7¼x10 engine with a 2500-pound hammer will strike from 15 to 25 blows per minute, running the hammer from 12 to 25 feet high every blow; and with a 7x12 engine with a 3000-pound hammer will strike the same number of blows.

Specifications. (Prices on application)

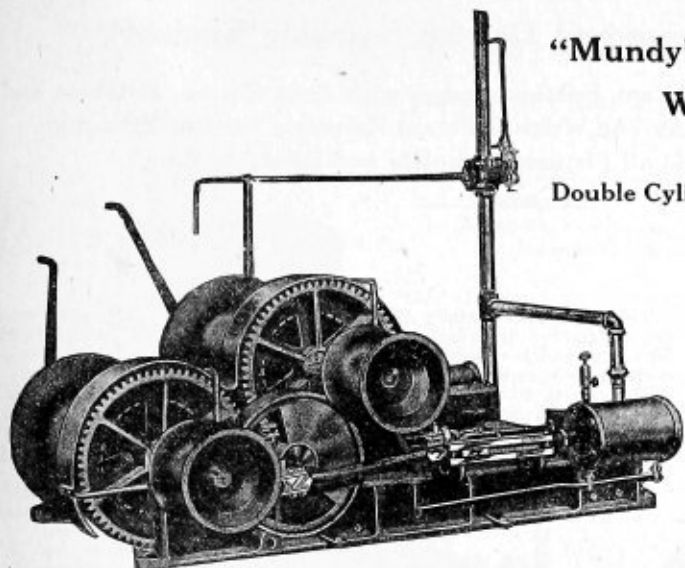
Size No. of Engine	Nominal Horse Power Rating	Dimensions of Cylinders		Dimensions of Hoisting Drums		Weight Hoisted Single Rope, Average Speed, Pounds	Suitable Weight of Pile-driving Hammer for Very Quick Work, Pounds	Dimensions of Boilers				Estimated Shipping Weight With Boiler Complete, Pounds
		Diam., Ins.	Stroke, Ins.	Diam., Ins.	Length, Ins.			Diam., Inches	Height, Inches	No. Tubes 2-inch Diam.	Length of Tubes, Inches	
227	8	4½	6	9	18	2000	800	28	68	40	42	4500
228	10	5	8	10	20	2500	1200	32	80	55	52	5600
230	12	5½	10	12	20	3000	2000	34	84	60	56	7500
232	16	6¼	10	14	22	4000	2400	36	84	65	56	8200
234	20	6½	12	14	24	5000	2600	38	90	77	62	8800
236	22	7¼	10	14	26	6500	2800	40	90	85	62	10200
238	24	7	12	14	28	7000	3000	42	96	90	68	10600
240	28	7½	12	14	30	7800	3400	42	96	90	68	11700
242	32	8	12	16	30	8500	3800	44	102	104	74	13500
244	40	9	10	16	30	9500	4000	46	102	125	74	14400
246	42	8½	13	16	30	10500	4200	46	102	125	74	15000
248	45	9	13	16	30	11000	5000	48	102	142	74	16000
250	50	9	16	18	30	12000	5000	48	102	142	74	16800
252	55	10	13	18	30	13000	5500	50	102	155	74	19900
254	60	10	16	18	32	14000	6000	52	108	160	78	22200
256	70	11	18	20	32	17000	7000	54	108	185	78	27400
258	80	12	16	22	40	19000	8000	60	120	200	90	32000

Furnished with link-reversing motion when especially ordered.
Can also be made with clutched winch heads.

"Mundy" Hoisting Engines Without Boiler

Double Cylinder Single Friction Drum Hoist

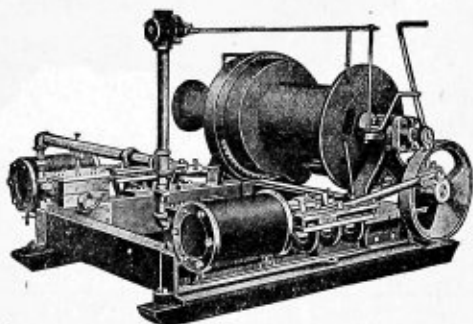
Double Cylinders, Double
Patent Friction Drums, with
Ratchets and Pawls, Two
Winch Heads and All
Fixtures Complete
Including Foot Brakes
For Each Drum



This type of engine is designed for operating derricks and for general hoisting purposes. It is especially adapted for use in quarries, or tunnel work, or excavations where it is desirable to use many of these engines along a line of work, taking the steam or compressed air from one stationary plant. All Mundy engines will work under compressed air pressure equally as well as under steam pressure. It is also well adapted for use on structural work, trestle work, and places where it is necessary to locate the engine at a point not convenient for the location of a boiler. This engine furnished with clutched winches in place of the fixed winches when desired. We always furnish foot brakes unless otherwise ordered.

Double Cylinders Single Friction Drum Hoist

Suitable for general hoisting or pile driving. A winch or nigger head is keyed to the drum shaft for hoisting piles while the drum is used for hammer line. Furnished with drum ratchets and pawl, foot brake and fixtures complete.



H. P. as Usually Rated	Size of Double Cyls., Bore and Stroke, Inches	Hoisting Drums, Diam. and Length, Inches	Weight Hoisted on Single Line Average, Pounds	Weight of Pile Driving Hammer for Quick Work, Pounds	Single Drum Hoists			Double Drum Hoists		
					No.	Wght., Lbs.	Price	No.	Wght., Lbs.	Price
8	4½ x 6	9x18	2000	800	343	1800	Prices Quoted Upon Appli- cation	379	2600	Prices Quoted Upon Appli- cation
10	5 x 8	10x20	2500	1200	344	2450		380	3400	
12	5½ x 10	12x20	3000	2000	346	3500		382	4800	
16	6½ x 10	14x22	4000	2400	348	3800		384	5100	
20	6½ x 12	14x22	5000	2600	350	4200		386	5400	
22	7½ x 10	14x26	6500	2800	352	4500		388	6500	
24	7 x 12	14x28	7000	3000	354	5000		390	7000	
28	7½ x 12	14x30	7800	3400	356	6000		392	7600	
32	8 x 12	16x30	8500	3800	358	6500		394	8400	
40	9 x 10	16x30	9500	4000	360	7000		396	8800	

Also furnished in larger sizes and all drum combinations. Prices upon request.

"Mundy" Improved Derrick Swinging Engine

Double Cylinders, Double Patent Friction Drums with Foot Brakes, Ratchets and Pawls, Two Winch Heads and Wright's Patent Reversing Friction Swinging Drum, Boiler and all Fixtures Complete and Ready to Run.

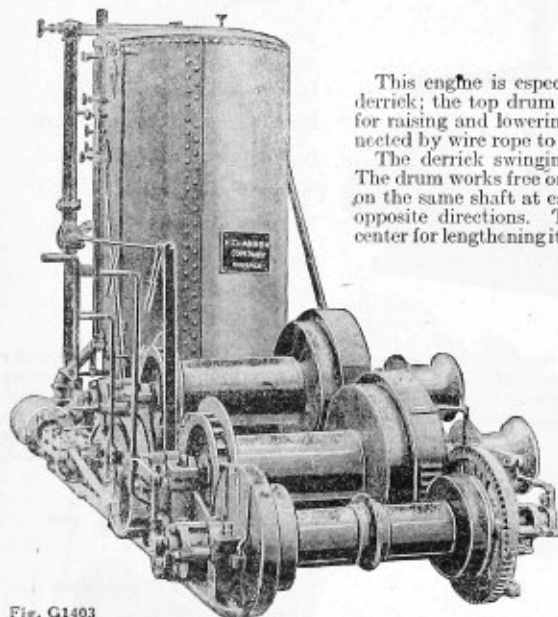


Fig. G1403

This engine is especially adapted for operating and swinging a boom derrick; the top drum being used for hoisting the load, the second drum for raising and lowering the boom, and the swinging drum, which is connected by wire rope to bull wheel of derrick, swings the mast and boom.

The derrick swinging attachment is of new design and construction. The drum works free on the shaft, and has a friction at each end. Located on the same shaft at each end of the drum, are friction gears, rotating in opposite directions. The drum is arranged with an adjustment in the center for lengthening it to compensate for the wear of the frictions. The construction for operating the drum is so arranged that it is engaged with either friction by the movement of one lever. The drum, when at rest, is disengaged from both frictions, and for swinging the derrick is thrown in to either the forward or back motion friction, as may be required. The pulling speed of this drum is of a proportion approximating 1-5 to 1-6 of the speed of the hoisting rope, for swinging the derrick with the load and has an increased proportion of approximately one-third the speed of the pulling drums for returning the empty derrick, thus making a saving of time. All of the parts of this attachment are made extra heavy and strong with steel gearing, and being compound geared will swing a derrick under any circumstances.

Can also be furnished with single friction drum.

Size Number of Engine	Horse Power Usually Rated	Dimensions of Cylinders		Dimensions of Hoisting Drums		Weight Hoisted Single Rope, Average Speed, Pounds	Suitable Weight of Pile-driving Hammer for Quick Work, Pounds	Dimensions of Boilers				Estimated Shipping Weight with Boiler Complete, Pounds
		Diam., Ins.	Stroke, Ins.	Diam., Ins.	Length, Ins.			Diam., Ins.	Height, Ins.	No. Tubes 2-inch Diam.	Length of Tubes, Ins.	
521	10	5	8	10	20	2500	1200	32	80	55	52	6400
523	12	5½	10	12	20	3000	2000	34	84	60	56	8400
525	16	6½	10	14	22	4000	2400	36	84	65	56	9500
527	20	6½	12	14	24	5000	2600	38	90	77	62	10400
529	22	7½	10	14	26	6500	2800	40	90	85	62	11400
531	24	7	12	14	28	7000	3000	42	96	90	68	11800
533	28	7½	12	14	30	7800	3400	42	96	90	68	12900
535	32	8	12	16	30	8500	3800	44	102	104	74	15200
537	40	9	10	16	30	9500	4000	46	102	125	74	16100
539	42	8½	13	16	30	10500	4200	46	102	125	74	16800
541	45	9	13	16	30	11000	5000	48	102	142	74	17900
543	50	9	16	18	30	12000	5000	48	102	142	74	18800

We can furnish this swinging attachment, including extension of frame with splice plate to attach same properly to frame of any make of engine.

"Mundy" Bridge-Builders' and Erectors' Engine

With Four Independent Clutch Spools

Double Cylinder, Double Patent Friction Drum Hoisting Engine with Four Independent Clutch Spools, Ratchets, Pawls, Boiler and all Fixtures Complete, Including Foot Brakes for Each Drum.

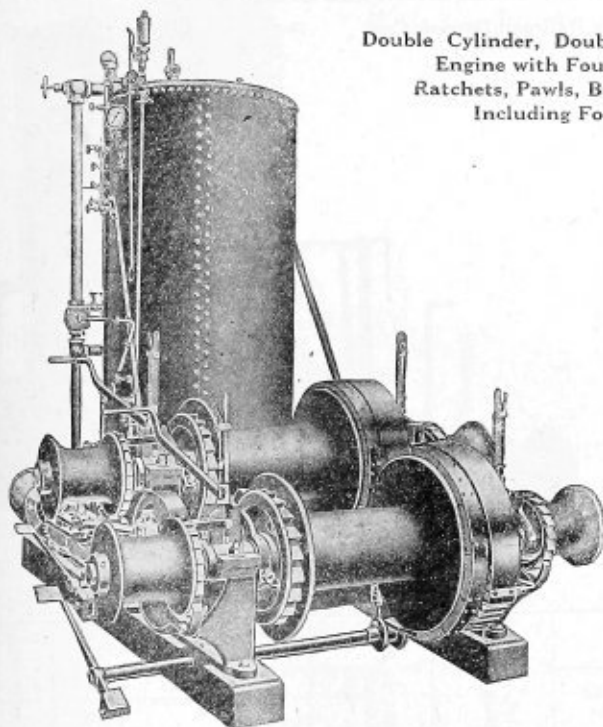


Fig. C1405

This engine is the favorite type for bridge building, erecting, pile driving and contractor's use.

This engine is especially constructed as a combination engine for use where it is desirable to handle derricks with friction drums and other material by use of winches with free end lines. All winches are independent, working free on shafts and are engaged with clutches, also having ratchets and pawls.

The levers for operating the clutches are provided with racks and latches for holding the clutches in position when engaged with the winches or disengaged. The shafts are made extra large to withstand heavy strains.

Size Number of Engine	Horse Power Usually Rated	DIMENSIONS OF CYLINDERS		DIMENSIONS OF HOISTING DRUMS		Weight Hoisted Single Rope Average Speed, Lbs.	Suitable Weight of Pile-driving Hammer for Quick Work, Lbs.	DIMENSIONS OF BOILERS				Estimated Shipping Weight with Boiler Complete, Lbs.
		Diameter Inches	Stroke, Inches	Diameter Inches	Length, Inches			Diameter Inches	Height, Inches	Number of Tubes 2-Inch Diameter	Length of Tubes, Inches	
416	10	5	8	10	20	2500	1200	32	80	55	52	6000
418	12	5½	10	12	20	3000	2000	34	84	60	56	8300
420	16	6¼	10	14	22	4000	2400	36	84	65	56	9500
422	20	6½	12	14	24	5000	2600	38	90	77	62	10000
424	22	7¼	10	14	26	6500	2800	40	90	85	62	10900
426	24	7	12	14	28	7000	3000	42	96	90	68	11200
428	28	7½	12	14	30	7800	3400	42	96	90	68	12500
430	32	8	12	16	30	8500	3800	44	102	104	74	14500
432	40	9	10	16	30	9500	4000	46	102	125	74	15200
434	42	8½	13	16	30	10500	4200	46	102	125	74	15800
436	45	9	13	16	30	11000	5000	48	102	142	74	17000
438	50	9	16	18	30	12000	5000	48	102	142	74	17900
440	55	10	13	18	30	13000	5500	50	102	155	74	21400

No. 424 is the popular size.

"Mundy" Double Cylinder, Double Friction Drum Hoisting Engine and Boiler

With Extension Winch Shaft and Four Clutch Winches, Especially Adapted for Architectural Iron Work, Construction and Bridge Erecting

For Railroad Derrick Cars

This engine is constructed especially for bridge erecting and structural work where a great amount of handling is done with winches and free end lines. Each winch works independently, with clutches and shifting apparatus; the frames being extended and provided with a very heavy shaft for hoisting or hauling of heavy loads. It is a very complete engine for general contracting work. All the drums and winches have shrouded ratchets, and are provided with pawls, for holding the load when the frictions or clutches are thrown out. The extension shaft with the frames can be made detachable if desired. Foot brakes included unless otherwise ordered.

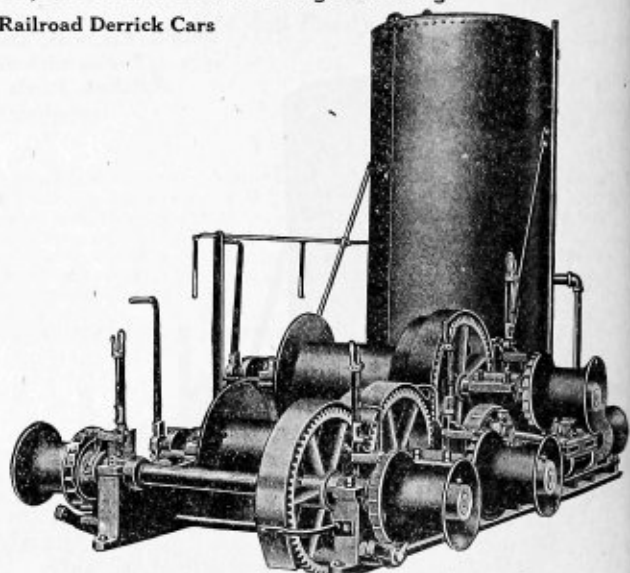


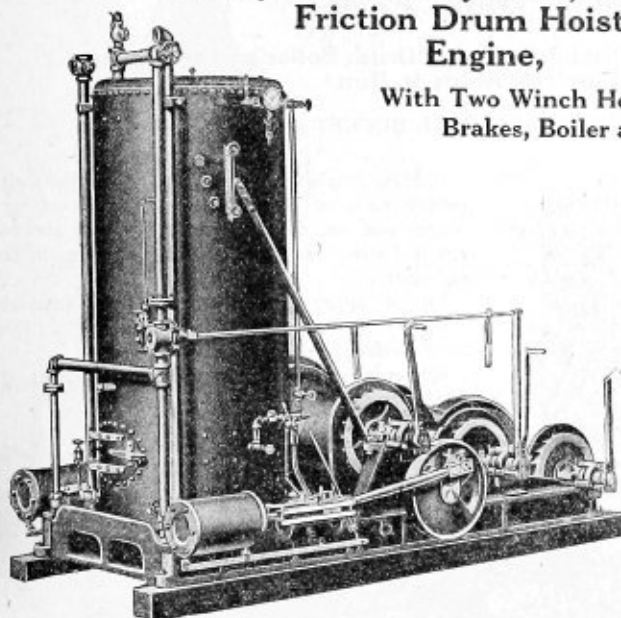
Fig. G1406

SIZE NUMBER OF ENGINE.	Horse Power Usually Rated	DIMENSIONS				Weight Hoisted, Single Rope, Average Speed, Lbs.	Suitable Weight of Pile-driving Hammer for Quick work, Lbs.	DIMENSIONS OF BOILERS				Estimated Shipping Wgt. with Boiler Complete, Lbs.
		Cylinders		Hoisting Drums				Diameter, Inches	Height, Inches	Number of Tubes 2-in. Diam	Length of Tubes, Inches	
		Diameter, Inches	Stroke, Inches	Diameter, Inches	Length, Inches							
542	16	6½	10	14	22	4000	2400	36	84	65	56	9200
544	20	6½	12	14	24	5000	2600	38	90	77	62	10400
546	22	7½	10	14	26	6500	2800	40	90	85	62	12400
548	24	7	12	14	28	7000	3000	42	96	90	68	12700
550	28	7½	12	14	30	7800	3400	42	96	90	68	13750
552	32	8	12	16	30	8500	3800	44	102	104	74	15600
554	42	8½	13	16	30	10500	4200	46	102	125	74	16800
556	45	9	13	16	30	11000	5000	48	102	142	74	18000
558	50	9	16	18	30	12000	5000	48	102	142	74	20000
560	55	10	13	18	30	13000	5500	50	102	155	74	23000

Propelling attachment for derrick car is usually attached to front shaft.

"Mundy" Double Cylinder, Triple Tandem Friction Drum Hoisting Engine,

With Two Winch Heads, Ratchets and Pawls, Foot Brakes, Boiler and all Fixtures Complete.



This engine is constructed with three friction drums, all provided with pawls and ratchets, each working independently. It is specially designed for operating a derrick, or handling a clamshell, or orange-peel bucket where it is desirable to use three lines; one drum being used to hoist and lower the boom, using the two remaining drums for operating the bucket. It can also be used for many other purposes where it is necessary to operate three hoisting lines.

There are two large winches fixed to the outer end of the drum shafts. We also furnish this engine with independent clutch winches in place of fixed winches, when wanted.

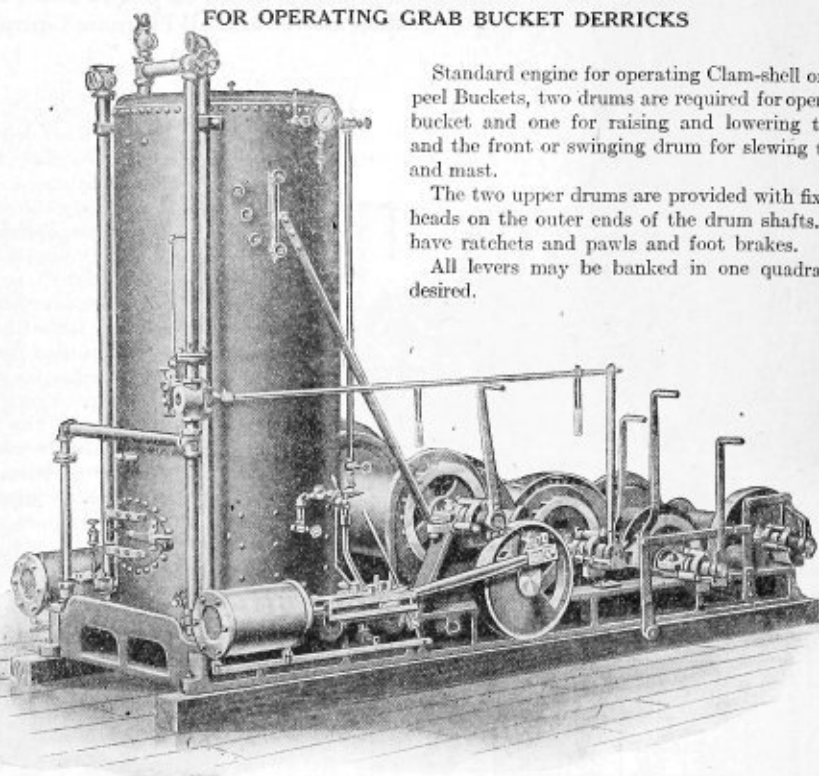
Independent swinging engines, listed elsewhere, usually furnished with this outfit.

SIZE NUMBER OF ENGINE	Horse Power Usually Rated	DIMENSIONS				Weight Hoisted, Single Rope, Average Speed, Lbs.	Suitable Weight of Pile-driving Hammer for Quick Work. Lbs.	DIMENSIONS OF BOILERS				Estimated Shipping Wgt. with Boiler Complete, Lbs.
		Cylinders		Hoisting Drums				Diameter, Inches	Height, Inches	Number of Tubes 2-in. Diam.	Length of Tubes, Inches	
		Diameter, Inches	Stroke, Inches	Diameter, Inches	Length, Inches							
442	10	5	8	10	20	2500	1200	32	80	55	52	6700
444	12	5½	10	12	20	3000	2000	34	84	60	56	9500
446	16	6½	10	14	22	4000	2400	36	84	65	56	10000
448	20	6½	12	14	24	5000	2600	38	90	77	62	10800
450	22	7½	10	14	26	6500	2800	40	90	85	62	11700
452	24	7	12	14	28	7000	3000	42	96	90	68	12600
454	28	7½	12	14	30	7800	3400	42	96	90	68	13800
456	32	8	12	16	30	8500	3500	44	102	104	74	15900
458	40	9	10	16	30	9500	4000	46	102	125	74	16200
460	42	8½	13	16	30	10500	4200	46	102	125	74	17800
462	45	9	13	16	30	11000	5000	48	102	142	74	18800
464	50	9	16	18	30	12000	5000	48	102	142	74	20000
466	55	10	13	18	30	13000	5500	50	102	155	74	23500
468	60	10	16	18	32	14000	6000	52	108	160	78	27000
470	70	11	18	20	32	17000	7000	54	108	185	78	30000
472	80	12	16	22	40	19000	8000	60	120	200	90	36000

"Mundy" Double Cylinder, Triple Tandem Friction Drum Engine

With Wright's Patent Derrick Swinging Drum Boiler and all Fixtures Complete, Ready to Run

FOR OPERATING GRAB BUCKET DERRICKS



Standard engine for operating Clam-shell or Orange-peel Buckets, two drums are required for operating the bucket and one for raising and lowering the boom and the front or swinging drum for slewing the boom and mast.

The two upper drums are provided with fixed winch heads on the outer ends of the drum shafts. Drums have ratchets and pawls and foot brakes.

All levers may be banked in one quadrant, if so desired.

Fig. C1408

Sizes and Capacities

Size number of Engine	Horse Power Usually Rated	Dimensions				Weight Hoisted, Single Rope, Average Speed, Lbs.	Suitable Weight of Fly-driving Hammer for Quick Work, Lbs.	Dimensions of Boilers				Estimated Shipping Weight, with Boiler Complete, Lbs.
		Cylinders		Hoisting Drums				Diameter, Inches	Height, Inches	Number of Tubes, 2-in. Diam.	Length of Tubes, Inches	
		Diameter, Inches	Stroke, Inches	Diameter, Inches	Length, Inches							
473	16	6 1/2	10	14	22	4000	2400	36	84	65	56	11000
475	20	6 1/2	12	14	24	5000	2600	38	90	77	62	11900
477	22	7 1/2	10	14	26	6500	2800	40	90	85	62	12950
479	24	7 1/2	12	14	28	7000	3000	42	96	90	68	13850
481	28	7 1/2	12	14	30	7800	3400	42	96	90	68	15000
483	32	8	12	16	30	8500	3800	44	102	104	74	17600
485	40	9 1/2	10	16	30	9500	4000	46	102	125	74	18800
487	42	8 1/2	13	16	30	10500	4200	46	102	125	74	19600
489	45	9	13	16	30	11000	5000	48	102	142	74	20700
491	50	9	16	18	30	12000	5000	48	102	142	74	22300
493	55	10	13	18	32	13000	5500	50	102	155	74	26400
495	60	10	16	18	32	14000	6000	52	108	160	78	28800
497	70	11	18	20	32	17000	7000	54	108	185	78	34000
499	80	12	16	22	40	19000	8000	60	120	200	90	40000

Mundy Logging Engines

Designed especially for logging purposes. Experience of many years has taught that these machines are the best and most economical in the long run.

The boilers are extra large on all Mundy Engines for this purpose, thereby steaming freely with a wood fire. The engines are made from new patterns throughout, with extra large steam and exhaust ports, thereby quickly giving the largest amount of power from the carefully selected sizes of the cylinders. The lower hoist drum is larger than the upper one and will hold a large amount of wire rope. The spur gear is also much larger. This is designed to give large pulling power from this drum for hauling the log out of the woods at a slow speed, while the engines are in quick revolution. The upper drum being geared quicker winds a large amount of smaller wire rope for the purpose of hauling the pulling rope back in the woods to the starting point.

The bed frames are extra strong. All parts of the engine fitted in the best possible manner. Drum and crank shafts made of steel. The gearing is made from cut patterns. The lower drum is so arranged when ordered that it can be detached from the frame, thereby making a single-drum engine. This is done by bolting underneath the bed frame heavy wrought-iron fish plates

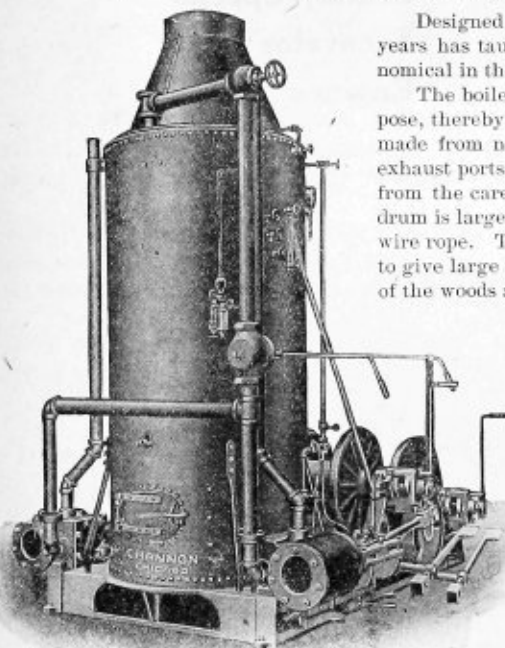


Fig. G1423

Mundy Steel Logging Engine Nos. 706, 708 and 710

Size Number	Horse Power	CYLINDERS		DIAMETER OF		DIAMETER OF		Length of Drum Between Flanges, Inches	Diameter of Boiler in Inches	Height of Boiler in Inches	Number of 2-inch Tubes	Length of Tubes, Inches	Estimated Wgt. of Engine and Boiler, Lbs.
		Bore Inches	Stroke Inches	Upper Drum in Inches	Flanges in Inches	Lower Drum in Inches	Flanges in Inches						
698	28	7½	12	12	30	14	40	30	44	102	104	74	11200
700	42	8½	13	14	30	16	40	32	48	102	142	74	15700
702	45	9	13	14	30	16	40	32	48	102	142	74	16800
704	60	10	13	16	32	18	44	38	52	108	160	78	20500

Mundy Steel Logging Engines

Especially adapted for hauling and yarding purposes. The bed frame, main pulling gear and winching drum are made of open-hearth steel.

The engines are very strong and capable of making long, heavy hauls. All parts of these machines are built in the best proportion, while the workmanship and material are first-class and have been pronounced by many who are using them on the Pacific Coast to be indestructible.

The boilers are made especially to carry high steam pressure, and the engine can be run at a high rate of speed, thereby producing great amount of horse-power.

Size Number of Engine	Horse Power Usually Rated 100 lbs. Pressure	DIMENSIONS				DIMENSIONS OF BOILERS				Estimated Shipping Wgt. with Boiler Complete. Lbs.
		Cylinders		Hoisting Drums		Diameter, Inches	Height, Inches	Number of Tubes 2-inch Diam.	Length of Tubes, Inches	
		Diameter, Inches	Stroke, Inches	Diameter, Inches	Length, Inches					
706	60	7¼	10	12	30	44	102	104	74	14000
708	90	9	10	12	34	48	102	142	74	16180
710	145	10	13	12	48	54	108	185	78	23000

Mundy Special Excavator Engines

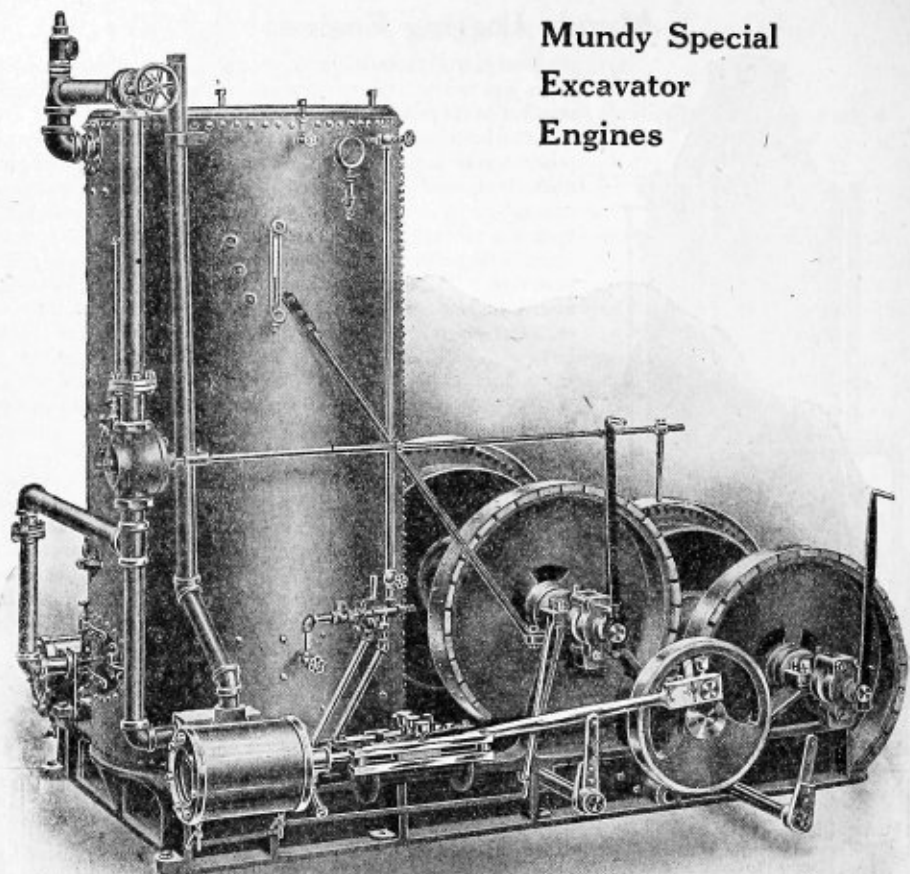


Fig. G1404

Cast Steel Gears—Bronzed Bushed Drums—Balanced Throttle One-Piece Side Frames

These engines are specially constructed for use with our scraper excavators and should not be confused with the so-called standard contractor's hoist which is smaller and lighter in every way.

They have extra heavy one-piece side frames, doing away with joints and bolts, thus avoiding the possibility of parts getting loose from sudden shocks and jars—a very important item in a machine of this kind.

The gearing is of cast steel throughout and special large size with wide face; the drums are bronze bushed and powerful band foot-brakes are placed opposite the friction heads to prevent heating.

The cone frictions are exceptionally large, consequently only half the pressure is required to set them, which enables the operator to handle the levers quickly and without fatigue.

The illustration shows two drums and vertical boiler but our Model 1460 is now regularly furnished with three drums and a high pressure locomotive firebox boiler.

Prices quoted upon request

"Mundy" Hoisting Engine Boilers

Vertical Full Length Tubes With "Jerrold" Patent Tube Setting in Top Head, 125 lb. Steam Working Pressure

This is the very highest grade of vertical boiler built. The heads are extra heavy and the top head has the Jerrold patent tube setting. These boilers are regularly furnished with our Mundy hoisting engines, but we sell many of them for other purposes.

Boiler shells are made of homogeneous steel of 60,000 pounds tensile strength; all vertical seams are double riveted; heads and furnace of best flange steel. Heads are extra heavy. The door frame is made of forged steel and on the best principal. These boilers are easy steamers.

Price complete, includes base, grates, hood and stock, standard steam trimmings, including injector with piping, valves and connections.

Sizes and Prices

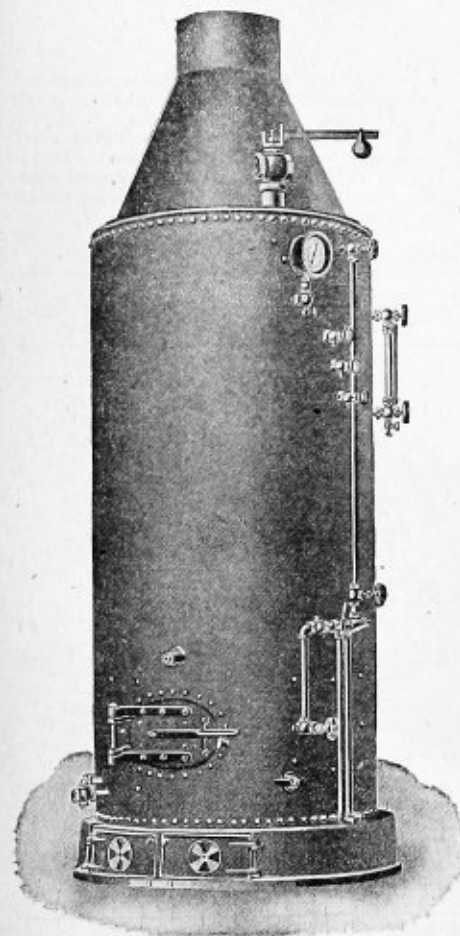


Fig. G1424

Size Number	Horse Power, as Usually Rated	Diameter, in Inches	Height, in Inches	Number of Tubes, Two-inch Diameter	Length of Tubes, Inches	Thickness of Shell, Inches	Thickness of Heads, Inches	Thickness of Furnace Plate, Inches	Diameter of Stack, Inches	Approximate Weight, Pounds	Price, Complete
1146	5	26	60	35	36	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{4}$	12	1000	\$ 235.00
1148	7	28	68	40	42	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{4}$	13	1200	254.00
1150	10	30	78	50	50	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{4}$	14	1450	285.00
1152	12	32	80	55	52	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{4}$	15	1600	315.00
1154	14	34	84	60	56	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{4}$	15	1850	354.00
1156	15	36	84	65	56	$\frac{9}{32}$	$\frac{3}{8}$	$\frac{9}{32}$	16	2100	374.00
1158	19	38	90	77	62	$\frac{9}{32}$	$\frac{3}{8}$	$\frac{9}{32}$	17	2400	423.00
1160	21	40	90	85	62	$\frac{9}{32}$	$\frac{3}{8}$	$\frac{9}{32}$	18	2600	443.00
1162	25	42	96	90	68	$\frac{9}{32}$	$\frac{3}{8}$	$\frac{9}{32}$	19	2900	468.00
1164	30	44	102	104	74	$\frac{9}{32}$	$\frac{3}{8}$	$\frac{9}{32}$	20	3350	536.00
1166	35	46	102	125	74	$\frac{5}{16}$	$\frac{7}{16}$	$\frac{9}{32}$	22	3800	591.00
1168	40	48	102	142	74	$\frac{5}{16}$	$\frac{7}{16}$	$\frac{9}{32}$	23	4150	660.00
1170	45	50	102	155	74	$\frac{5}{16}$	$\frac{7}{16}$	$\frac{9}{32}$	24	4500	705.00
1172	50	52	108	160	78	$\frac{11}{32}$	$\frac{7}{16}$	$\frac{5}{16}$	25	5150	782.00
1174	60	54	108	185	78	$\frac{11}{32}$	$\frac{7}{16}$	$\frac{5}{16}$	27	5600	865.00
1176	70	60	120	200	90	$\frac{3}{8}$	$\frac{7}{16}$	$\frac{5}{16}$	28	7200	1045.00

Other Vertical Boilers listed in another section of this Catalog.

"Mundy" Friction Drum Electric Hoists

With Patent Automatic Locking Brakes

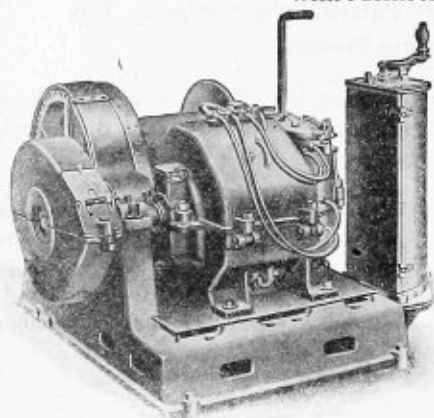


Fig. G1427

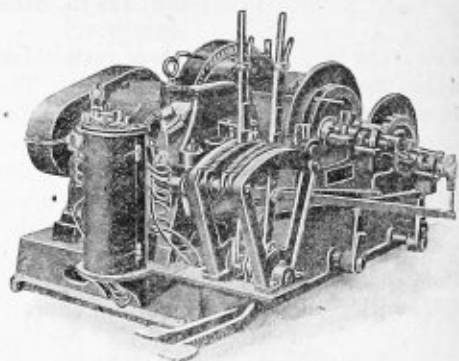


Fig. G1428

The above illustrations show designs as generally furnished. We can arrange position of motors, drums and controllers to suit convenience of purchaser. Controllers of the street car pattern are furnished so that any speed may be obtained from minimum to maximum as quickly as with a steam hoist.

Our line of electric hoists is very complete, consisting of single friction drum, double and triple friction drum with winches, the best arranged handling apparatus together with the most reliable electrical apparatus that is constructed. We also furnish special types of electrical machinery such as haulage machines, continuous winding machines, etc. In ordering it is necessary to state all the electrical conditions under which the hoist will be used, also give speed that the load is to be hoisted per minute when motor is running at its full speed.

Single Drum Hoist

Number of Hoist	Motor Horse Power	Size of Drum		Hoisting Duty		Approximate Shipping Weight, Pounds
		Diameter, Inches	Length, Inches	Weight Hoisted, Pounds	Speed in Feet per Minute	
1052½	5	8	16	800	200	2000
1053	7½	8	16	1200	200	3000
1054	10	10	16	1500	200	3500
1056	15	12	16	2000	225	4000
1058	20	14	18	2800	225	4500
1060	25	14	18	3500	225	5000
1062	30	16	18	4200	225	5500
1064	35	16	18	4800	225	6000
1066	40	18	18	5500	225	6500
1068	45	20	20	6200	225	7000
1070	50	22	20	7700	225	8000

Double Drum Hoist

Number of Hoist	Motor Horse Power	Size of Drums		Hoisting Duty		Approximate Shipping Weight, Pounds
		Diameter, Inches	Length, Inches	Weight Hoisted, Pounds	Speed in Feet per Minute	
1070½	5	8	16	800	200	2500
1071	7½	8	16	1200	200	3700
1072	10	9 and 10	16	1500	200	4200
1074	15	10 and 12	16	2000	225	4800
1076	20	12 and 14	18	2800	225	5300
1078	25	12 and 14	18	3500	225	6000
1080	30	14 and 16	18	4200	225	6700
1082	35	14 and 16	18	4800	225	7200
1084	40	16 and 18	18	5500	225	7800
1086	45	16 and 20	20	6200	225	8500
1088	50	18 and 22	20	7000	225	10000

Be sure to state your current and voltage, also maximum load and speed that the hoist is to handle. Larger sizes and any combination of drums furnished promptly. Prices on request.

Mundy Electric Hoists

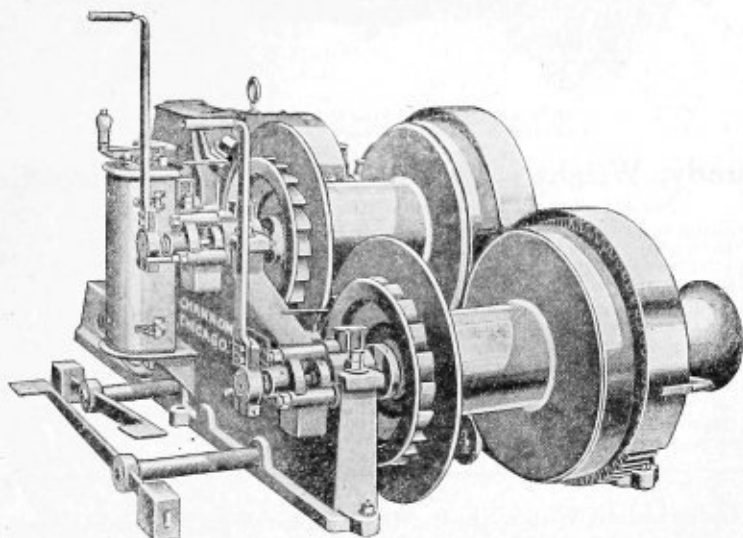


Fig. 1425. Standard Double Friction Drum Hoist
Regular Arrangement of Handling Levers

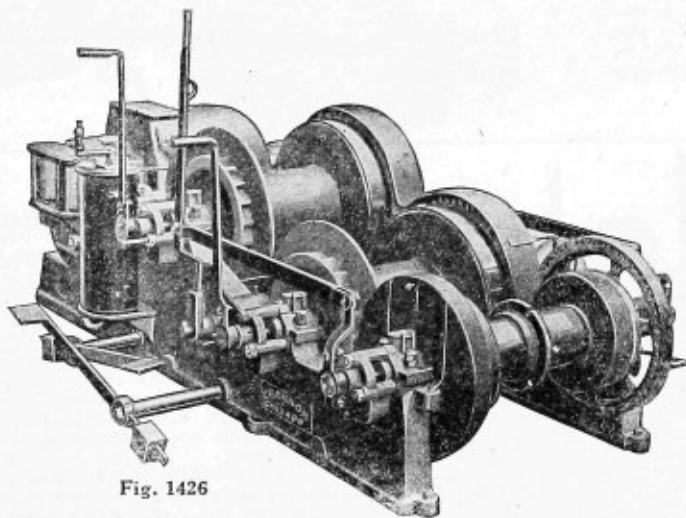


Fig. 1426

Standard Double Friction Drum, Contractors Electric Hoist, with Wright's Patent Single Reversing Drum Derrick Swinging Attachment

For Sizes, Etc., See Preceding Page

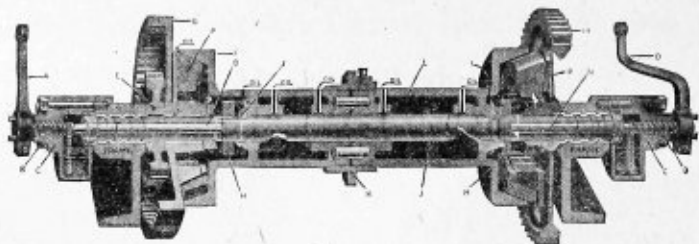


Fig. G 1413. Sectional View Showing Construction
See Engine Nos. 521 to 543 for Method of Attachment

Mundy, Wright's Patent Reversing Swinging Gear

For Attachment to Engine with any Combination of Drums

This boom swinging or slewing device is simple and compact, taking up less room than any other swinger on the market. It is attached in front of contractor's hoisting engine with any combination of drums and driven by steel pinion keyed into the front drum shaft and between the winch head. Operated by one lever at the engineer's side of engine.

This drum when at rest is disengaged from both frictions and for swinging the derrick is thrown into either the forward or backward motion, as desired by the movement of one lever.

Drum is compound geared to a pulling speed of approximately one-fifth to one-sixth the speed of the front drum of the main engine, for swinging the boom with the load and an increased speed of about one-third when returning without the load, thus making a saving of time.

The gears are cast steel. The friction Mundy standard cone drum has take up for wear in the form of an adjusting collar in the center.

Prices quoted upon request.

Independent Winch Shaft, With Clutch Winches and Gear

Can be attached in front of any standard double drum engine to adapt it for derrick car work. Propelling device may be attached in center of shaft.

Prices upon request.

Fig. G 1414

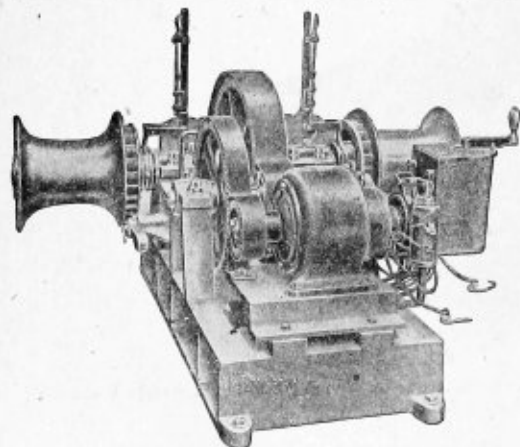
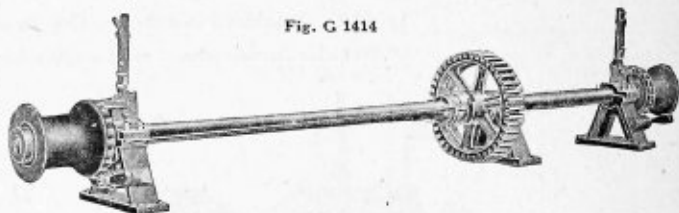


Fig. G 1415

Mundy Electric Compound-Geared Car Pullers or Winch Hoists

Winches Either Fixed or Clutched

These machines are equipped with large winches or "nigger heads" only, no drum. Winches can be fixed or clutched, as desired.

Clutched winches have jaw clutches, ratchets and pawls and latched levers for disengaging the clutches.

Exceptionally compact and strongly built.

When enquiring for prices, state current and voltage and if alternating current state cycles and phases also.

Prices quoted upon request.

“Mundy” Contractors’ Portable Gasoline Hoists

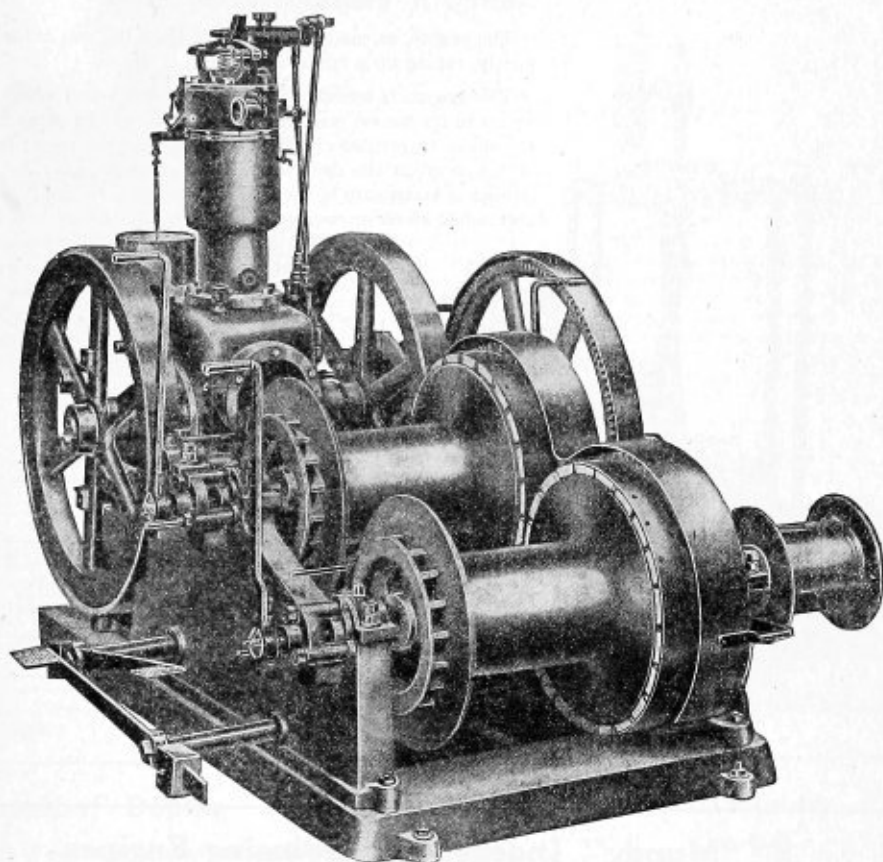


Fig. G1439

This hoist is designed for all kinds of hoisting where it is not practical to make use of the Steam or Electric Hoist—being a complete combination of Gasoline Engine and Friction Drum Hoist, all assembled on one Iron Bed Plate, and so constructed and arranged that the engine may be in constant motion and the hoisting and lowering of loads can be safely accomplished. The hoisting drum is provided with a powerful foot brake that will hold any load that can be hoisted with the engine.

Single Friction Drum Hoists

Rated Horse Power.....	5 H. P.	8 H. P.	10 H. P.	12 H. P.
Diameter Hoist Drum.....	8 inches	10 inches	10 inches	12 inches
Length Hoist Drum.....	16 inches	20 inches	20 inches	22 inches
Weight will hoist 150 ft. per minute.	1000 lbs.	1500 lbs.	1800 lbs.	2500 lbs.
Weight will hoist 100 ft. per minute.	1500 lbs.	2250 lbs.	2700 lbs.	3750 lbs.

Double Friction Drum Hoists

Rated Horse Power.....	10 H. P.	12 H. P.	18 H. P.	25 H. P.
Diameter Hoist Drum.....	10 inches	10 inches	12 inches	12 inches
Length Hoist Drum.....	17 inches	20 inches	30 inches	32 inches
Weight will hoist.....	1800 lbs.	2500 lbs.	3000 lbs.	3500 lbs.
Speed will hoist per minute.....	150 feet.	150 feet	150 feet	150 feet

Larger sizes and any combination of drums quoted promptly upon request.

"Mundy" Balanced Piston Reverse Valve Swinging Engines

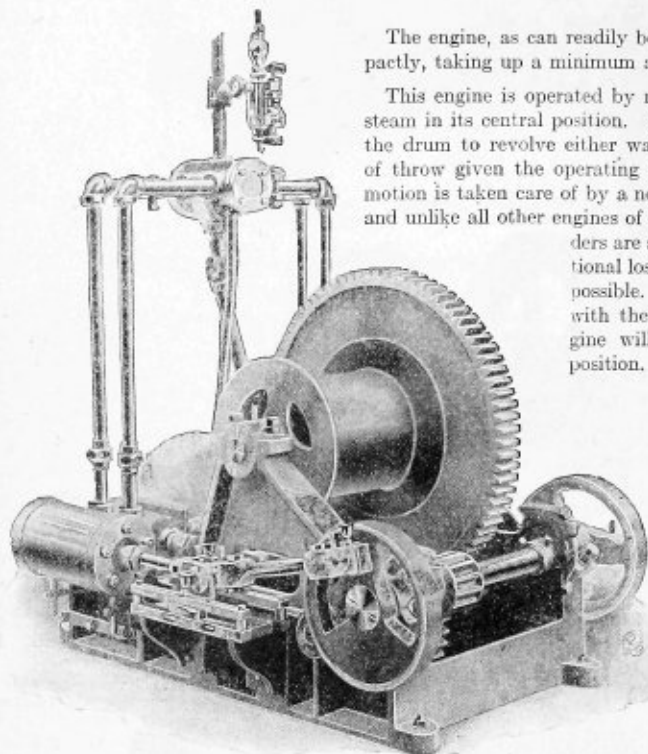


Fig. G1410

The engine, as can readily be seen from the cut, is built very compactly, taking up a minimum amount of space.

This engine is operated by means of one lever, which cuts off the steam in its central position. Moving it forward or backward causes the drum to revolve either way, regulating the speed by the length of throw given the operating lever by the engineer. The reversing motion is taken care of by a new style balanced piston throttle valve, and unlike all other engines of this type, the slide valves in the cylinders are steam balanced, thus lessening the frictional loss in the cylinders to the smallest degree possible. When the throttle valve is closed, with the lever in its central position, the engine will hold the boom stationary in any position.

No.	Size of Double Cylinders	Cap'ty on Single Line with 80 Lbs. Steam Pres.	Approx. Weight	Price
37	3x7	4,000 lbs.	1,400	\$400.00
68	6x8	10,000 lbs.	3,500	865.00

"Mundy" Independent Swinging Engines

Compound-Geared, Link-Reversing Double Cylinders, Single Fixed Drum

Operated entirely by one lever.

One of the crank discs has band brake, which locks when engine is at rest and releases when engine is started.

Especially adapted for swinging on dredges, barges, derricks, pile drivers, etc., where extra long and heavy booms are used, or any place where the mast is liable to get out of plumb, causing the machine to list, as on barge derricks.

It is simple and compact in construction, taking up but little space, and made especially strong to stand the heavy strains due to dredge work, etc.

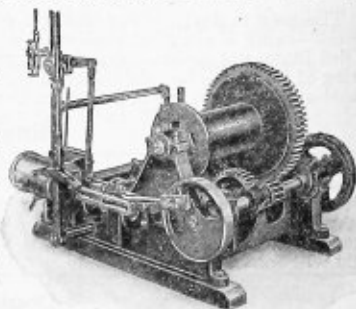


Fig. G1409

Number	Cylinders		Drum		Ratio of Gearing	Approximate Shipping Weight	List Price
	Diam.	Stroke	Diam.	Length			
45x	4½	x 6	9	x 12	11 to 1	1,950 lbs.	\$ 665.00
50x	5	x 8	12	x 18	11 6 to 1	2,900 "	780.00
55x	6¼	x 10	12	x 24	10 9 to 1	4,300 "	1,150.00

"Jackson" Double Cylinder, Reversible, Single Geared Drum Hoisting Engines

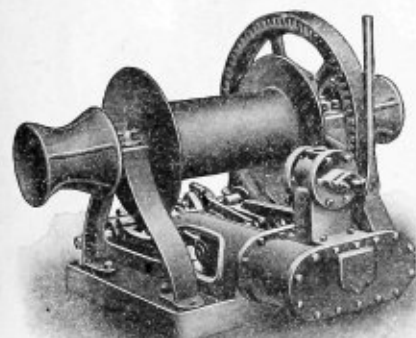


Fig. 1434

View of Engine, showing two Winch Heads. Can be furnished with one Winch or without as desired. Size of Winches, 5x12 inches.

For Steam or Compressed Air

These hoists are quick, simple, exceptionally compact and powerful; the cylinders and frame are cast in one piece. They are under complete control of the balanced reversible throttle. Can be stopped, started or reversed instantly, and will hold load without brake.

Adapted for mines, coal and ore docks, for pulling cars and general hoisting purposes. Before leaving the shop, every hoist is tested and run under pressure, and all working parts thoroughly inspected and adjusted. Being double-cylindere, the speed is uniform, and there are no dead centers; they, therefore, have a high lifting power as well as steady and uniform motion. The gears are protected by a wrought band to keep lines and clothing from being drawn in.

No.	Usually Rated H. P.	Double Cylinders		Will Hoist Single Line, Pounds	Size of Gears		Size of Drum, Inches	Floor Space, Inches	Weight, Pounds	Price
		Diameter	Stroke		Pinion	Gear				
66	12	6	7	2500	7	34½	12 x 20	68 x 52	2500	\$520.00
67	18	7	8	3000	7	34½	12 x 20	72 x 60	2700	575.00
68	26	8	9	4000	7	42	12 x 20	72 x 60	4200	695.00
69	30	8	10	4300	7	42	12 x 20	72 x 60	4300	735.00

Price includes throttle valve, oil cups, sight feed cylinder lubricator and two winches. If winches are not wanted, deduct \$7.50 each.

"Jackson" Double Cylinder Reversible Center-Gear Engines

For Steam or Compressed Air

These engines are completely under control with throttle, and can be stopped, started or reversed instantly.

Crank shaft, connecting rods, piston and valve rods are steel; cross head gibs are babitted, and boxes in connecting rods are of gun metal. All bearings are adjustable to wear, and of high grade anti-friction metal, to insure smooth running.

They are used successfully on dredges for hoisting dippers, swinging cranes and hoisting spuds; in saw mills for circular feeds; in iron-working shops for driving punches, shears and rolls; for driving concrete mixers, etc.

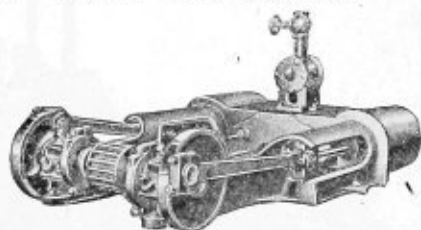


Fig. C 1435

No. of Engine	Horse Power Usually Rated	Size of Cylinders		Floor Space Required, Inches	Shipping Weight, Pounds	Price Each
		Diameter, Inches	Stroke, Inches			
36½	12	6	8	36x62	1300	\$425.00
37	18	7	9	48x68	1600	480.00
38	28	8	10	48x70	2000	640.00
310	40	10	12	62x88	4200	1055.00
310½	45	10	14	62x92	4400	1085.00

Can also be furnished with side instead of center gears.

Prices include throttle valve, oil cups and sight feed cylinder lubricator. Pinion is extra.

Single Drum Friction Hoist

For drawing cars up quarry inclines and lowering them after dumping. They may be operated from above, below or either end by adding the necessary connections.

They are very strong and serviceable and will handle heavy 7-yard cars on usual inclines.

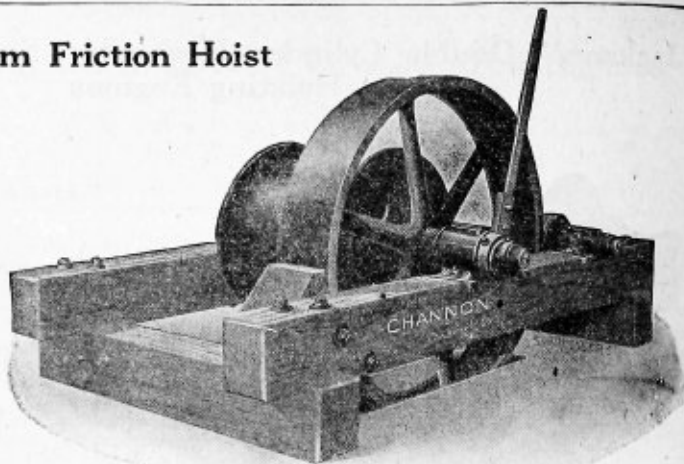


Fig. G1419

Single Frictions

Price List and Dimensions

Size No.	Maximum Hoisting Capacity, Pounds	Hoisting Speed, Ft. per Minute	Wire Rope		Pulley		Price Each
			Size, Inches	Drum Capacity, Feet	Size, Inches	Speed, R. P. M.	
10	1000	150	5/8	250	16 x 6	375	\$165.00
20	1200	150	5/8	450	16 x 6	250	186.00
30	1500	150	3/4	380	20 x 6	225	216.00
40	1800	150	3/4	450	20 x 6	194	258.00
50	2000	150	3/4	390	32 x 7	190	336.00
60	2500	150	7/8	540	20 x 7	250	408.00
70	3000	150	1 1/2	480	24 x 7	225	465.00
80	3500	150	1 1/2	580	30 x 8	194	582.00
90	4000	150	9/8	500	36 x 8	190	735.00
100	4500	150	9/8	660	40 x 10	150	826.00

Price includes drive pulley, but no rope.

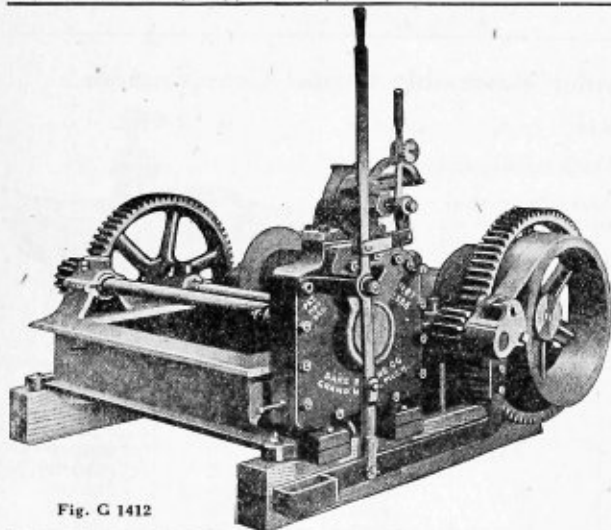
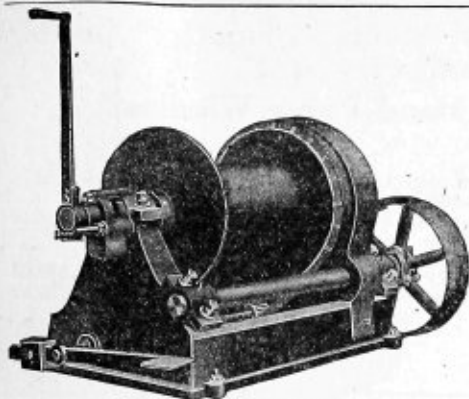


Fig. C 1412

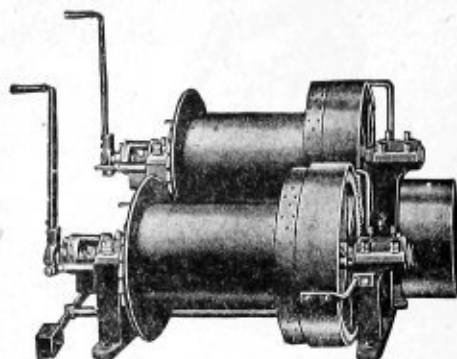
The Dake Swinging Engine

For swinging derrick booms on derricks up to about 5 tons capacity. Engine is wide enough to bolt onto skids of the ordinary hoisting engine or may be placed at the side, as desired. The engine is a Dake rotary and starts, stops and reverses at the will of operator.

No.	H. P. of Engine	Size of Drum, Diam. Length	Size of Base		Weight	Price
			Length	Ordinary Width		
3 1/2 S	7	8 x 32 1/2	42"	46"	1600 lbs.	\$275.00
4 S	10	10 x 32 1/2	52"	47"	2275 "	400.00
5 S	15	10 x 32 1/2	52"	47"	2600 "	475.00



Single Drum—Fig. G-1416



Double Drum—Fig. G-1417

“Mundy” Friction Drum Belt Hoists With Band Foot Brakes

Can be belted to any power. Adapted for derricks, pulling cars, concrete and other miscellaneous hoisting. For general description of the Mundy Cone Friction Drum see preceding page.

Lifting Capacity With Single Rope, Lbs.	Single Drum Hoist		Prices Quoted upon Application.	Double Drum Hoist		Prices Quoted upon Application.	Size of Drum		Proportion of Gearing		Size of Pulley	
	Size No. of Hoist	Shipping Weight in Lbs.		Size No. of Hoist	Shipping Weight in Lbs.		Diam. In.	Length In.	Teeth in Pinion	Teeth in Gear	Diam. In.	Face. In.
1000	1025	900		1035 1/2	1800		8	16	14	57	16	6
2000	1026	1200		1036	2200		10	20	14	60	20	6
2500	1027	2000		1037	3000		12	22	15	64	22	6
4000	1028	2500		1038	3500		14	24	16	64	24	6
5000	1030	2600		1040	4200		14	26	13	62	26	8
6500	1032	3200		1042	5000		16	30	12	57	30	8
8000	1034	4000		1044	6400		16	30	12	53	36	10
10000	1035	6000		1045	8000		18	30	13	66	40	12

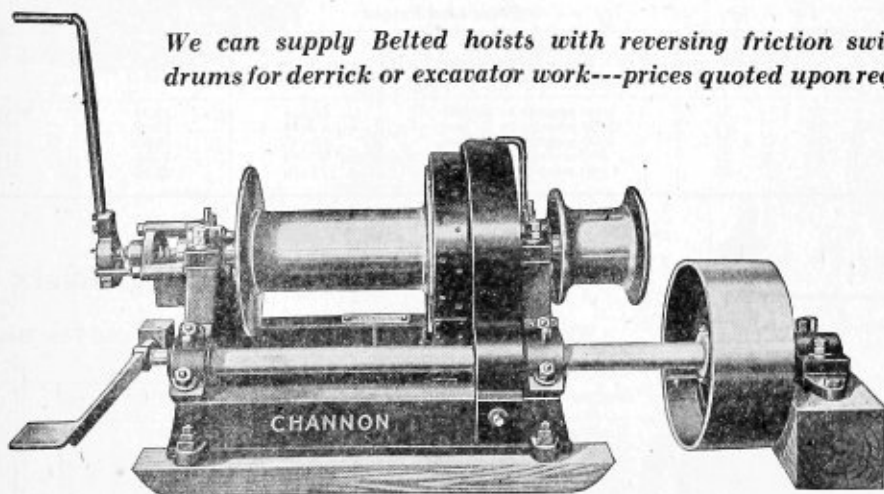
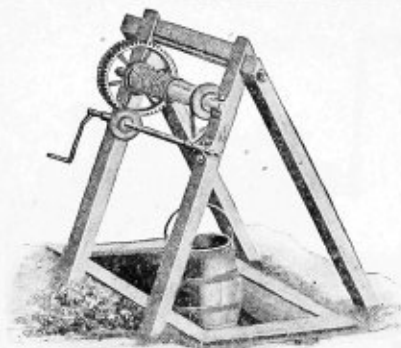


Fig. G-1418

Hoist equipped for pile driving with turned winch head and extended pulley shaft having outboard bearing. The drum is used for the hammer line and the winch head for the pile line. Belted to a gasoline engine, this makes a popular outfit for light work, requiring frequent moving. Extra price sizes 1025 to 1028. Prices Quoted upon Application.

We carry an immense stock of machinery of all kinds in our Chicago warehouse.



Hand Power Windlass

Used for prospecting, in connection with a small two cubic foot ore bucket. Manila rope is usually used.

Size of timbers, 6x6. Dia. of drum, 6 inches. Length of drum, 21 inches.

Price with timbers, complete.....\$70.00

Price iron work only.....50.00

Horse Power Hoists

Single Drum with Automatic Safety Attachment and Brake.

A horse operating a derrick working at intervals, and walking at the rate of 3 miles per hour, will exert a force of 200 pounds on a straight line over a pulley. We estimate the capacity of our machines on this basis.

This machine is frequently used for mining purposes in connection with $\frac{1}{2}$ -inch steel cable and a 5 cu. ft. capacity pressed steel ore bucket. We will quote on a complete prospecting outfit on application.

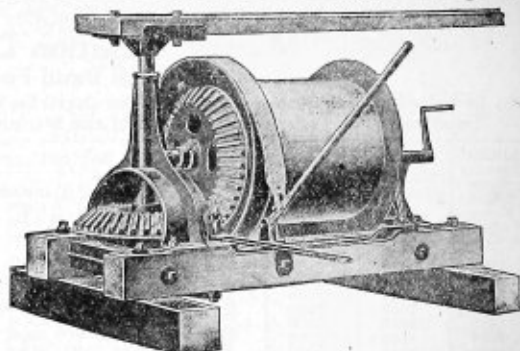


Fig. 817 No. 12 Machine

Sizes and Prices

No.	Size of Drum, Inches		Hoisting Capacity on a Single Line and Speed in Feet per Minute	Size of Bed Frame, Inches	Approximate Weight, Pounds	Price
	Diameter	Length				
11	20	22	4800 pounds at 11 feet	63x33	1500	\$175.00
12	20	22	2400 pounds at 22 feet	63x33	1500	140.00
12½	20	22	1600 pounds at 33 feet	63x36	1400	160.00
13	20	22	960 pounds at 55 feet	63x39	1300	160.00
14	20	22	960 pounds at 55 feet	72x39	2150	235.00

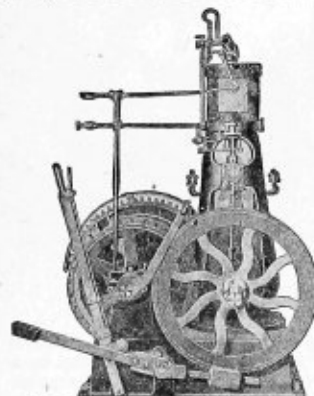


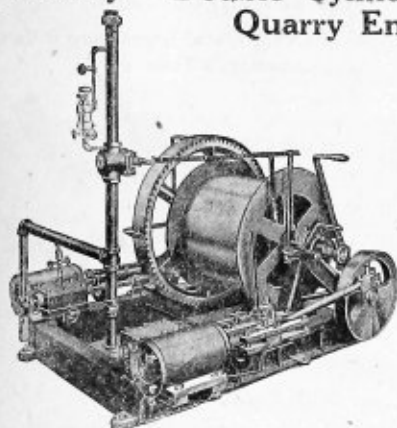
Fig. 1437 10 and 15 H. P. Sizes

"Giant" Mine Prospecting Hoists

With Single Friction Drums, Vertical Engines and Foot Brakes.

Size number.....	25	26	27
Horse power as usually rated.....	8	10	15
Cylinder, bore and stroke, inches.....	6x6	7x7	8x8
Diameter of drum, inches.....	11	20	20
Length of drum, inches.....	12	12	12
Diameter of flanges, inches.....	20	26	26
Diameter of gear wheel, inches.....	25	32½	32½
Diameter of pinion, inches.....	6	8	8
Diameter and face of band wheel, inches.....	20x5	32x2½	32x2½
Floor space, inches.....	31x38	39x15	39x45
Hoisting capacity, pounds.....	660	1200	1800
Speed in feet per minute.....	250	200	200
Approximate weight, pounds.....	1600	3650	3250
Price each.....	\$400.00	\$460.00	\$510.00

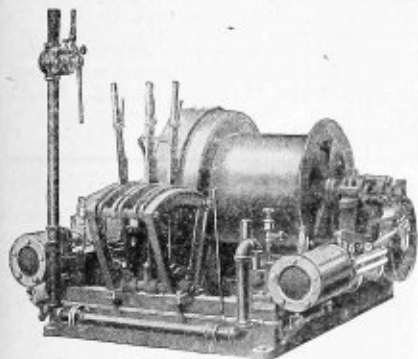
"Mundy" Double Cylinder Single Friction Drum Mining and Quarry Engine Without Boiler



Has large gearing, large friction and drum for rapid hoisting. Drum is true and well balanced, either plain or grooved for rope. Drum is also provided with band brake, operated by foot-lever.

Size No. of Engine	Horse- power Usually Rated	DIMENSIONS				Weight Hoisted, Single Rope, Average Speed, Lbs.	Estimated Shipping Weight, Lbs.
		Cylinders		Hoisting Drum			
		Diam., Inches	Stroke, Inches	Diam., Inches	Length Inches		
794	16	6½	10	24	23	2700	4410
796	20	6½	12	26	24	3300	4800
798	22	7½	10	28	26	3700	5100
800	24	7½	12	28	28	3900	5300
802	28	7½	12	30	30	4100	5600
804	32	8	12	30	30	4500	6000
806	42	8½	13	32	30	5000	7500
808	50	9	16	34	32	5500	9000
810	60	10	16	36	36	7700	11300

Double Cylinder Mine Hoisting or Haulage Engine



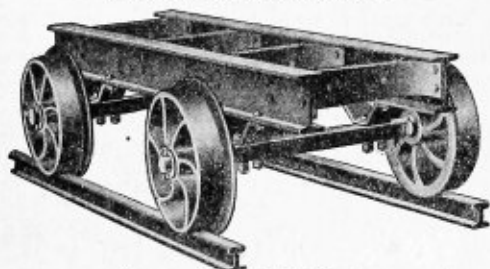
This is a combination engine, constructed with link-reversing motion, double cylinders and friction drum. It is especially adapted for hoisting from mines of different levels, also for hauling trains of cars from mines being worked with incline plain, or on a level. The drum is grooved for the rope or made with plain body and also provided with a powerful band brake, and is made to carry a large amount of rope. The link-reversing apparatus, thrust apparatus and brake are all banked in quadrant with racks and latch levers at front of engine.

The engine is of the very best construction, made strong and durable and a load can be hoisted or hauled at a rapid speed. For hoisting from a shaft two ropes can be used on the drum, thus handling two cages, one cage being lowered while the other is being hoisted from the mine.

Size Number of Engine	Horse-Power Usually Rated	DIMENSIONS				Speed will Hoist in Feet per Minute	Weight Hoisted, Single Rope, Average Speed, in Lbs.	Estimated Shipping Weight
		Cylinders		Hoisting Drums				
		Diameter, Inches	Stroke, Inches	Diameter, Inches	Length, Inches			
645	22	7¼	10	28	30	450	2500	5800
647	24	7	12	28	30	450	2800	6000
649	28	7½	12	30	36	450	3000	6500
651	32	8	12	40	36	500	3500	7800
653	40	9	10	42	40	525	3700	8500
655	42	8½	13	42	40	525	4000	9500
657	45	9	13	48	42	550	4200	10500
659	50	9	16	48	42	550	4500	12000
661	55	10	13	54	48	600	4500	13300
663	60	10	16	54	48	600	5000	14000
665	70	11	18	56	54	600	5500	16500
667	80	12	16	60	54	600	6000	18400
669	100	12	20	60	60	600	6500	20000
671	130	14	20	66	60	600	7000	28000

No. 33 Steel Billet Car

Capacity, 2 Tons
For Iron or Steel Billets, Etc.



Gauge of track, 30 Inches

Designed especially for handling light billets in iron and steel mills. Frame of 6-inch steel I-beams, length, 7 feet; width, 20 inches; four double cross trusses of steel, $2\frac{1}{2} \times \frac{1}{2}$ inches, riveted together; V-shaped at ends, and double riveted to side sills, as shown in cut; steel axles 2 inches square, wheels 16 inches diameter. Weight, 740 pounds.

Prices on application.

**Standard Mining Cage**

Size of Platform About, Feet	Capacity, Pounds	Weight, Pounds	Price
4x4	6,000	850	Prices on application
4x6	6,000	1,400	

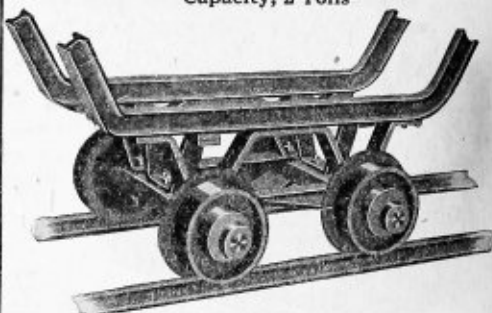
Colorado Landing Chairs
Working Parts of Forged Steel

Medium, weight, 400 pounds. Heavy, weight, 500 pounds.

Prices on application.

No. 720 Ingot Cars

For Copper or Other Metal Ingots and Billets
Capacity, 2 Tons



With Roller Bearings

Gauge of track, 18 inches; roller bearings of cold drawn steel; length between rails at top, 47 inches; width outside rails at top, $14\frac{1}{2}$ inches; height from rail to top of T-rack, $27\frac{1}{2}$ inches; rack, 20-pound T-rails; cross and side axle brackets, $2\frac{1}{2} \times \frac{1}{2}$ -inch steel; steel axles, $2\frac{1}{4}$ inches square; wheels solid web chilled face; diameter, 9 inches; face, $3\frac{1}{4}$ inches; cold drawn steel rollers, $\frac{3}{8} \times 4$ inches, 12 in each bearing. Weight 475 pounds.

Prices on application.

**Mining Cage, Leadville Type**

Built entirely of mild steel and Norway iron. All joints machined and fastened together with turned steel bolts, no rivets used. The highest type of cage for severest service.

Single-deck cage, weight 1,400 pounds. Double-deck cage, weight 2,000 pounds.

Prices on application.

Automatic End Dump Quarry Cars

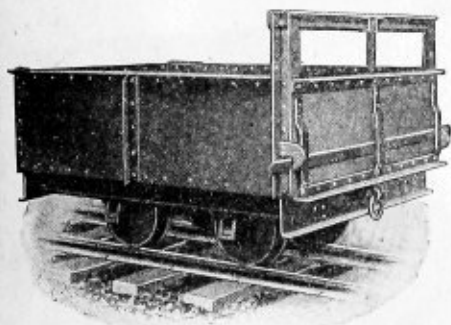


Fig. 608. Steel Car

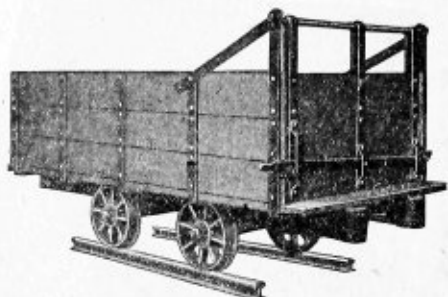


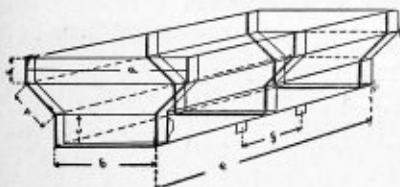
Fig. 613 Wood Car

Made in sizes 1 yard to 3 yards capacity of either steel or wood to suit purchaser's requirements. Track gauges usually 30 to 48 inches. Wood cars are of oak and may be had with steel lining if desired.

Be sure to state in inquiring for prices—Number of cars wanted; track gauge; whether all steel or wood; if wood, whether lining is wanted; if so, on bottom only or throughout inside; kind of material to be handled; kind of wheels and bearings preferred, and what limitations to size of car, if any.

Coal Mine Cars

Built to order only, of either steel or wood, to special proportions and of any gauge of track, in capacities from 20 to 80 cubic feet. We furnish plain or chilled wheels, with or without self-oiling hubs.



Dimension Diagram

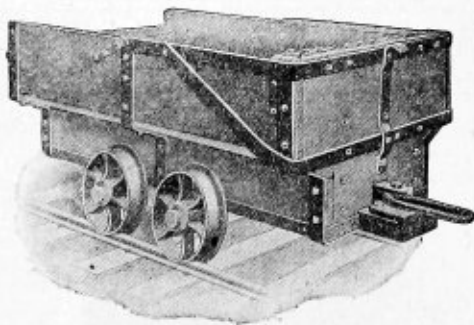


Illustration shows Style M Car, Cast or Steel Bumper

Inquiry Blank

State number and style wanted and gauge of track.

Style and diameter of wheel.

Kind of axle—square or round.

Distance "F" (centers of axles).

When wheels are tight on axles give information as to inside or outside bearings, and state kind of oil boxes desired; also give length and diameter of journal.

Capacity in cubic feet level full (about 40 cubic feet to the ton).

Distance "a" "b" "c" "d" "e" in dimension diagram.

Distance "h" when extra vertical plank is used.

Distance between bumpers of four-bumper cars.

Height that car is wooded up in rear end above bottom plank.

Thickness of bottom and side planks.

Size of iron for front, center and rear binders or belts.

Bumpers, side or center and size of iron.

Size of rear cross binder.

Diameter of hole in end of draw-bar.

Standard Steel Ore Cars

Leadville Type. Dumps at End or on Either Side. 18 Inch Gauge
(Prices on Application)

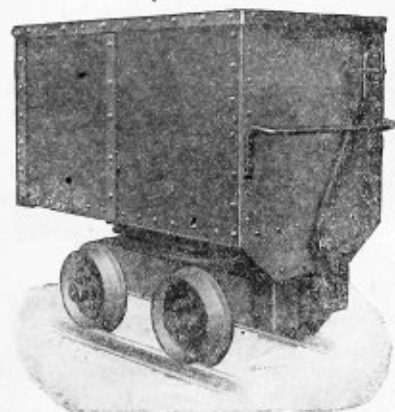


Fig. 526A
Lever Dump Ore Car

For General
Mining,
Drift or
Cage Use.

Wrought steel turntable: truck frame either of oak or steel, as specified. Wheels are chilled cast iron with extra wide tread, fitted with malleable self-oiling, dust proof caps. Axles are square steel.

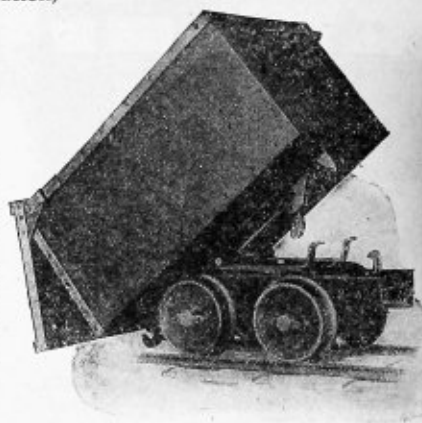


Fig. 527A
Automatic Dump Ore Car

Fig. 526A. A single lever operates the hinged door and locks the body of car frame.
Fig. 527A. The door hook is hinged to a rod, the joint sliding in a yoke. The rod is controlled by a cam lever, pivoted to its opposite end, supported by a bracket and against the face of the turntable when the car is upright.
On tipping the car body the cam lever descends, allowing the door to be opened by the weight of the load. Righting the car body securely locks the door.

Cap'y in Cubic Feet	Dimensions Over All			Body of Car			Gauge of Steel			Size of Wheels in Inches	Size Square Axles, Inches	Fig. 526A		Fig. 527A	
	Length in Inches	Width in Inches	Height in Inches	Length in Inches	Width in Inches	Depth in Inches	Sides	Bottom	Door			Car No.	Wght., Lbs.	Car No.	Wght., Lbs.
12	49	30	37	44	24	20	No. 12	No. 10	No. 10	10	1 1/4	559	460	554	495
14	49	30	40	44	24	23	No. 11	No. 8	No. 8	10	1 1/4	560	500	555	535
16	53	30	42	48	24	24	No. 10	No. 8	No. 8	10	1 3/8	561	560	556	595
20	53	36	42	48	30	24	No. 8	3/4-in.	3/4-in.	12	1 3/8	562	675	557	715
24	53	38	45	48	32	27	3/4-in.	1 1/4-in.	1 1/4-in.	12	1 1/2	563	780	558	840

Contractors' Rocker Dump Steel Cars

(Prices on Application)

Furnished with plain, babbitted, roller or brass bearings as ordered.
Charging height is about 4 inches less than overall height.

Sizes and Specifications

Cap. Ca. Ft.	Track Gauges		Overall Dimensions of Regular Gauge Cars			Dia. Wheels Ins.	Dia. Axles, Ins.	Thick. of Body Plates		Aprx. Wt. Lbs.
	Reg. ular Ins.	To Order Ins.	Length, Ft., Ins.	Width, Ft., Ins.	Height, Ft., Ins.			Sides, Ends, Ins.	Ins.	
18	24	18, 20	6-8 1/2	4-0	3-7 1/4	12	1 1/4	1 1/4	1 1/4	900
27	24	18, 20	7-6 1/4	4-2	3-11	12	1 3/4	1 3/4	1 3/4	950
40	30	30, 36	8-1	4-11	4-7	14	2	1 1/4	3/4	1425
54	36	30	8-8	5-3	4-11	14	2 1/4	3/4	1 1/4	1775

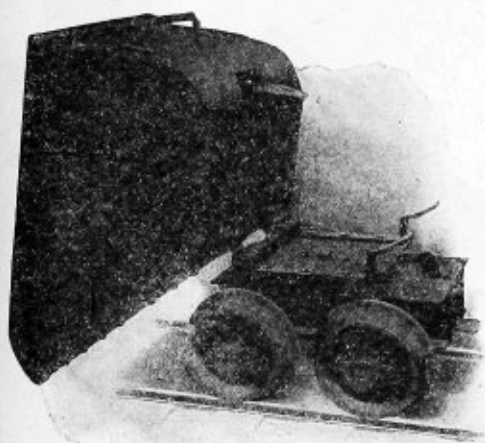
Large Size Two-Way Rocker Dump Steel Cars

For Locomotive Traction, strongly braced and reinforced throughout.
Usually furnished with spring draft rigging and cast steel drawhead.

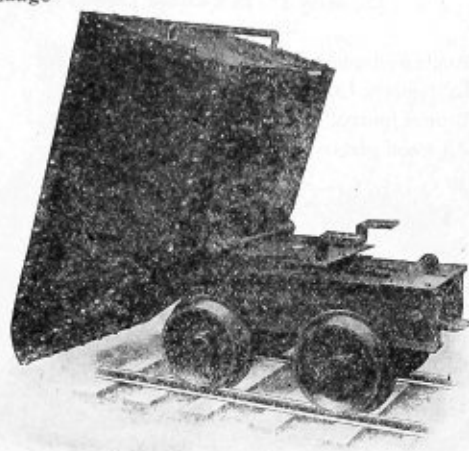
No.	Capacity, Cubic Yards	Gauge of Track, Feet, Inches	Overall Dimensions			Thickness of Plate, Inches	Diameter of Axles, Inches	Diameter of Wheels, Inches
			Length, Feet, Inches	Width, Feet, Inches	Height, Feet, Inches			
426	3	2-6	9-9	5-10	4-11	1 1/4	2 1/4	14
427	3	3-0	9-9	5-10	4-9	1 1/4	2 1/2	14
428	4	2-6	12-3	5-11	5-0	1 1/4	3	16
429	4	3-0	12-3	5-11	4-10	1 1/4	3	16
430	5	3-0	13-2	7-0	5-6 1/2	1 1/4	3 1/2	16
431	5	4-8 1/2	13-2	7-0	5-6 1/2	1 1/4	3 1/2	16

Scoop Box Rotary Steel Dump Cars

18-Inch Gauge



Nos. 572 and 573

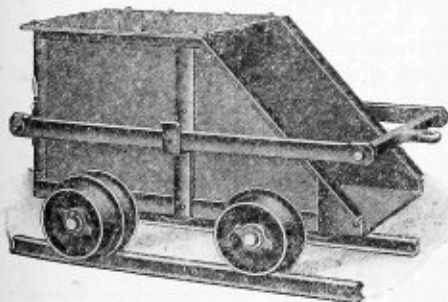


Nos. 574 and 575

Body is supported on a wrought steel turntable, and is securely locked to the truck by a treadle catch. When unlocked body is swung on its turntable, permitting the load to be dumped at the end or at either side.

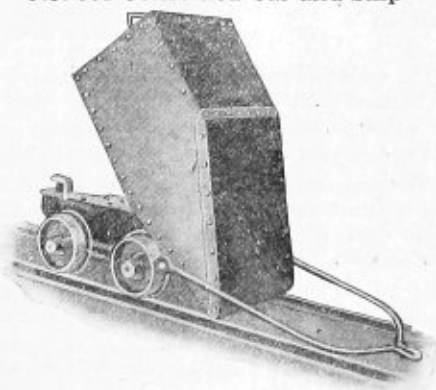
No.	Capacity, cubic feet	OVER ALL DIMENSIONS			GAUGE OF STEEL			Diameter Wheels	Size of Axles	Weight, lbs.	Price Each
		Length	Width	Height	Sides	Bottom	Door				
572	8	44	28	33	No. 12	No. 10	No. 10	10	1½ Sq.	350	\$ 90.00
573	12	47	28	39	" 12	" 10	" 10	10	1¾ Sq.	410	95.00
574	18	58	32	44	" 10	" 8	" 10	12	2 Rd.	850	106.00
575	21	58	32	48	" 8	¾ in.	" 8	12	2 Rd.	900	115.00

No. 577 Automatic Ore Skip



Capacity—12 cu. ft. or 1,300 lbs. of ore. Length of box on top 28½ in., on bottom 48 in. Width, 24 in. Depth, 22 in. No. 8 steel. Center band 2½ x ½ in., angles at corners 2 x 2 x ¼ in., and at top and opening 1½ x 1½ x ¼ in. Reinforcing plate 6 x ¼ in. at open end under bottom and turned up on sides. Ball 2½ x ¾, draft bar 1½ in. sq. Axles 1½ sq. Wheels 12 in. x 2½ tread. Gauge 24 in. Larger sizes quoted upon request. Weight, 720 lbs. Price.....\$115.00

No. 581 Combined Car and Skip



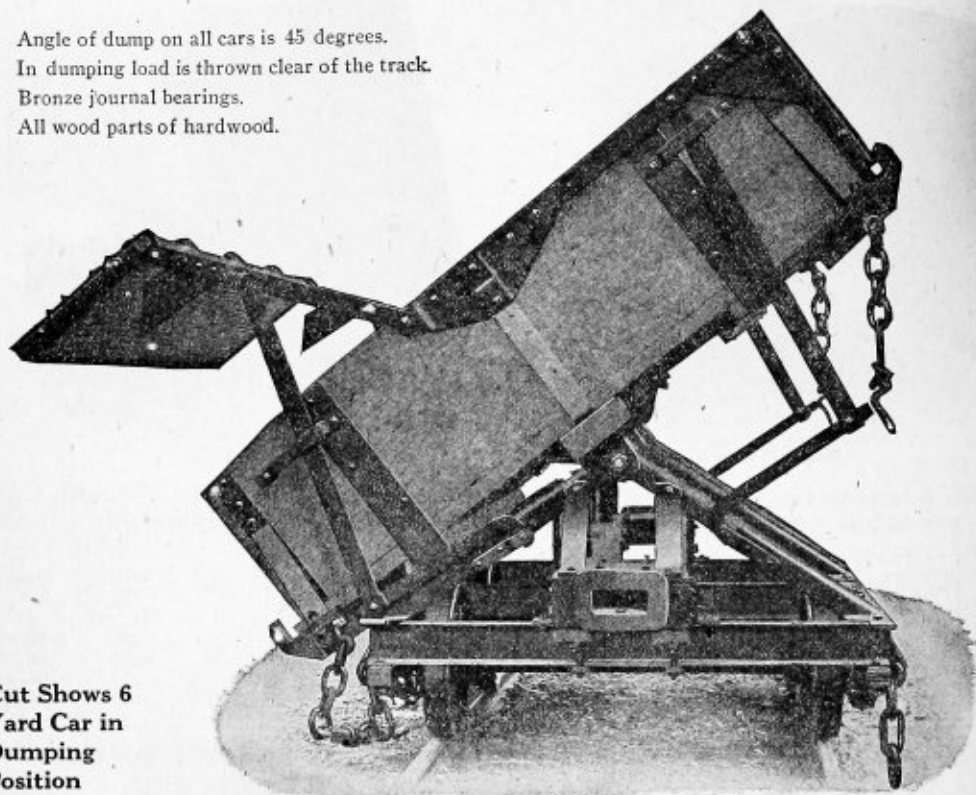
Box made of No. 12 steel. Length, 48 in. Width, 24 in. Depth, 20 in. Top band, 1½ x ¾ in. Truck frame, 5½ x ¼ in. steel. Connecting angles, 1½ x 1½ x ¾ in. 10-inch chilled face wheels on 1½ in. axles. Handle ¾ round. Ball 1 in. round. Gauge of track 18 in. Weight, 525 lbs. Price.....\$85.00

Contractors' Two-Way Dump Cars

Capacity $1\frac{1}{2}$ to 6 Cubic Yards. Level Full. For Hand or Steam Shovel Work

Angle of dump on all cars is 45 degrees.
 In dumping load is thrown clear of the track.
 Bronze journal bearings.
 All wood parts of hardwood.

Cut Shows 6
Yard Car in
Dumping
Position



The trucks of the 3, 4 and 6 yard cars are of the diamond frame type, with heavy I beam cross sills and Pressed Steel Channel Arch Braces. The wheels have faces, bronze journal bearings and springs over axles on 3-yard capacity and larger.

The $1\frac{1}{2}$ yard car has trucks of steel channels and I beams.

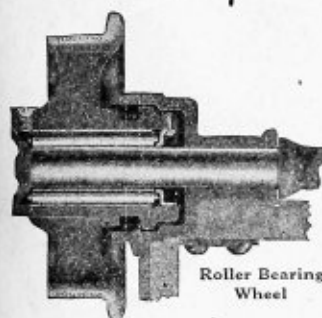
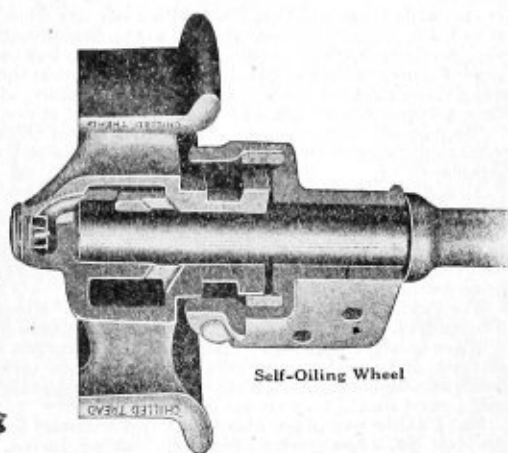
The door suspension is patented and of great importance, as it leaves the door free to swing outward if struck by rock or frozen earth, and gives a far greater dumping clearance than can be had with a rigid door, it also avoids the use of a separate lever. The door always locks when returned to carrying position.

Specifications

Code Word	Capacity, cubic Yards	Track Gauge, inches	Weight of Car, lbs.	No. of Cars to a Carload	Length of Bed Inside, inches	Width of Bed Inside, inches	Depth of Bed Inside, inches	Top of Rail to Center of Draw-Bar, inches	Top of Rail to Top of Floor, inches	Top of Rail to Top of Car, inches	Diameter of Wheels, inches	Size of Round Axles, inches	Size of Journal Bearings, inches
Preface	$1\frac{1}{2}$	36	2400	12-14	72	72	14	$20\frac{1}{2}$	39	53	16	$2\frac{1}{2}$	$2\frac{1}{8} \times 6$
Prefect	$1\frac{1}{2}$	24	2300	12-14	78	60	16	18	34	50	14	$2\frac{1}{2}$	$2\frac{3}{8} \times 5$
Probing	3	36	4600	8	96	72	20	$22\frac{1}{2}$	42	62	16	$3\frac{1}{4}$	3 x 6
Profess	4	36	5000	6	96	77	25	24	48	$73\frac{1}{2}$	18	$3\frac{1}{2}$	3 x 9
Plumage	6	$56\frac{1}{2}$	8400	3	$108\frac{1}{2}$	102	26	$27\frac{1}{2}$	55	81	24	$4\frac{1}{2}$	$3\frac{1}{2} \times 7$

Cars furnished with brakes only when specially ordered.

Mining Car Trucks

Roller Bearing
Wheel

Self-Oiling Wheel

Each Truck Consists of 4 Wheels, 2 Axles and 4 Boxes

Price per Truck

Diam. of Wheel in Ins.	Size of Round Axle in Ins.	With Roller Bearing Wheels					With Self-Oiling Wheels					Width of Tread of Standard Wheels, Inches	Approx. Weight Each Complete Truck, Pounds	Extra Wt. per Truck Each Extra Inch of Track Ga., Pounds
		24-in. Gauge	30-in. Gauge	36-in. Gauge	42-in. Gauge	48-in. Gauge	24-in. Gauge	30-in. Gauge	36-in. Gauge	42-in. Gauge	48-in. Gauge			
8	1½	\$30.20	\$30.50	\$30.80	\$31.10	\$31.40	\$23.62	\$23.76	\$23.90	\$24.04	\$24.18	3	290	1.00
10	1½	31.90	32.20	32.50	32.80	33.10	24.32	24.46	24.60	24.74	24.88	3	325	1.00
10	2	40.92	41.46	42.00	42.54	43.08	30.60	31.04	31.58	32.12	32.66	3¼	480	1.78
12	1½	34.00	34.30	34.60	34.90	35.20	27.12	27.26	27.40	27.56	27.70	3	400	1.00
12	2	43.32	43.86	44.40	44.94	45.48	32.74	33.28	33.82	34.36	34.90	3¼	560	1.78
12	2½	54.82	55.66	56.50	57.34	58.18	42.98	43.82	44.66	45.50	46.34	3½	725	2.78
14	1½	36.20	36.50	36.80	37.10	37.40	28.32	28.46	28.60	28.74	28.88	3	420	1.00
14	2	45.32	45.86	46.40	46.94	47.48	34.34	34.88	35.42	35.96	36.50	3¼	593	1.78
14	2¼	50.48	51.14	51.80	52.46	53.12	37.86	38.52	39.18	39.84	40.50	3¼	695	2.25
14	2½	56.52	57.36	58.20	59.04	59.68	43.66	44.50	45.34	46.18	47.02	3½	760	2.78
14	2¾	62.82	63.84	64.86	65.88	66.90	48.36	49.38	50.40	51.42	52.44	3½	900	3.38
15	2	46.72	47.26	47.80	48.34	48.88	35.62	36.16	36.70	37.24	37.78	3¼	680	1.78
15	2¼	51.98	52.64	53.30	53.96	54.62	39.14	39.80	40.46	41.12	41.78	3¼	715	2.25
15	2½	58.62	59.46	60.30	61.14	61.98	45.18	46.02	46.86	47.70	48.54	3½	800	2.78
16	2	47.42	47.96	48.50	49.04	49.58	37.22	37.76	38.30	38.84	39.38	3¼	655	1.78
16	2½	59.62	60.46	61.30	62.14	62.98	47.02	47.86	48.70	49.54	50.38	3½	860	2.78
16	2¾	65.82	66.84	67.86	68.88	69.90	51.80	52.82	53.84	55.20	55.88	3½	940	3.38
18	2	49.92	50.46	51.00	51.54	52.08	39.62	40.16	40.70	41.24	41.78	3¼	715	1.78
18	2½	62.32	63.16	64.00	64.84	65.68	49.50	50.34	51.18	52.02	52.86	3½	940	2.78
18	2¾	68.82	69.84	70.86	71.88	72.90	54.60	55.62	56.64	57.66	58.68	3½	1050	3.38
18	3	73.60	74.80	76.00	77.20	78.40	59.20	60.40	61.60	62.80	64.00	3½	1090	4.00
20	2½	66.72	67.56	68.50	69.34	70.08	53.60	54.34	55.18	56.02	56.86	3½	1050	2.78
20	3	78.60	79.80	81.00	82.20	83.40	62.30	63.50	64.70	65.90	67.10	3½	1260	4.00

In Ordering State

- (1) Style of truck. (2) Size of axle. (3) Diameter of wheel.
 (4) Wheel base, or distance axles are spaced apart on centers.
 (5) Track gauge (the exact distance between heads of rails inside).
 (6) State whether wheels are desired with solid center plug bolt or with patent malleable spring cage oiling device, or with old side plug.

Universal Ball Bearing Turntable

One man can operate these tables when loaded to full capacity.

The table is revolved on a serpentine circular track filled with 2, 2½ or 3-inch balls—according to the diameter. As the weight of the table is sustained only by those balls at the highest point, friction is greatly reduced. Of course the balls roll around the race course in the ordinary manner, only as they roll up and down but a few carry the weight at one time.

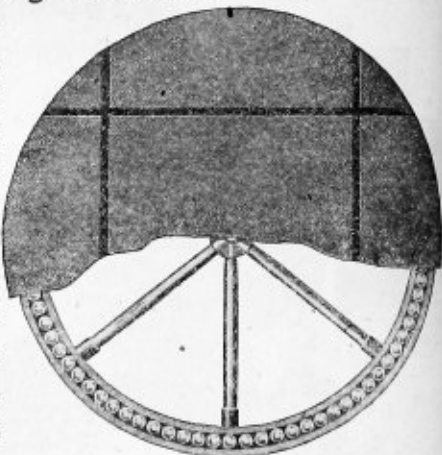
"Universal" tables are neat, strong and substantially made, weights distributed so as to reinforce parts subjected to the greatest strain.

All tables, regardless of size and style, are 6-inch in depth, allowing of their being placed in any flooring. Their construction is such—the top casting overlapping the bottom—that there are no places for dirt to accumulate. This makes the "Universal," in addition to its many other virtues, a dirt proof table.

The locking device furnished with "Universals" Nos. 2 and 3 is positive, automatic and at all times out of the way.

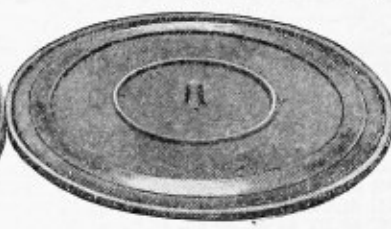
When ordering state style, number of tables required, gauge of track and wheel base of cars—or diameter of tables—if flange of wheels runs on the outside, please advise, otherwise will assume that it rests on the inside.

No. 1 table has plain checkered top without locking device. No. 2 has grooved top with locking device. No. 3 has grooved top locking device and guard rails.



Size Diameter, Feet	Gauge, Inches	Weight, Pounds			Price		
		No. 1	No. 2	No. 3	No. 1	No. 2	No. 3
2½	18 to 24	770	790	1010	\$ 58.00	\$ 64.00	\$ 79.00
4	18 to 30	1000	1040	1250	62.00	84.00	99.00
5	18 to 36	1270	1300	1525	69.00	91.00	105.00
6	18 to 48	1800	1840	2100	110.00	122.00	137.00
8	48 and upward	3480	3520	3750	280.00	290.00	310.00

"Planet" Roller Bearing Turntable



Cut Shows Top Removed

Size Diam., Inches	Gauge, Inches	Weight, Pounds			Price		
		Plain	Grooved	Raised	Plain	Grooved	Raised
42	18, 24, 30, 36 or 42, as desired	650	750	675	\$ 61.00	\$ 80.00	\$ 67.00
48		800	1000	900	74.00	96.00	90.00
60		1300	1550	1500	150.00	160.00	147.00
72		2200	2500	2400	210.00	245.00	235.00
96		4000	5700	5300	480.00	560.00	530.00

This is a very efficient and easy operating turntable. There is no tipping, no getting out of line, no trouble to keep in order and no journal friction.

Made in three types as listed, plain top, grooved and raised rail.

There is no center bearing. The entire load is on the chilled rollers, turning on roller path near the outside of the table. These rollers are conical and cannot slide or grind against each other, being held rigidly apart by spacing frame. There is only rolling friction resulting in an easily turning table. No oil is required.

Frogs for 42, 48 and 60-inch, per pair\$4.00
Frogs for 72 and 96-inch, per pair\$5.00

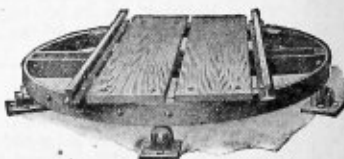
"Open-Top" Turntable

No. 960 open top turntable revolves on a center pivot and outside rollers. Is easy to operate and is durably built.

Price List

List No.	Diameter, Inches	Track Gauge, Inches	Weight, Pounds	List Price
960	42	18 to 24	230	\$34.00
960	48	18 to 30	245	37.00
960	60	18 to 36	327	46.00
960	72	18 to 48	340	49.00
960	84	18 to 48	496	60.00

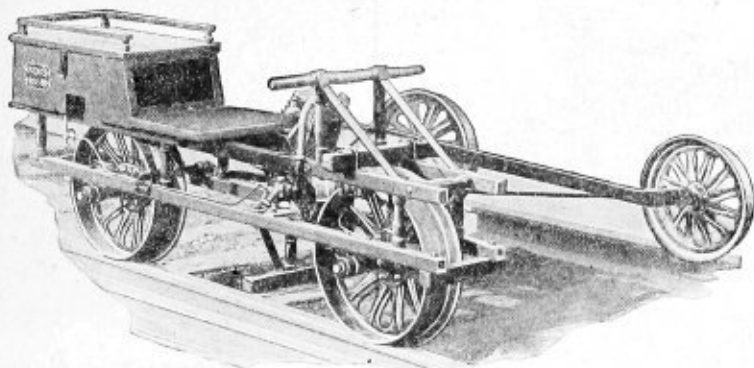
Equipped with 12-pound rail unless otherwise specified.



No. 10 Motor Velocipede

Engine $2\frac{1}{4}$ H. P. Air-Cooled. Speed 4 to 20 Miles per Hour

Can be Handled by One Man on or off Track



Gasoline Tank Holds Supply for Two Hundred Mile Run

Car is driven by a special roller chain with nickel steel rivets. Chain has a strength of 2500 pounds. Sprockets are provided with friction device so that in case of undue slack chain will not break.

The frame is of selected ash; wheel base is 46 inches; pressed steel wheels, 17 inches diameter; light and strong.

Starts without cranking. Equipped with five-cell battery and waterproof spark coil; has gravity sight-feed lubricator.

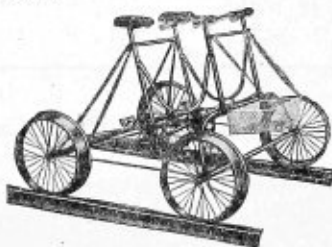
Price.....\$250.00

Four-Wheel Light Inspection Cars

Ball Bearings Throughout



Single-seated Car, Built any Gauge



Double-seated Car, Gauge 3 Feet and Larger

The single-seated car is fitted with detachable luggage basket and tool bag. Geared to suit grade conditions. The standard gear is 62; options of 52, 58 or 73. Net weight, 65 pounds. Shipping weight, crated, 100 pounds.

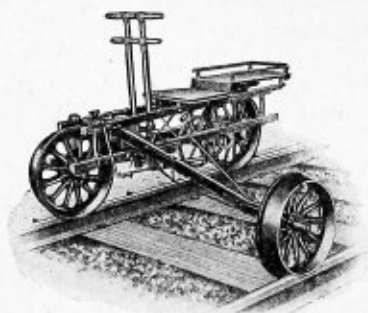
Price.....\$65.00

The double-seated car is geared same as the single-seated. Net weight, 75 pounds. Crated for shipment, 125 pounds.

Price.....\$85.00

Detachable front seat for either car; weight, 15 pounds. Extra.....7.50

Railroad Velocipedes



Light, durable and easily operated and handled.
Built of tough rock elm, with patent singleplate pressed steel wheels, with ball bearings.

No. 1 Standard

As shown by illustration above. Weight, 150 pounds.
Price.....\$70.00

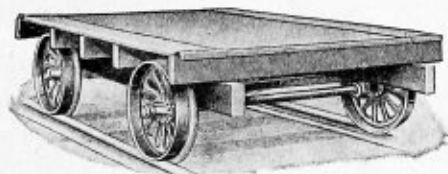
No. 2 Velocipede

For two persons. Same style as No. 1, but with seat for passenger. Weight, 158 pounds.
Price.....\$73.00

No. 3 Telegraph Car

For three persons. Can be operated by one man, if desired. Has box for carrying tools and supplies. Weight, 195 pounds.
Price.....\$90.00

No. 65 Railroad Push Cars



Extra heavy; standard gauge; platform 7 feet long by 5 feet 7 inches wide; pressed steel wheels 20 inches in diameter; machine steel axles 2 inches in diameter. Weight, 700 pounds.

Price.....\$40.00

Railroad Hand Cars

With Pressed Steel Wheels



Illustration Shows No. 1 Car

No. 1 Standard Hand Car

Standard gauge; platform 6 feet long by 4 feet 5 inches wide; wheels 20 inches in diameter; axles 1 1/2 inches diameter. Weight, 500 pounds.

Price.....\$60.00

No. 2 Bridge Gang Car

Standard gauge; platform 8 feet long by 5 feet 7 inches wide; axles 1 3/4 inches diameter. Weight, 700 pounds.

Price.....\$72.00

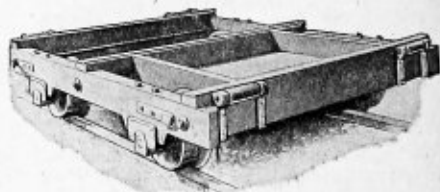
No. 5 Inspection Car

For use of roadmasters and supervisors of track, bridge builders, etc.

Same size platform as No. 1 car. Furnished with single or double end lever, as desired. Weight, 475 pounds.

Price.....\$80.00

10-Ton Track Laying or Rail Car



Standard gauge; size, 8 feet long by 6 feet 6 inches wide; chilled wheels 16 inches in diameter, with 6-inch tread; axles, 2 3/4 inches in diameter; capacity, 10 tons; sills, 4x8-inch oak; cross sills plated with iron; car fitted with chain and tool boxes, and has two rollers at each end. Weight, about 2000 pounds.

Price.....\$120.00

Hyde Hand Power Capstans

All have six holes for capstan bars. Ratio power to speed, about $2\frac{1}{2}$ to 1



These capstans are operated by men pushing against capstan bars inserted into holes shown in the head. To change from power to speed, it is only necessary for the men to walk in the opposite direction, and vice versa.

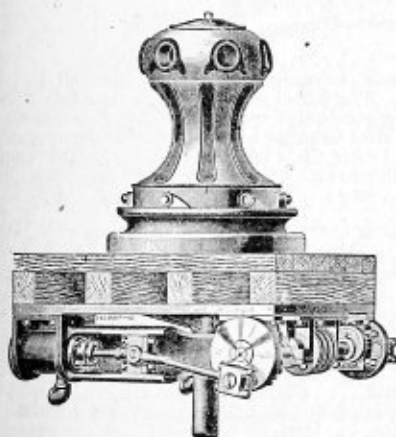
A feature of importance is that the strain is taken by both the inside as well as the outside pawls and as the inside pawls are sufficiently strong to hold the load even if the outer ones were left off entirely, the danger as well as the annoyance of "jumping" is avoided. The gears are in the lower part of the barrel where there is room to make them of ample strength.

All bearings are of composition metal and all parts are interchangeable and can be duplicated at any time.

No.	Price Each	Diameter of Barrel, Inches	Diameter of Base, Inches	Height, Inches	Approximate Weight, Pounds
7A	\$ 70.00	8 $\frac{1}{4}$	24	27	375
6B	90.00	8 $\frac{1}{2}$	26	29	500
5C	100.00	9	29	32	600
4D	120.00	10	30	34 $\frac{1}{2}$	730
3E	144.00	11	32	40	1070

Wooden capstan bars are extra. Per foot \$0.50

Hyde Steam Capstans



Showing engines bolted up under deck.
Can be set up also on deck below
as desired.

These capstans are built in a thorough manner and are superior to any others on the market. They can be used as hand capstans as well as steam capstans. The gears for obtaining power, when used as a hand capstan, are all in the base, and are of ample strength.

All bearings are bushed with composition, and all parts are made interchangeable.

The engines are simple and compact and not liable to get out of order.

The cylinders, slides and main bearing are made in one casting. All surfaces that are bolted together are planed and secured by fitted bolts.

The worm is inclosed in a cast iron casing and runs in a bath of oil, insuring perfect lubrication.

Each machine is thoroughly tested before it leaves the works.

The engines may be bolted up under deck as shown in cut, or they may be placed on the deck with reverse side up.

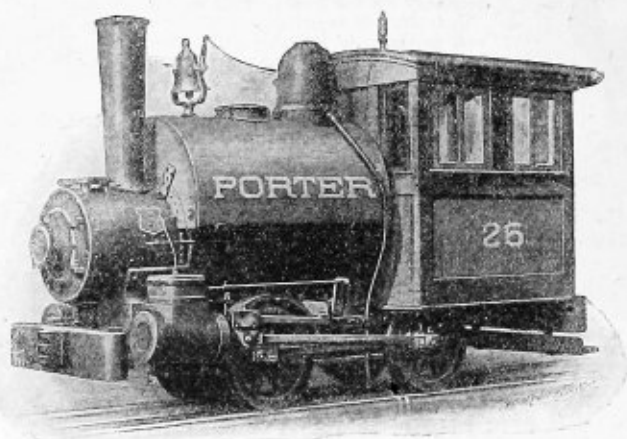
This latter plan is preferred where there is room, as all parts of engine are more accessible.

No.	Price Each, Non-reversing	Double Cylinder Engines		Diameter of Capstan Barrel, Inches	Diameter of Capstan Base, Inches	Approximate Weight, Pounds
		Diameter, Inches	Stroke, Inches			
7A	\$450.00	4	4			1190
6B	600.00	4 $\frac{1}{2}$	6	8 $\frac{1}{2}$	27	1725
5C	650.00	4 $\frac{1}{2}$	6	9	29 $\frac{1}{2}$	2250
4D	630.00	5	8	10	30 $\frac{1}{4}$	3500
3E	700.00	6	8	11	33 $\frac{1}{2}$	3900
2X		8	8	13	35	
1X		10	10	15	38	

For reversing engines with special reversible valve, advance price \$50.00.

Porter Light Saddle Tank Locomotives

New Design for Contractors, Logging, Plantations, Inside and Outside Mines, Rolling Mills, or Other Service.

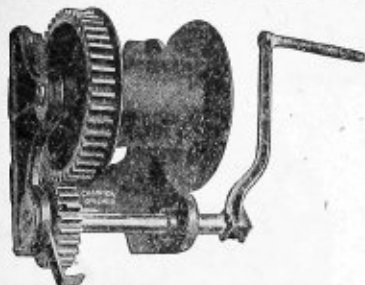


Built 30-inch Gauge and Upward

The above design is the most popular and widely used contractors' locomotive built. Kirwan and Kittel are usually kept in stock for immediate delivery for 36 inches gauge. The Kittel is the size most generally used by contractors. These locomotives are built with boilers to insurance companies' requirements, and abundantly free steaming; best forged iron frames; steel crossheads; open hearth steel forgings; best materials and workmanship and of design which is the result of 35 years' experience. All Porter Co.'s locomotives are built to exact system, and duplicate parts which will fit correctly are kept on hand in stock. These locomotives are especially adapted for industrial service, coal and ore roads, quarries, tramways, etc.

Code word.....	Kirche	Kirmes	Kirwan	Kismet	Kittel	Kittin
Cylinders, diameter, inches.....	5	6	7	8	9	10
Cylinders, stroke, inches.....	10	10	12	14	14	14
Diameter of driving wheels, inches.....	20	20	24	28	28	30
Wheel-base, feet and inches.....	4-0	4-0	4-8	5-0	5-3	4-6
Length over bumpers, feet and inches.....	11-0	11-6	12-9	14-0	15-4	16-9
Extreme height above rail, feet and inches.....	9-4	9-6	9-8	9-10	10-0	10-3
Weight in working order, all on driving wheels, pounds.....	11,500	14,000	17,500	23,000	27,000	32,000
Water capacity of tank, gallons.....	125	150	200	250	325	400
Fuel capacity, coal, pounds.....	200	200	250	300	350	450
Fuel capacity, wood, cubic feet.....	15	18	20	20	25	25
Weight per yard of lightest rail advised, pounds.....	14	16	16	20	25	30
Radius of sharpest curve advised, feet.....	30	30	35	35	40	35
Radius of sharpest curve practicable, feet.....	15	15	16	18	20	18
Boiler pressure per square inch, pounds.....	150	150	150	150	150	150
Tractive force, pounds.....	1,500	2,290	3,125	4,075	5,160	5,960
Hauling capacity, in tons of 2,000 pounds (exclusive of locomotive): On absolute level.....	235	345	470	610	775	900
On 1½ per cent grade—26 4/10 feet per mile.....	90	130	180	235	295	345
On 1 per cent grade—52 8/10 feet per mile.....	50	75	105	140	180	210
On 2 per cent grade—105 6/10 feet per mile.....	25	40	55	75	95	105
On 3 per cent grade—158 4/10 feet per mile.....	15	25	35	45	60	75

Note.—The above figures for hauling capacity are based on a frictional resistance of 6½ pounds per ton of 2,000 pounds. In practice this may run 5 to 10 pounds for good cars and track, or much higher for poor cars and track.

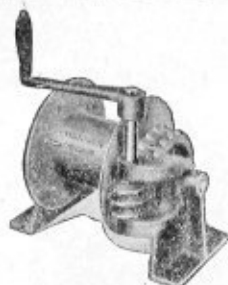


The "Junior" Winch
With Pawl Stop

The Junior is very compact and suitable for general light hoisting—is largely used for hoisting at camps. Regularly furnished with one crank or handle, but two can be furnished, if desired, at a slight extra cost.

The No. 12 Winch is worm-gear and holds the load suspended safely at any point; load cannot slip or run down—the handle must be turned to lower the load. No. 13 is the same as No. 12 except in size of drum.

Hand Power Winches

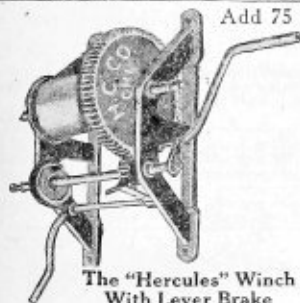


No. 12
Safety Worm-Gear Winch

Sizes and Prices

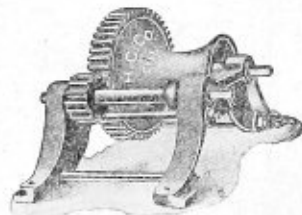
Name	Diam. and Length of Drum, Inches	Height Drum Flanges, Inches	Geared	Length of Crank, Inches	Capacity on Single Line with One Man	Size of Frame, Inches	Approx. Weight	Net Price
Junior	5 x 6	2½	45 to 25	12½	500 lbs.	9½ x 13½	70 lbs.	\$16.65
No. 12	5½ x 6	2¾	Worm	8½	750 lbs.	9 x 15½	90 lbs.	16.65
No. 13	5½ x 14	1½	Worm	8½	750 lbs.	9 x 23½	95 lbs.	18.00

Add 75 cents for extra handle for Junior winch.



The "Hercules" Winch
With Lever Brake

Arranged for
Two Speeds,
Two Cranks
Furnished

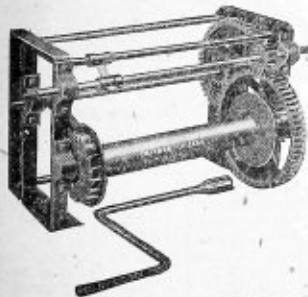


"Little Dandy" Winch
With Concave Drum

The Little Dandy Winch has spool-shaped drum, so that any length of line may be run off.

Sizes and Prices

Name	Size of Drum			Geared	Length of Cranks	Capac'y Single Line		Size of Frame	Approx. Weight	Net Price
	Diam.	Length	Flanges			One Man	Two Men			
Hercules	4½	12	1¾	45 to 17	12½	600	1200	11 x 22	100 lbs.	\$25.00
Little Dandy	3¾ at center	x 6¼	Long	45 to 17	12½	650	1300	11 x 14½	75 lbs.	18.00



Wagon Windlasses

Steel Frame—Double Purchase—Two Speeds—Drum Ratchets and Pawl

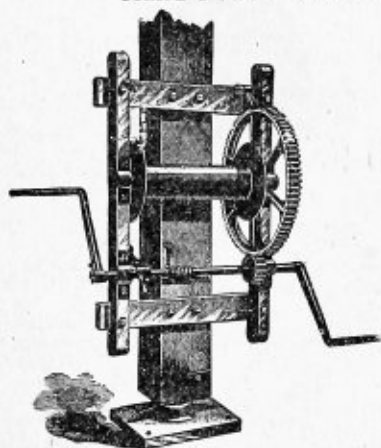
These windlasses are attached to front of heavy wagons for hauling and unloading heavy machinery, safes, stone, etc.

No.	Size of Drum		Proportion of Gearing	Capacity on Single Line, Two Men		Approx. Weight Lbs.	Net Price
	Diam.	Length		Fast Speed	Slow Speed		
2	4	28	64-14-47-16	2300	6000	500	\$64.00
4	4	28	64-12-40-12	2700	8000	625	89.35

Any length drum built to special order.

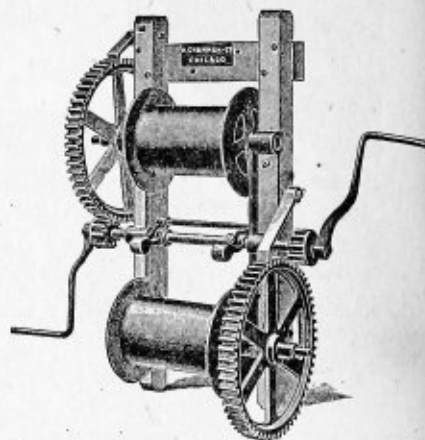
Derrick Winches or Crabs

Hand Power—Wooden Frames for Attachment to Derrick Masts



No. 20—Single Drum

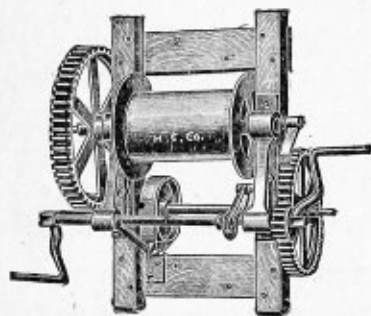
Single
Purchase
Winches,
Without
Brakes



No. 26—Double Drum

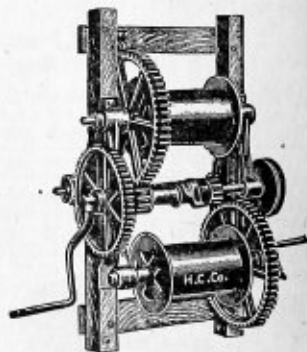
Single Purchase Winches

No. and Size	Drum Suitable for	Size of Drum		Proportion of Gearing	Capacities on Single Line with Two Men	Approximate Weight, pounds	Price
		Diameter, inches	Length, inches				
20 F	Manila Rope	4	21	84 to 12	1500 pounds	235	\$37.00
20 B	Manila Rope	6	24	67 to 12	1800 pounds	435	46.00
20 D	Wire Rope	8	17	67 to 12	1250 pounds	450	48.00
26 B	Manila Rope	6	24	67 to 12	1800 pounds	700	69.00
26 D	Wire Rope	8	17	67 to 12	1250 pounds	800	76.00



No. 25—Single Drum

Double
Purchase
Winches,
With Friction Brakes
for Lowering.
Two Speeds



No. 27—Double Drum

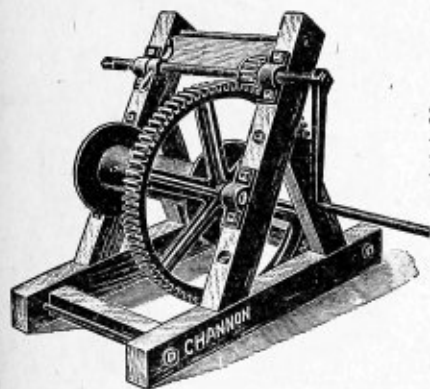
Double Purchase Winches

No. and Size	Drum Suitable for	Size of Drum		Proportion of Gearing	Capacities on Single Line with Two Men, pounds		Approx. Weight, pounds	Price
		Diameter, inches	Length, inches		Fast Speed	Slow Speed		
25 B	Manila Rope	6	24	67-40-12	1800	5600	525	\$ 86.00
25 C	Wire Rope	9	17	67-40-12	1250	3750	550	88.00
27 B	Manila Rope	6	24	67-40-12	1800	5600	700	117.00
27 C	Wire Rope	9	16	67-40-12	1250	3750	1000	127.00

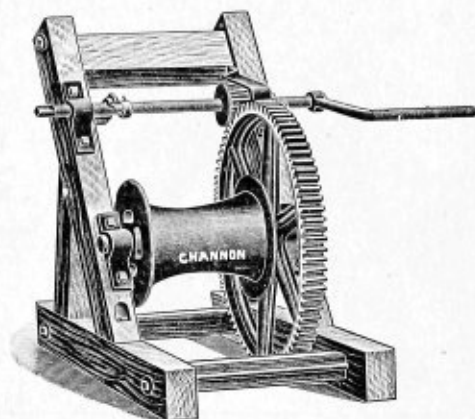
With four men, the capacity is doubled, and by use of blocks, may be still further increased.

Hand Power Winches

With Wooden Triangle Frames to be placed on ground or bolted to floor



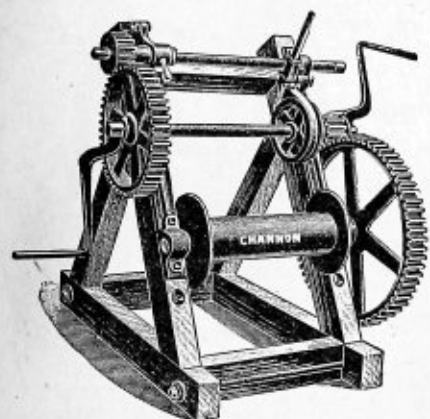
No. 18—Straight Drum

Single
Purchase
Winches

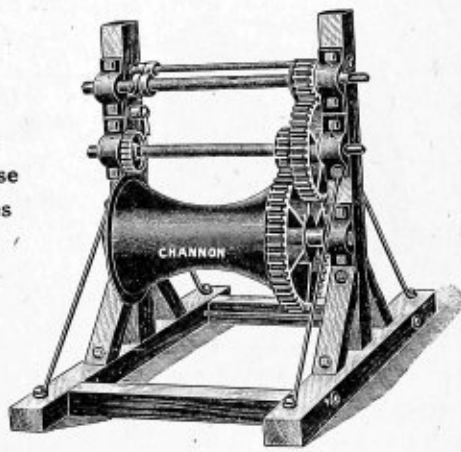
No. 25—Concave Drum—14 Inches Long

Single Purchase Winches

No. and Size	Drum Suitable For	Drum		Proportion of Gearing	Capacities on Single Line with Two Men	Approximate Weight, pounds	Net Price
		Diameter, inches	Length, inches				
18 B	Manila Rope	6	24	67 to 12	1800 pounds	510	\$56.00
18 D	Wire Rope	8	17	67 to 12	1250 pounds	515	66.00
25	Manila Rope	7 tapered to 13		67 to 12	1600 pounds	485	60.00



No. 185—Straight Drum—With Lever Brake

Double
Purchase
Winches
Two
Speeds

No. 280—Concave Drum—14 Inches Long

Double Purchase Winches

No. and Size	Drum Suitable for	Drums		Proportion of Gearing	Capacities on Single Line with Two Men, Lbs.		Approx. Weight, pounds	Net Price
		Diameter, inches	Length, inches		Fast Speed	Slow Speed		
185 B	Manila Rope	6	24	67—40—12	1800	5600	600	\$ 96.00
185 D	Wire Rope	9	16	67—40—12	1250	3750	635	100.00
280	Manila Rope	6 tapered to 12		67—40—12	1600	4800	600	90.00

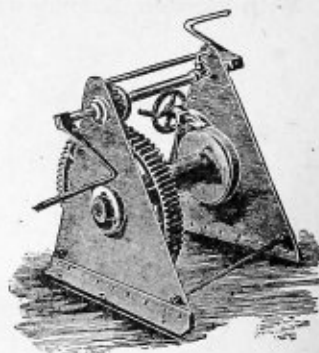
With four men, the capacity is doubled, and by use of blocks, may be still further increased.

Hand Power Crabs or Winches With Iron Frames



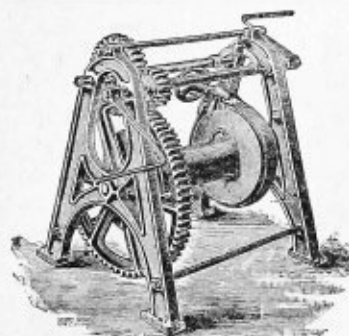
No. 29—Cast-Iron Frame
Showing Lever Brake

Single
Purchase



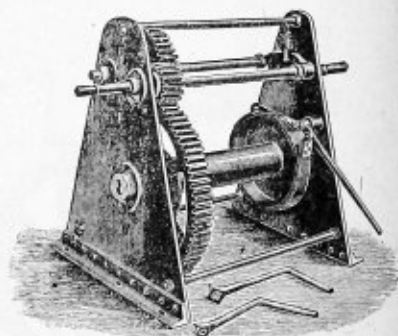
No. 31—Wrought-Steel Sides

No. and Size	Drum Suitable for	Size of Drum		Proportion of Gearing	Capacity on Single Line with Two Men	Capacity with Dou. and Triple Block	Approx. Weight, pounds	Price with Lever Brake
		Diameter, inches	Length, inches					
29 A	Manila Rope	4	21	84 to 14	3000 pounds	7	325	\$44.00
29 B	Manila Rope	6	21	72 to 14	1750 pounds	4	375	48.00
29 C	Wire Rope	8	17	72 to 14	1200 pounds	3	800	55.00
31 A	Manila Rope	4	21	84 to 14	3000 pounds	7	350	55.00
31 B	Manila Rope	6	21	72 to 14	1750 pounds	4	450	62.00
31 C	Wire Rope	8	17	72 to 14	1200 pounds	3	900	75.00



No. 30—Cast-Iron Frame,
Showing Screw Brake

Double
Purchase,
Two Speeds,
Ratchets and
Pawl



No. 32—Wrought-Steel Sides

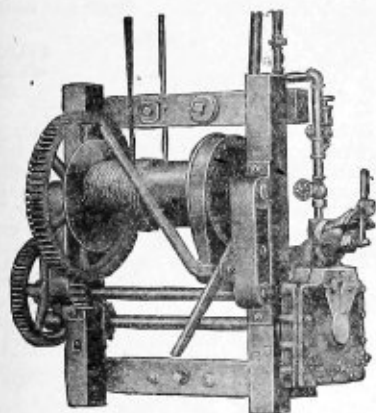
No. and Size	Drum Suitable for	Size of Drum		Proportion of Gearing	Capacity on Single Line with Two Men, pounds		Capacity with Dou. and Triple Block	Approx. Weight, pounds	Price with Screw Brake
		Diameter, inches	Length, inches		Fast Speed	Slow Speed			
30 A	Manila Rope	4	21	84—28—14	3000	5500	13	400	\$ 85.00
30 B	Manila Rope	6	24	72—28—14	1750	3200	8	575	93.00
30 C	Wire Rope	9	17	72—28—14	1200	2100	5	950	100.00
32 A	Manila Rope	4	21	84—28—14	3000	5500	13	450	100.00
32 B	Manila Rope	6	21	72—28—14	1750	3200	8	625	109.00
32 C	Wire Rope	9	16	72—28—14	1200	2100	5	1050	120.00

If wanted with Winch heads on drum shaft, add \$12.50 net each.

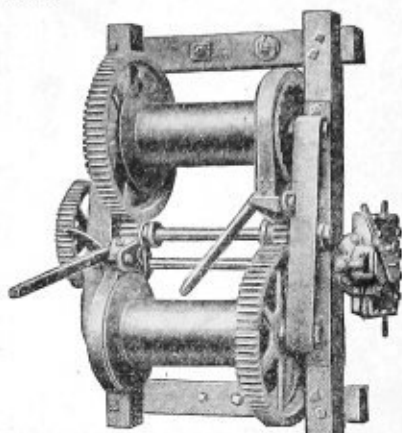
With four men, the capacity is doubled, and by use of blocks, may be still further increased.

Single and Double Drum Power Derrick Winches

For Compressed Air or Steam



Single and Double
Drum Power
Derrick Winches
For Compressed
Air or Steam



The drums are operated by a reversing motor which is attached with its main journal to the back of the iron frame. As the motor is self-contained, it cannot get out of alignment and there is very little vibration because the outer piston is the only reciprocating part of the machine.

All machines are equipped with brake bands, pawl, ratchets and levers for throwing in and out the pinions. The intermediate shafts are fitted for cranks for hand power in case of emergency when steam or compressed air is not at hand.

The winches can be furnished with an additional set of gears and pinions for faster speed at a small extra cost.

Size No.	H. P. of Motor	Max. Load Single Line, Pounds	Speed of Load, Single Line, Ft. per Min.	Weight of Crab, Lbs.		Price Each	
				Single Drum	Double Drum	Single Drum	Double Drum
2 K	3	1000	75	700	880	\$295.00	\$345.00
3 K	5	3000	50	1000	1300	\$365.00	\$440.00
3½ K	7	5000	40	1310	1400	\$440.00	\$535.00

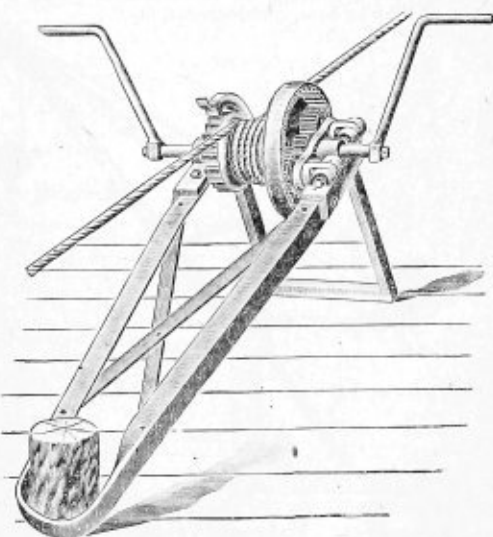
The "Duplex" Hoisting Jack or Winch

This type of winch or "Jack" as it is sometimes called is largely used for raising windmill towers during construction but can be used in many other places as well.

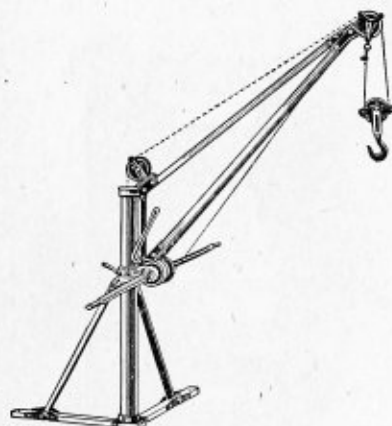
The power is multiplied 32 times so that one man exerting 50 pounds' pull on the crank can hoist about 1600 pounds.

The winch has a concave drum so that it is necessary to maintain tension on the end of the rope opposite the load while hoisting; see cut.

The drum is hinged to the frame, so that operator can tip the drum up and drop the coils of rope around it. Machine has folding legs in front, also angle steel leg that can be slipped over a post as shown; equipped also with ratchet and pawl for holding the drum, when pressure is removed from the cranks. Price, \$25.00



Steel Champion Circle Swing Builders' Derrick



Capacity 1,000 pounds, weighs only 200 pounds, can be operated by hand, horse or power. Height, 7½ feet; boom extends 5 feet. Equipped with 110 feet crucible steel cable, block, cleats, and bolts for fastening, complete ready for work.

Price, hand power	\$50.00
Price, hand and power	51.35
Extra cable, per foot .....	.07

Drum holds 135 feet.

This portable derrick is built of all steel, has self-lubricating bushings, load and boom brake. Boom can be removed in a few seconds by loosening one nut and raising 2 inches. Bottom sills and mast fold together, making it in two parts, compact enough so that a contractor can haul it to jobs in his auto.

For loads up to 1,000 pounds our Steel Champion cannot be excelled by anything on the market.

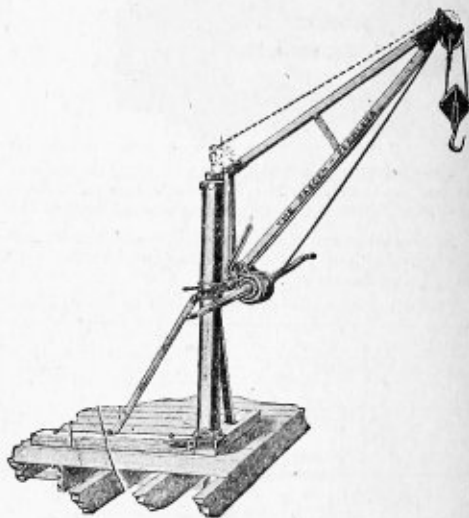
Peerless Circle Swing Steel Derrick

Capacity 1,800 pounds, weight 275 pounds, height 8 feet, swing 10 feet. Equipped with 125 feet crucible steel cable, block, cleats, and bolts for fastening, complete ready for work.

Price, hand power	\$63.00
Price, hand and power	66.00
Extra cable, per foot .....	.07

Drum holds 175 feet.

This portable derrick is built of all steel except bottom sills, has self-lubricating bushings, load and boom brake, can be used, hand, horse or power. Boom can be taken off in an instant by removing one nut. The bottom sills and mast fold together making it easy to remove or put up. Many contractors haul them to jobs in their automobiles. For the above reasons the machine is almost indispensable to contractors who build from 2 to 4 story buildings; for hoisting joists, timbers, iron, stone, terra cotta, reinforcing bars, wheelbarrows, etc.



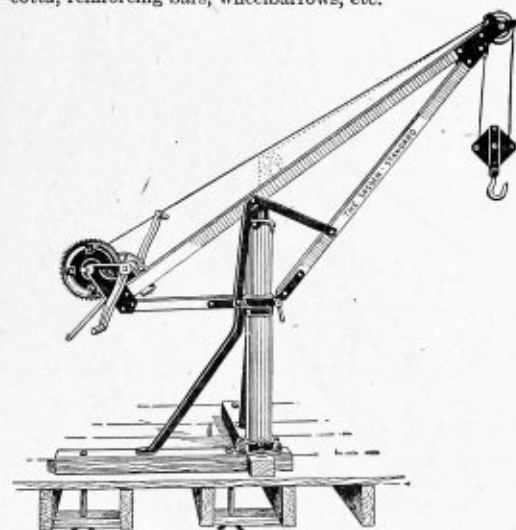
Standard Circle Swing Builders' Derrick

Capacity 2,500 pounds, weight 350 pounds, height 8 feet, swing 10 feet. Equipped with geared winch, 150 feet ¾-inch steel cable, block, cleats and bolts for fastening. Complete ready for use.

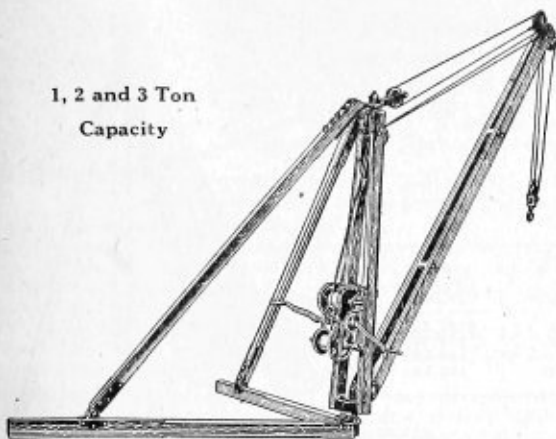
Price, hand power	\$66.00
Price, hand and power	70.40
Standard with steel boom, extra	3.00
Extra cable, per foot .....	.07

Drum holds 275 feet.

All crucible steel and malleable fittings, including winch, making it strong and safe on buildings. Has boom and load brake and is built so that the boom can be quickly detached. Mast folds to bottom sills, making it easy to take apart or set up. It has no equal for hand or power hoisting and is the only full circle swing builders' derrick of the capacity stated.



1, 2 and 3 Ton Capacity



Channon Stiff Leg Derricks

Our Stiff Legged Derricks are built with split mast and boom, fitted throughout with crucible steel fittings, making the derricks light and strong and easy to set up. They can be used by hand or power and are especially handy on buildings. Gears and frames of our double hoisting winch are also made of crucible steel, which means safety and no breaking of gears. Our 1-ton bottom sills work hinge-like in front, and can be set at angle desired.

One ton legs and sills are 4x6, split mast and boom two 3x6.

Two ton legs and sills are 6x6, split mast and boom two 2x6.

Three ton legs and sills are 6x8, split mast and boom two 3½x8.



Pole
Derrick

ONE TON CAPACITY			TWO TON CAPACITY			THREE TON CAPACITY		
Length of Boom	Equipped for Power	With double drum winch for hand and power	Length of Boom	Equipped for Power	With double winch for load and boom, also for power	Length of Boom	Equipped for Power	With double winch for load and boom.
12 ft.	\$117.50	\$147.00	18 ft.	\$161.50	\$205.50	20 ft.	\$242.00	\$286.00
14 ft.	120.00	149.50	20 ft.	169.00	213.00	22 ft.	250.00	293.50
16 ft.	123.50	153.00	22 ft.	176.00	220.00	24 ft.	257.00	301.00
18 ft.	126.50	155.50	24 ft.	183.50	227.50	26 ft.	264.00	308.00
20 ft.	129.00	158.50	26 ft.	191.00	235.00	28 ft.	279.00	323.00
22 ft.	132.00	161.50	28 ft.	206.00	250.00	30 ft.	293.50	337.50
24 ft.	135.00	164.50	30 ft.	220.00	264.00	32 ft.	308.00	352.00
						34 ft.	323.00	367.00
						36 ft.	337.50	381.50
						38 ft.	352.00	396.00
						40 ft.	367.00	411.00

Channon Pole Derricks

Capacity, 1,400 lbs., with winch not geared, or 2,500 to 3,000 lbs., equipped with geared winch. Weight from 200 to 300 lbs., according to capacity. Built of 5½x5½ selected wood with extension sheave frame, so that the load can be hoisted to top without scraping hole. Equipped with rollers at the bottom, winch, cable, and block, complete ready for hoisting. No guy lines.

Capacity 1,400 lbs. 18 ft. \$38.50
Equipped with 110 ft. cable 20 ft. 40.50
Block, winch not geared . 22 ft. 41.50
Capacity 2,500 to 3,000 lbs. 18 ft. \$46.50
Equipped with 125 ft. cable 20 ft. 48.00
Block, geared winch. 22 ft. 49.50

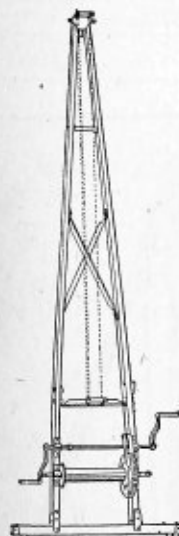
If longer lengths are desired add \$1.50 per ft. Fish tackle to swing derrick out and in, containing 5 blocks and 50 ft. ½-in. rope, \$5.00.

Channon Setter Derricks

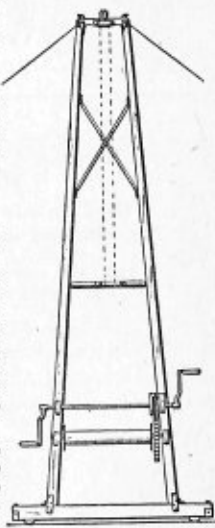
Have many improvements over the old style Setter Derricks. The top frame made of the best malleable iron, and equipped with two sheaves—does away with the block on top, and increases the hoisting height about two feet—is extended forward which enables one to hoist the load without scraping the derrick. Have lugs for guy lines in front and back and also clamps for fastening extension pole. The shaft boxes are so constructed that the drum and gear shafts can be taken off without removing boxes. The bottom and side pieces are connected with two malleable castings. This makes a very strong connection and enables one to take it apart if necessary. The derricks are equipped with steel gears and both are built on the same order, with the exception that the Top Point is considerably lighter and side timbers come to a point at the top.

	Capacity	Length	Price		Capacity	Length	Price
Top Point.	3000	18	\$48.40	Regular.	4000	18	\$56.00
Setter.	3000	20	\$1.50	Setter.	4000	20	\$9.00
Derrick.	3000	22	\$4.50	Derrick.	4000	22	\$2.00

If longer lengths are desired, add \$1.50 per ft. For more capacity, add \$3.00 per 1,000 lbs. Fish tackle to swing derrick out and in containing 5 blocks and 50 ft. ½-in. rope, \$5.00.



Top Point
Setter's Derrick



Regular
Setter's Derrick

No. 17 Sulky Trench Derrick

A Portable Derrick for Laying Sewer and Water Pipe

The rear leg folds back, allowing the whole derrick to be transported on the wagon wheels shown—can be hitched to the back of any wagon—pulled through the streets on its own wheels and is quickly set up again ready for work.

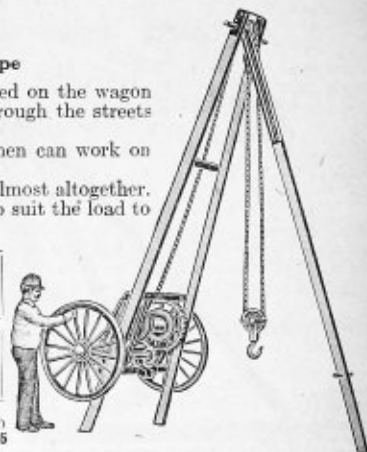
The wagon wheels act as cranks with long leverage and several men can work on each side. Winch has lever brake.

Chain is shown in illustration but wire or manila rope is now used almost altogether.

A two part tackle is shown but any number of parts may be used to suit the load to be handled.

Size No.	Height, Feet	Size of Timber, Inches	Size of Drum, Inches	Capacity Single Line, Pounds	Price without Chain or Block
17A	12	4x4	4x21	2200	\$121.35
17B	12	4x6	5x24	2000	132.60
17C	12	6x6	5x30	2400	146.65
17D	16	6x6	5x30	2400	160.00

Traveling wheels—for moving lengthwise of the ditch together with bottom cross-brace, extra.....\$16.65

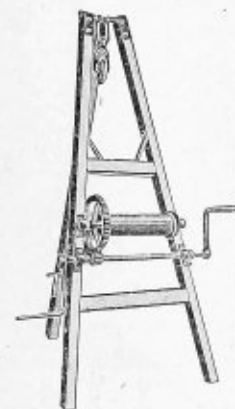


No. 27 Folding Wood Tripod Derrick

This derrick is similar to the one above but has hand cranks for two men instead of wagon wheel cranks.

Largely used in cities for hoisting out of man-holes, sewer and pipe line trenches, caisson holes, etc.

Can be supplied with wheels at bottom of legs for traveling—see extra price below.



Size No.	Height of Timbers, Feet	Size of Timbers, Inches	Diameter and Length of Drum, Inches	Capacity for Two Men on Single Line, Pounds	Price of Ironwork only, No Timber, Blocks or Rope	Price with Ironwork Attached to Timbers and Painted, No Rope or Blocks
27A	16	3x6	4x21	1500	\$ 57.35	\$ 65.00
27B	20	4x6	6x21	1600	66.65	94.00
27C	24	4x6	6x26	1600	80.00	105.00
27D	28	4x6	6x30	1600	100.00	112.00

Traveling wheels for moving lengthwise of the ditch, extra.....\$16.65
Blocks and ropes are priced elsewhere in this catalog.

No. 118 Channon Portable Folding Pipe Tripod Derrick

Used by Safe Movers, Marble Works, Cemeteries, Etc.

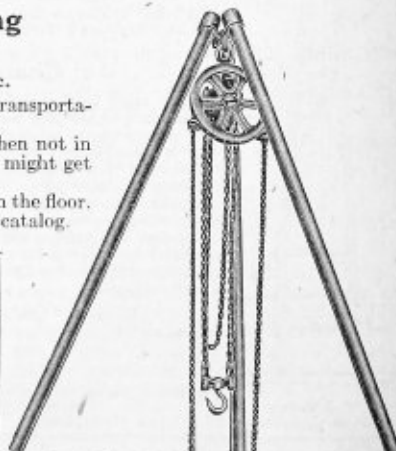
These derricks are made of pipe and can be folded together for transportation.

They are light, convenient to handle and take up little room when not in use—they are always ready, as nothing has to be taken apart that might get lost.

The bottom of each leg is supplied with spikes, giving a firm grip on the floor.

Prices do not include chain hoist which is priced elsewhere in this catalog.

No.	Capacity, Pounds	Length Folded, Feet	Weight, Pounds	Price without Chain Hoist
118A	1,000	12	68	\$16.50
118B	2,000	12	90	20.00
118C	4,000	12	120	24.50
118D	6,000	14	165	33.35
118E	12,000	14	285	49.35
118F	16,000	16	375	70.00
118G	20,000	16	425	80.00
118H	30,000	16	450	86.00



Chain Hoists of all kinds are listed in another section.

Channon Derricks

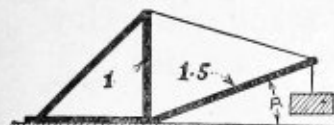


FIG. 611

Channon derrick irons are of simple design and well proportioned throughout—care has been taken to make the wood work as simple as possible, so that men of ordinary skill can readily fit the irons to the timbers.

The capacity of a derrick depends upon so many things that we cannot quote intelligently unless we have all the information asked for at the bottom of this page.

The capacity depends upon the size and also the quality of the timbers used—for ordinary lengths our irons are stronger than the timbers—where the booms are long, larger timbers are necessary. The ratio between the length of the boom and the height of the mast also determines the capacity—our ratings are usually based upon a ratio of boom to mast of 1.5 to 1 with the boom about 15 degrees from the horizontal as shown by Fig. 611—shortening the mast lowers the capacity—increasing the length of the boom above this ratio does the same.

The number of sheaves in the fittings or blocks is determined by the capacity of the engine or winch to be used—it is usual to allow one, or better, two more lines in the boom topping lift to allow for the weight of the boom and its fittings, blocks, chain slings, etc.

We furnish all derrick irons with our self-lubricating graphite-plug bronze bushings (described below), unless otherwise specified.

We furnish complete derrick outfits, comprising engines, winches, derrick irons, bull-wheels, wire rope, rope clips and thimbles, and while we show only a few styles in this book we can make up any combination desired in a few days.

Bushing of Sheaves



Self-Lubricating,
Graphite-Plug
Bronze Bushing

Tests of common bushed sheaves have shown a loss of power through friction to be as high as 12 per cent of the weight carried by each sheave—the same tests showing but 5% loss when our self-lubricating bushings were used. Our bushings require no oil or attention and are suitable for heavy loads and high speeds.

This bushing is a casting made of a hard phosphor-bronze composition with drilled holes filled flush with a special graphite, or plumbago, lubricant baked in.

When a bushing is worn out another can be obtained at small cost, saving the cost of a new sheave.

These bushings are listed separately in another section.



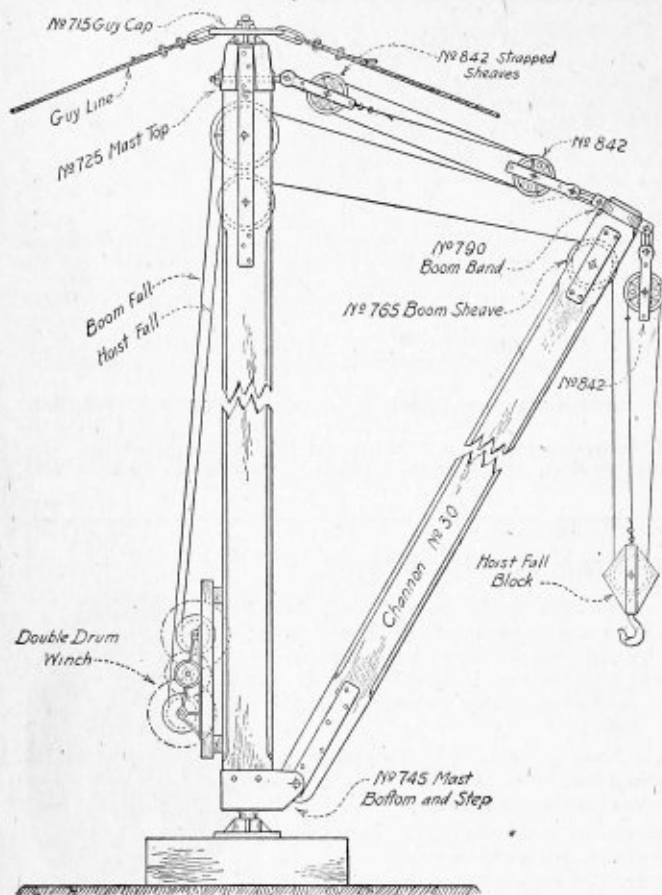
Information Necessary

When Writing for Prices on Derricks Be Sure and Give All the Information Requested Below
It Will Save Trouble and Time

Quote price on.....derrick similar to
No.....page.....the heaviest load to be.....tons.
Length of boom will be.....feet. Size of mast timber will be.....inches square.
Name price including { Hoisting Engine
Horse Power
Hand Power Crab
Boom and Fall Ropes
Guys* } Credit out
what you
don't want We will use { Say whether
Hand Power
Horse Power
Steam Power or
Electric Power }power.
Derrick to be used for.....
Unusual conditions if any.....
Changes if any.....

Under no circumstances do we guarantee derrick irons or machinery unless specifically agreed upon in writing. Any parts proving defective will be replaced, provided they are tested immediately after delivery and notices of defects given us promptly; but in no case do we assume responsibility for any delay or damage.

Be sure to give all the information asked for.



No. 30 Channon Hand Power Guy Derrick

This is the simplest form of derrick—consisting of only two sticks—the mast and the boom.

It is easily set up and can be quickly moved from place to place.

The combination of irons shown is the lowest priced we make on account of using strapped sheaves instead of blocks in all except in hoist fall block—a flat bolted band in boom point, No. 715 Guy Cap, simplest form of mast bottom, etc.

A single drum winch can be used instead of the double drum shown, in this case the boom line is usually of Manila rope and the line fastened to a cleat at the back of the mast.

We can furnish Manila rope sheaves throughout, but wire rope is recommended as being more satisfactory in the long run.

Each guy rope is usually three or four times the height of the mast, depending upon the contour of the ground and the location of the "dead-men." Guys are usually galvanized steel of 6 strand, 7 wire construction.

Booms should be 4 to 8 feet shorter than the mast to clear the guy ropes. Sheaves listed are self-lubricating bronze bushed.

Prices of Iron Work—Without Timber, Winch, Rope or Clips

Size of mast timber.....Inches	8x8	10x10	12x12	14x14	16x16
Size of boom timber.....Inches	6x6	8x8	10x10	12x12	14x14
Nominal capacity.....Tons	1½	3	6	10	15
Longest mast (without truss rods).....Feet	32	40	45	55	64
Longest boom (without truss rods).....Feet	28	36	40	48	58
Size of guy ropes and number required.....	1½"-4	¾"-4	1"-5	1½"-5	1¾"-6
One No. 725 Mast top casting with gudgeon pin and collar straps to mast, wrought eye-bolt, and two sheaves with shafts.....	\$ 32.00	\$ 37.20	\$ 45.20	\$ 56.80	\$ 95.00
One No. 715 Guy cap with forged ring and links.....	8.00	10.00	13.35	19.80	24.00
One No. 745 Mast bottom casting with step, straps to boom and boom shaft.....	24.00	28.00	38.70	52.00	90.00
One Fig. 790 Split boom band with two links.....	6.60	8.00	9.35	20.00	22.40
One No. 765 Boom end sheave with pin and side plates.....	9.40	11.00	12.00	14.70	17.60
All necessary bolts for above ironwork are included.					
Boom Fall:—Two No. 842 Strapped sheaves, one single and one double.....	21.00	27.00	33.35	40.00	56.30
Hoist Fall:—One No. 842 Single strapped sheave.....	8.00	10.00	13.00	17.85	22.30
and one single hoist fall block with swivel hook.....	10.00	12.00	13.90	30.70	35.20
Total of above Iron work.....	\$119.00	\$143.20	\$178.85	\$251.85	\$362.80

Above prices include self-lubricating sheaves. Deduction for plain sheaves—see separate list of derrick parts. Winches, Guy ropes with take-ups, Hoist Lines, Clips and Thimbles are priced in other sections of this Catalog.

No. 31 Channon Combined Hand and Power Guy Derrick

Same remarks apply as on our No. 3. This is a popular derrick where the raising or lowering of the boom take place but few times a day as in a quarry—the hoisting line may be operated by any single drum power hoist.

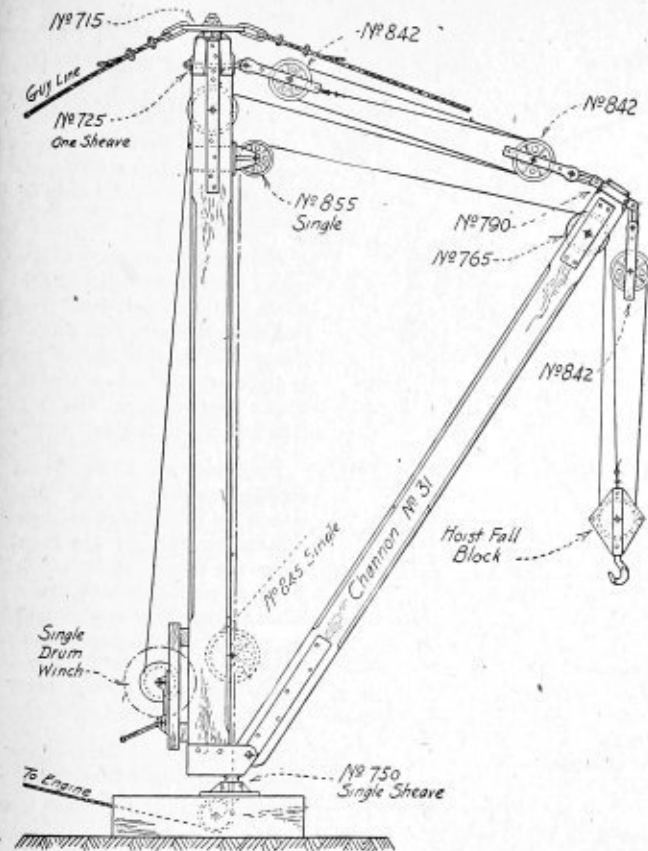
The single drum winch may be single or double purchase—depending on the load.

Same may prefer to run the hoist line down the boom—in this case use No. 749 center pintle mast bottom and No. 845 single mast sheave (shown dotted) at the base of the mast.

This style of derrick can be arranged with other styles of mast bottoms, boom points, etc. Shown in the pages following.

On level ground the guy ropes are usually three times the height of the mast.

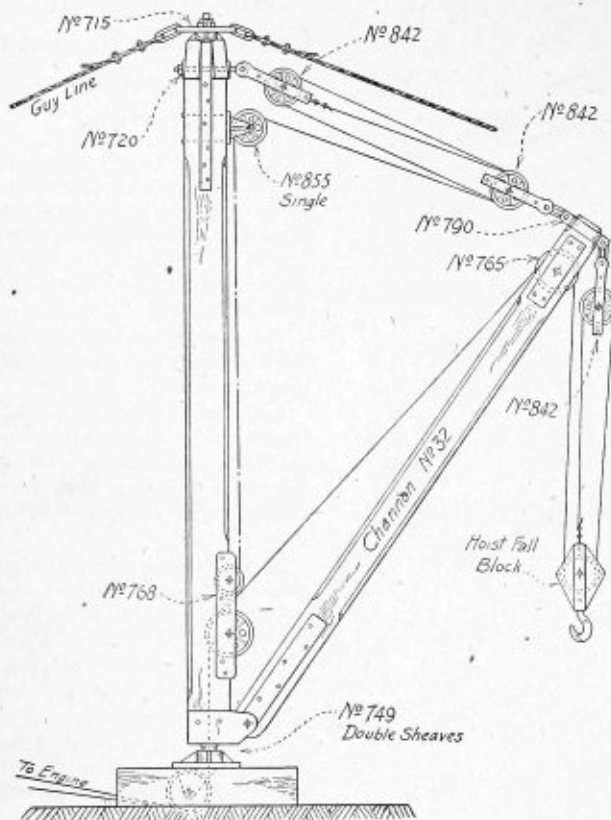
Booms should be 4 to 8 feet shorter than the mast to clear the guys. Sheaves listed are all self-lubricating bronze bushed.



Prices of Irons—Without Timber, Winch, Rope or Clips

Size of mast timber.....	Inches	8x8	10x10	12x12	14x14	16x16
Size of boom timber.....	Inches	6x6	8x8	10x10	12x12	14x14
Nominal capacity.....	Tons	1½	3	6	10	15
Longest mast (without truss rods).....	Feet	32	40	45	55	64
Longest boom (without truss rods).....	Feet	28	36	40	48	58
Size of guys and number required.....		1½"-4	¾"-4	1"-5	1½"-5	1¾"-6
One No. 725 Mast top casting with gudgeon pin and collar, wrought eye-bolt, straps to mast and single sheave with shaft.....		\$ 30.00	\$ 30.65	\$ 38.65	\$ 50.65	\$ 88.00
One No. 715 Guy cap with forged ring and links.....		8.00	10.00	13.35	19.80	24.00
One No. 750 Mast bottom casting with step and single sheave, straps to boom and boom shaft.....		30.00	31.35	50.65	66.65	100.00
One No. 855 Single mast sheave with brackets.....		12.00	12.50	13.85	16.00	18.65
One No. 790 Split boom band with two links.....		6.60	8.00	9.35	20.00	22.40
One No. 765 Boom end sheave with pin and side plates.....		9.40	11.00	12.00	14.70	17.60
All necessary bolts for above ironwork are included.						
Boom Fall:—Two No. 842 Strapped sheaves, one single and one double.....		21.00	27.00	33.35	40.00	56.30
Hoist Fall:—One No. 842 Single strapped sheave.....		8.00	10.00	13.00	17.85	22.30
and one single hoist fall block with swivel hook.....		10.00	12.00	13.90	30.70	35.20
Total of above iron work.....		\$135.00	\$162.50	\$198.10	\$276.35	\$384.45

Above prices include self-lubricating sheaves—deductions for plain sheaves—see separate list of derrick parts. Engine, winches, guy ropes, take-ups, hoist lines, clips and thimbles are priced in other sections of this catalog.



No. 32 Channon Power Guy Derrick

This derrick is fitted with a double sheave step so that both boom and hoist fall lines can be handled by power.

The mast bottom shown has a center pintle but we can furnish offset pintle so that both lines lead down the face of the mast—this avoids cutting the bottom of the mast which saves time in fitting and leaves the full strength of the timber.

For quick work we would recommend one of our bull-wheels to be attached to the bottom for swinging the boom by power instead of by one or two men pulling on hand lines—when arranged with power swinging attachment the engineer can hoist and swing the load into place, in the same time it would take to hoist the load only.

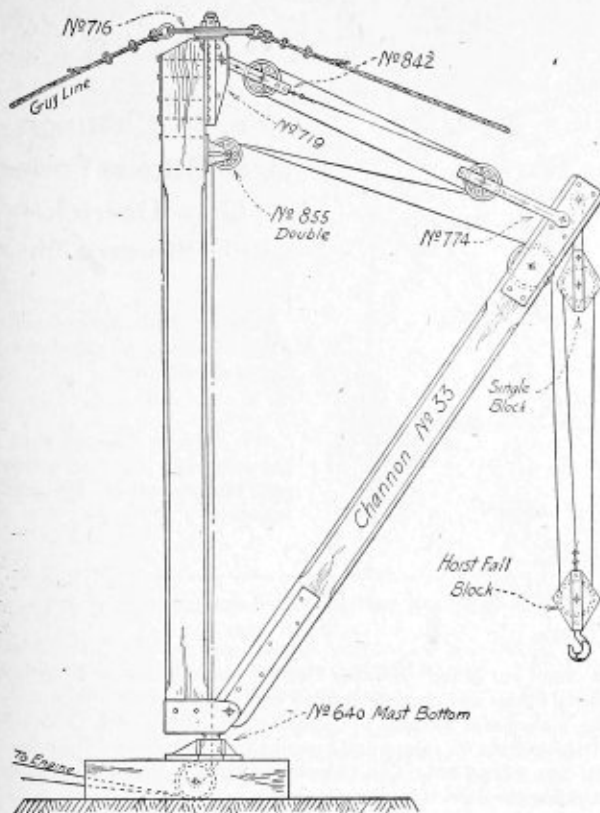
On level ground the guys are usually three times the height of the mast.

Sheaves listed are all self-lubricating bronze bushed.

Prices of Irons—Without Timber, Rope or Clips

Size of mast timber.....Inches	8x8	10x10	12x12	14x14	16x16
Size of boom timber.....Inches	6x6	8x8	10x10	12x12	14x14
Nominal capacity.....Tons	1½	3	6	10	15
Longest mast (without truss rods).....Feet	32	40	45	55	64
Longest boom (without truss rods).....Feet	28	36	40	48	58
Size of guys and number required.....	1½"-4	¾"-4	1"-5	1½"-5	1¾"-6
One No. 720 Mast top casting with gudgeon pin and collar, wrought eye-bolt and straps to mast.....	\$ 26.40	\$ 29.00	\$ 31.40	\$ 45.00	\$ 72.50
One No. 715 Guy cap with forged ring and links.....	8.00	10.00	13.35	19.80	24.00
One No. 749 Mast bottom casting with step and double sheaves, straps to boom and boom shaft.....	33.75	40.00	56.20	73.35	110.00
One No. 855 Single mast sheave with brackets.....	12.00	12.50	13.85	16.00	18.65
One Set No. 768 Mast sheaves with side plates and shafts.....	14.55	18.70	30.35	38.50	52.00
One No. 790 Split boom band with two links.....	6.60	8.00	9.35	20.00	22.40
One No. 765 Boom end sheave with pin and side plates.....	9.40	11.00	12.00	14.70	17.60
All necessary bolts for above iron work are included.					
Boom Fall:—Two No. 842 Strapped sheaves, one single and one double.....	21.15	27.00	33.20	40.00	56.30
Hoist Fall:—One No. 842 Single strapped sheave.....	8.00	10.00	13.00	17.85	22.30
and one single hoist fall block with swivel hook.....	10.00	12.00	13.90	30.70	35.20
Total of above iron work.....	\$149.85	\$178.20	\$226.60	\$315.90	\$430.95

Above prices include self-lubricating sheaves—deduction for plain sheaves—see separate list of derrick parts
Guy ropes, guy take-ups, hoist lines, clips and thimbles are all priced in other sections of this catalog.



No. 33 Channon Improved Power Guy Derrick

This improved type of guy derrick has structural steel mast top, improved steel boom point, plate steel guy cap and a ball and socket mast step.

The derrick swings easily whether the mast is out of plumb or not—this step has oil reservoir and gib keys to prevent the mast from "kicking" out of the step—the bearing surfaces of this step are always in contact even with the mast out of plumb.

The bottom pintle is off-set as is the gudgeon pin allowing the lines to pass straight down the face of the mast—there is no cutting of the derrick timbers except for the boom point sheave.

We can furnish a center pintle mast bottom for those who desire it—see separate derrick parts.

For quick work we recommend a bull wheel and power swing.

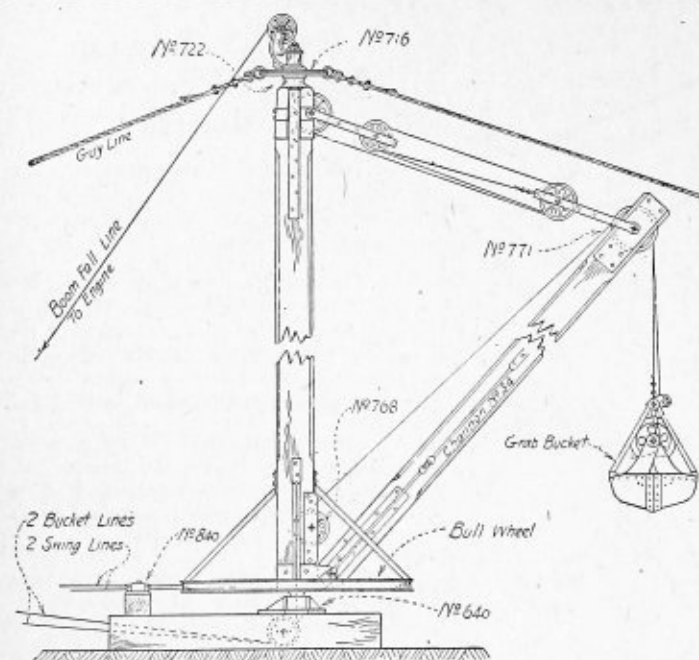
On level ground the guys are usually three times the height of the mast.

Sheaves listed are all self-lubricating bronzed bushed.

Prices of Irons—Without Timber, Rope or Clips

Size of mast timber.....	Inches	10x10	12x12	14x14	16x16
Size of boom timber.....	Inches	8x8	10x10	12x12	14x14
Nominal capacity.....	Tons	3	6	10	15
Longest mast (without truss rods).....	Feet	40	45	55	64
Longest boom (without truss rods).....	Feet	36	40	48	58
Size of guys on number required.....		$\frac{3}{4}$ "-4	1"-5	$1\frac{1}{8}$ "-5	$1\frac{1}{4}$ "-6
One No. 719 Structural steel mast top with off-set gudgeon pin and collar, boom to line conn. pin and washer plate.....		\$ 18.50	\$ 29.35	\$ 36.95	\$ 52.00
One No. 716 Steel plate guy cap with shackles.....		17.00	19.35	28.00	33.00
One No. 640 Ball and socket mast bottom with off-set pintle, double sheave step, straps to boom and boom shaft.....		70.00	93.85	120.00	164.55
One No. 855 Double mast sheaves with brackets.....		18.70	25.35	22.40	29.00
One No. 774 Steel boom point with side plates, pins, sheave for hoist line and boom lift bail with two sheaves.....		47.50	55.45	63.00	76.55
All necessary bolts for above iron work are included.					
One No. 842 Strapped sheave, single, for connection to mast head head pin.....		10.00	13.00	17.85	22.30
One single wire rope block, without hook, for connection to boom point strap.....		11.45	13.35	29.00	33.35
One single hoist fall block with swivel hook.....		12.00	13.90	30.70	35.20
Total of above iron work.....		\$205.15	\$263.60	\$347.90	\$445.95

Above prices include self-lubricating sheaves—deductions for plain sheaves—see separate list of derrick parts. Engines, bull-wheels, guy ropes, guy take-ups, hoist lines, clips and thimbles are all priced in other sections of this catalog.



No. 34 Channon Grab Bucket Power Guy Derrick with "Rooster" Top

Showing application of bull-wheel which can be attached to any of our derricks.

We carry in Chicago stock, hayward clam shell and orange peel buckets up to $1\frac{1}{2}$ yard capacity.

This excavating derrick in combination with one of our Mundy Hoisting Engines makes a fine portable unit well adapted for miscellaneous digging on railroads, bridge and general contract work. We furnish either clam-shell or orange-peel buckets depending upon the character of material to be excavated. These buckets require two friction drums for their operation, another friction drum for raising and lowering the boom besides the swinging drum making four drums in all—see engines Nos. 473 to 499. Can be operated by two drum engine if the boom is not raised or lowered by power and providing the derrick is swung by hand.

Digging with grab-buckets is hard work on a derrick and larger sized timbers than those used for ordinary hoisting are recommended.

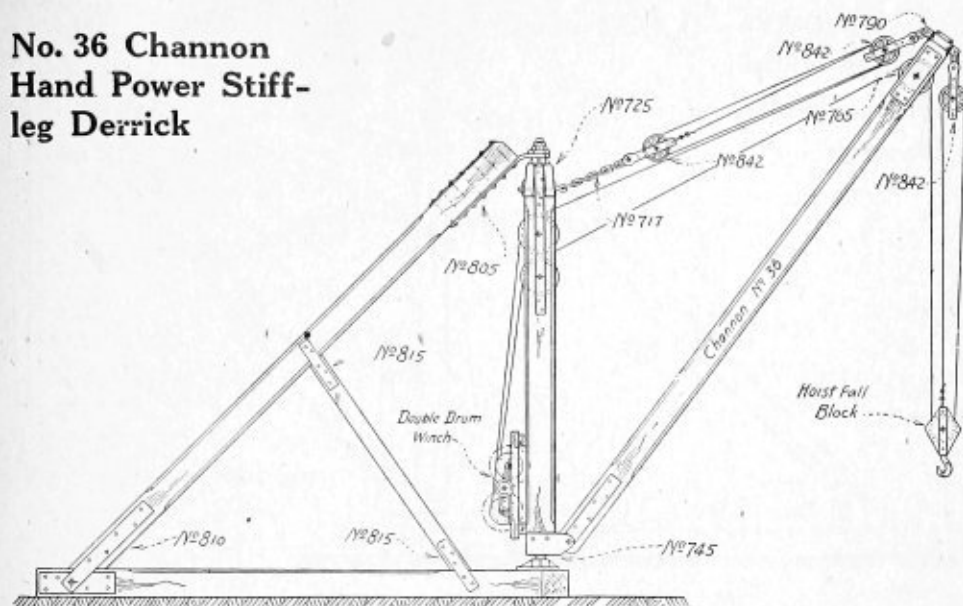
Be sure to state size or weight of bucket and the length of the boom.

Prices of Irons—Without Timber, Bull-wheel, Bucket, Rope or Clips -

Size of mast timber.....	Inches	10x10	12x12	14x14	16x16	18x18
Size of boom timber.....	Inches	8x10	10x10	12x12	14x14	16x16
Nominal capacity.....	Tons	3	6	10	15	20
Longest mast.....	Feet	40	45	55	64	70
Longest boom.....	Feet	36	40	48	58	62
Size of guys and number required.....		$3\frac{1}{4}"-5$	$1"-5$	$1\frac{1}{4}"-5$	$1\frac{1}{4}"-6$	$1\frac{1}{4}"-10$
One No. 722 Rooster mast top casting with straps to mast, hollow gudgeon pin and collar, rooster sheave and bracket, center sheave, straps and single sheave for boom fall line.....						
		\$101.55	\$109.35	\$146.65	\$206.65	\$256.00
One No. 716 Steel plate guy cap with shackles.....						
		18.60	25.35	28.00	30.00	40.00
One No. 640 Ball and socket mast bottom with center pintle, double sheave step, straps to boom and boom shaft.....						
		70.00	93.85	120.00	164.55	237.35
One Set of No. 768 Mast sheaves with side plates and shafts.....						
		18.70	30.35	38.50	52.00	66.00
One No. 771 Grab bucket boom point with double bucket sheaves and pin and boom lift bail with double sheaves.....						
		58.65	66.00	85.80	99.00	99.00
All necessary bolts for above iron work.....						
Total of above iron work.....						
		\$267.50	\$324.60	\$418.95	\$552.20	\$698.35

Above prices include self-lubricating bronze-bushed sheaves throughout—other styles of irons can be used if desired—see separate list of derrick parts. Hoisting engines, bull-wheels, guide sheaves, guy ropes, guy take-ups, hoist lines clips and thimbles are all listed in other sections of this catalog.

No. 36 Channon Hand Power Stiff- leg Derrick



Stiff-leg derricks are practically self-supporting and are usually preferred to guy derricks on account of the difficulty of attaching and locating long guy lines.

The boom swings to about three-quarters of a circle. We recommend the use of wire rope but can furnish sheaves for manila rope at the same price. We can furnish a single drum which instead of double drum shown—in this case Manila rope is used for the boom line which is then fastened to a cleat at the back of the mast.

Capacities are estimated for booms about one and one-half times the height of the mast, which is usual; shortening the mast lowers the capacity, lengthening the boom does the same.

Booms can be as long as twice the height of mast but this ratio is not recommended on account of the greatly increased stresses set up.

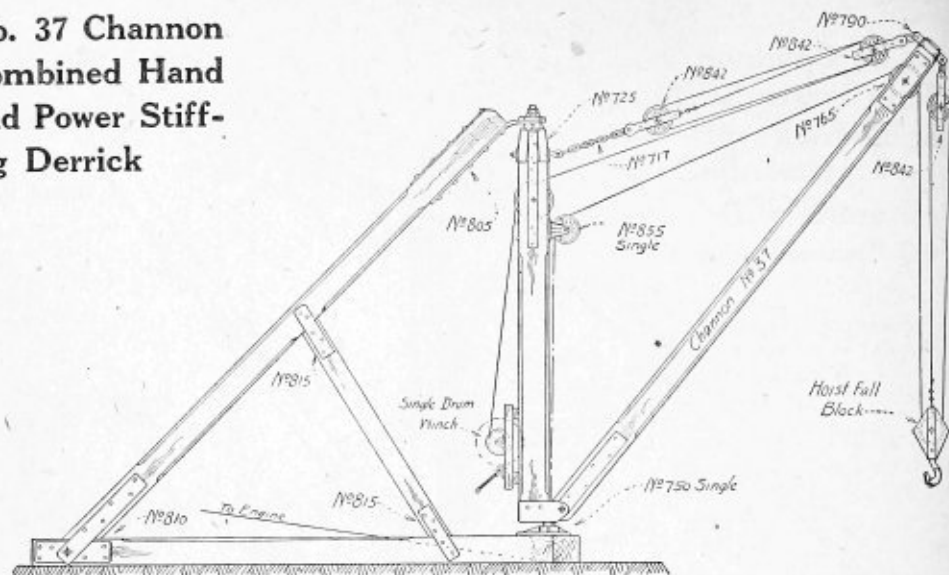
For greater boom and hoist purchases deduct blocks listed and add proper blocks for capacity of the winch to be used.

Prices of Irons—Without Timber, Winch, Rope or Clips

Size of mast timber.....Inches	8x8	10x10	12x12	14x14	16x16
Size of boom, stiff-legs and sills.....Inches	6x6	8x8	10x10	12x12	14x14
Nominal capacity.....Tons	1½	3	6	10	15
Longest boom (without truss rods).....Feet	30	36	40	50	54
Height of mast for above booms.....Feet	20	24	32	34	36
One No. 725 Mast top casting with gudgeon pin and collar, wrought eye-bolt, straps to mast and two sheaves with shafts.....	\$ 32.00	\$ 35.70	\$ 45.20	\$ 56.80	\$ 95.00
One No. 745 Mast bottom casting with step, straps to boom and boom shaft.....	24.00	28.00	38.70	52.00	90.00
Two No. 805 Top stiff-leg irons or "goose-necks".....	40.00	52.80	63.05	79.20	145.35
Two No. 810 Bottom stiff-leg irons.....	19.80	21.00	23.95	31.40	57.95
Four No. 815 Stiff-leg brace irons.....	16.00	18.70	23.70	34.00	52.80
One No. 790 Split boom band with two links.....	6.60	8.00	9.35	20.00	22.40
One No. 765 Boom end sheave with pin and side plates.....	9.40	11.00	12.00	14.70	17.60
One No. 717 Mast head chain.....	5.00	6.55	9.30	11.85	18.35
All necessary bolts for above iron work.					
Boom Fall:—Two No. 842 Strapped sheaves, one single and one double.....	21.00	27.00	33.35	40.00	56.30
Hoist Fall:—One No. 842 Single strapped sheave.....	8.00	10.00	13.00	17.85	22.30
and one single hoist fall-block with swivel hook.....	10.00	12.00	13.90	30.70	35.20
Total of above iron work.....	\$191.80	\$230.75	\$285.50	\$388.50	\$613.25

Above prices include self-lubricating bronze-bushed sheaves throughout—deductions for plain sheaves see separate list of derrick parts. Winches, wire rope, clips and thimbles are priced on other sections of this catalog.

No. 37 Channon Combined Hand and Power Stiff- leg Derrick



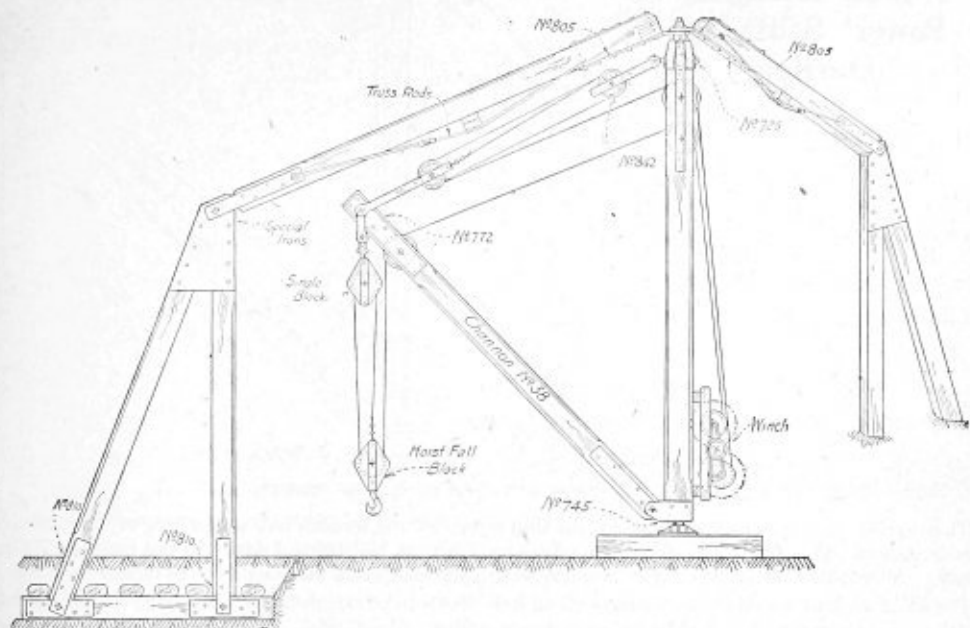
Same remarks apply as for No. 36 derrick. Arranged with single drum winch for raising and lowering the boom—where this takes place but few times a day—the hoisting line may be operated by any single drum power hoist. This single drum winch may be single or double purchase, depending upon the load. Some may prefer to run the hoist line down the boom—in this case, use center pintle mast bottom and No. 845 single mast sheave. This same derrick may be arranged with other styles of fittings—see pages following. This style of derrick should not be used with booms longer than one and one-half times the height of the mast. For greater boom and hoist purchase, deduct blocks listed and add proper blocks for the power to be used.

Prices of Irons—Without Timber, Winch, Rope or Clips

Size of mast timber.....Inches	8x8	10x10	12x12	14x14	16x16
Size of boom, stiff-legs and sills.....Inches	6x6	8x8	10x10	12x12	14x14
Nominal capacity.....Tons	1½	3	6	10	15
Longest boom (without truss rods).....Feet	30	36	40	50	54
Shortest mast for above booms.....Feet	20	24	32	34	36
One No. 725 Mast top casting with gudgeon pin and collar, wrought eye-bolt, straps to mast and single sheave with shaft.....	\$ 30.00	\$ 30.65	\$ 38.65	\$ 50.65	\$ 88.00
One No. 750 Mast bottom casting with step and single sheave, straps to boom and boom shaft.....	20.00	31.35	50.65	66.65	100.00
Two No. 805 Top stiff-leg irons or "goose-necks".....	40.00	52.80	63.05	79.20	145.35
Two No. 810 Bottom stiff-leg irons.....	19.80	21.00	23.95	31.40	57.95
Four No. 815 Stiff-leg brace irons.....	16.00	18.70	23.70	34.00	52.80
One No. 855 Single mast sheave with brackets.....	12.00	12.50	13.85	16.00	18.65
One No. 790 Split boom band with two links.....	6.60	8.00	9.35	20.00	22.40
One No. 765 Boom end sheave with pin and side plates.....	9.40	11.00	12.00	14.70	17.60
One No. 717 Mast head chain.....	5.00	6.65	9.30	11.85	18.35
All necessary bolts for above iron work are included.					
Boom Fall:—Two No. 842 Strapped sheaves, one single and one double.....	21.00	27.00	33.35	40.00	56.30
Hoist Fall:—One No. 842 Single strapped sheave.....	8.00	10.00	13.00	17.85	22.70
and one single hoist fall block with swivel hook.....	10.00	12.00	13.90	30.70	35.20
Total price of above iron work.....	\$207.80	\$241.55	\$304.75	\$413.00	\$635.30

Above prices include self-lubricating bronze bushed sheaves throughout—deductions for plain sheaves—see separate list of derrick parts. Winches, wire rope, clips and thimbles are priced in other sections of this catalog.

No. 38 Channon Full Circle Stiff-leg Derrick



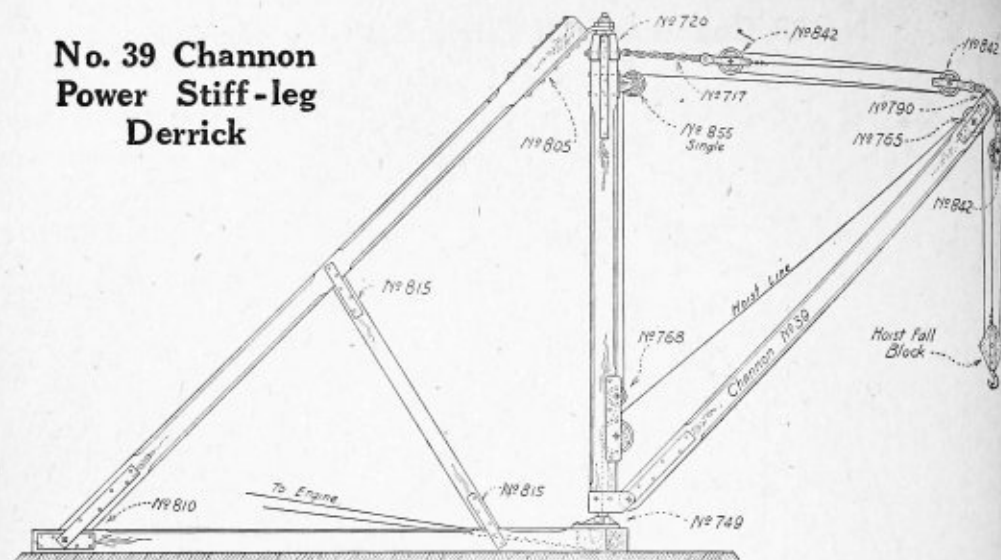
These derricks are used where room is limited, and it is found impossible to use wire rope guys on account of buildings, tracks, etc. When used on a dock, a combination of one stiff-leg and two guys is often desirable. Where the location will permit, the sills of the stiff-legs are sunk about six feet below the surface of the ground. When the sills are used on the surface, they must be loaded down or bolted to the foundation. This style of derrick requires a mast about 10 feet longer than the boom. Can also be furnished with double sheave step for operation by power.

Price of Irons—Without Timber, Winch, Rope or Clips

Size of mast timber.....	Inches	8x8	10x10	12x12	14x14	16x16
Size of boom, stiff-legs and sills.....	Inches	6x6	8x8	10x10	12x12	14x14
Nominal capacity.....	Tons	1½	3	6	10	15
Longest boom (without truss rods).....	Feet	30	36	40	50	50
Height of mast for above booms.....	Feet	40	46	50	60	60
One No. 725 Mast top with gudgeon pin and collar, wrought eye-bolt, straps to mast and two sheaves with shafts.....		\$ 32.00	\$ 37.20	\$ 45.20	\$ 56.80	\$ 95.00
One No. 745 Mast bottom casting with step, straps to boom and boom shaft.....		24.00	28.00	38.70	52.00	90.00
One No. 772 Boom point with side plates and shafts, sheave for boom end, boom lift bail with two sheaves and bail for hoist fall block.....		47.50	47.50	55.45	63.00	76.55
Two No. 805 Top stiff-leg irons or "goose-necks".....		40.00	52.80	63.00	79.20	145.35
Four Stiff-leg truss rods with turn buckles and plates.....		61.60	68.95	71.15	85.00	90.95
One Set (4) lower stiff-leg irons as shown.....		40.35	42.55	47.80	63.00	115.85
One No. 842 Single strapped sheave for mast top.....		8.00	10.00	13.00	17.85	20.70
One single wire rope block for hoist fall, no hook.....		10.00	11.45	13.35	29.00	33.35
One single wire rope block with swivel hook.....		10.00	12.00	13.90	30.90	35.20
All necessary bolts for above iron work.						
Total of above Ironwork.....		\$273.45	\$310.45	\$361.55	\$476.75	\$702.95

Above prices include self-lubricating bronze-bushed sheaves throughout—deductions for plain sheaves—see separate list of derrick parts. Winches, wire rope, clips and thimbles are priced in other sections of this catalog.

No. 39 Channon Power Stiff-leg Derrick



This derrick has a center pintle mast bottom with ropes running through hole in the base of the mast to the double sheaves in the step. We can furnish off-set mast bottom No. 750 if desired—in this case No. 768 mast sheaves are omitted and No. 855 would have double sheaves—both lines leading down the face of the mast.

For quick work we would recommend one of our bull-wheels to be attached to mast bottom casting for swinging the boom by power instead of by one or two men pulling on hand lines. When arranged with power swing one man—the engineer—can swing and hoist the load in the same time it would take to hoist the load only.

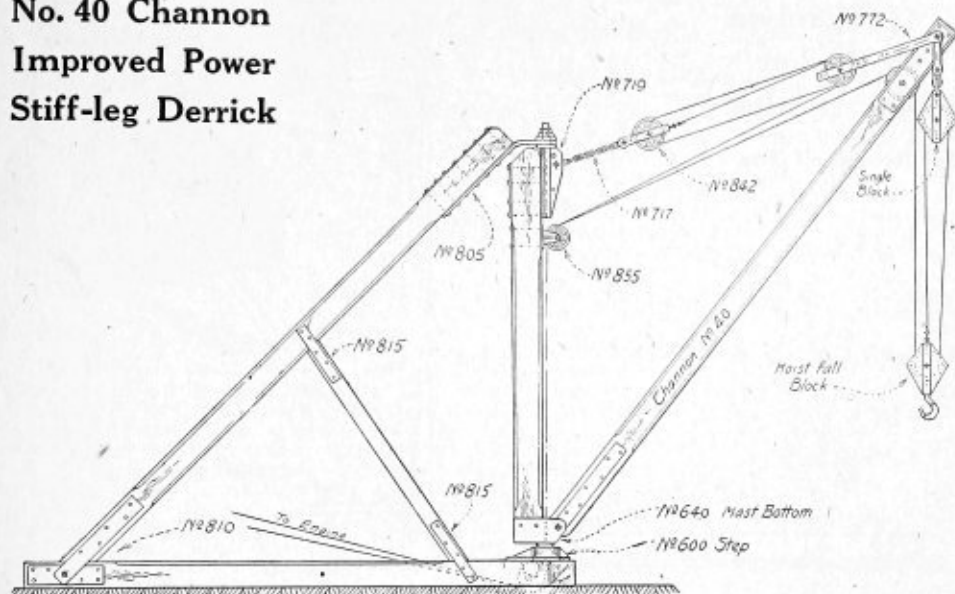
Capacities are estimated for booms one and one-half times the height of mast; shortening the mast lowers the capacity—lengthening the boom does the same.

Prices of Irons—Without Timber, Rope or Clips

Size of mast timber.....	Inches	8x8	10x10	12x12	14x14	16x16
Size of boom, stiff-legs and sills.....	Inches	6x6	8x8	10x10	12x12	14x14
Nominal capacity.....	Tons	13½	3	6	10	15
Longest boom (without truss rods).....	Feet	30	36	40	50	54
Height of mast for above booms.....	Feet	20	24	32	34	36
One No. 720 Mast top casting with gudgeon pin and collar, wrought eye-bolt and straps to mast.....		\$ 26.40	\$ 29.00	\$ 31.40	\$ 45.00	\$ 72.50
One No. 749 Mast bottom casting with step and double sheaves, straps to boom and boom shaft.....		33.75	40.00	56.20	73.35	110.00
Two No. 805 Top stiff-leg irons or "goose-necks".....		40.00	52.80	63.00	79.20	145.35
Two No. 810 Bottom stiff-leg irons.....		19.80	21.00	23.95	31.40	57.95
Four No. 815 Stiff-leg brace irons.....		16.00	18.70	23.70	34.00	52.80
One Set No. 768 Mast sheaves with side plates and shafts.....		14.55	18.70	30.35	38.50	52.00
One No. 855 Single mast sheave with brackets.....		12.00	12.50	13.85	16.00	18.65
One No. 790 Split boom band with two links.....		6.60	8.00	9.35	20.00	22.40
One No. 765 Boom end sheave with pin and side plates.....		9.40	11.00	12.00	14.70	17.60
One No. 717 Mast head chain.....		5.00	6.55	9.30	11.85	18.35
All necessary bolts for above ironwork are included.						
Boom Fall:—Two No. 842 Strapped sheaves, one single and one double.....		21.00	27.00	33.35	40.00	56.30
Hoist Fall:—One No. 842 Single strapped sheave.....		8.00	10.00	13.00	17.85	22.70
and one single hoist fall block with swivel hook.....		10.00	12.00	13.90	30.70	35.20
Total price of above ironwork.....		\$222.50	\$267.25	\$333.35	\$452.55	\$681.80

Above prices include self-lubricating bronze bushed sheaves, throughout—deductions for plain sheaves—see separate list of derrick parts. Engines, bull-wheels, wire rope, clips and thimbles are priced in other sections of this catalog.

No. 40 Channon Improved Power Stiff-leg Derrick



This improved type of stiff-leg derrick has structural steel mast top, improved steel boom point and a ball and socket mast step. This derrick swings easily whether the mast is out of plumb or not—the step has oil reservoir and gib keys to prevent the mast from “kicking-out” of the step—the bearing surfaces of this step are always in contact—even with the mast out of plumb.

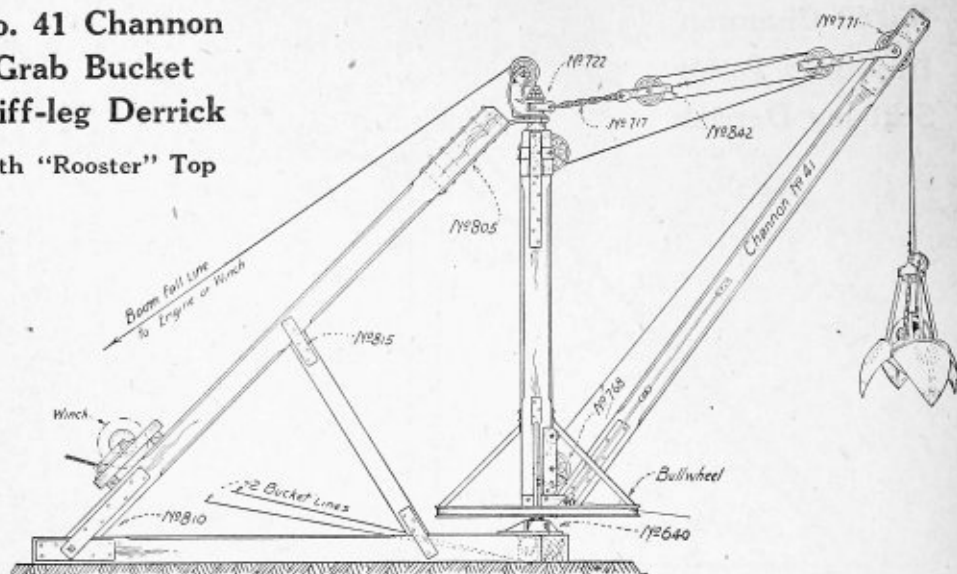
The bottom pintle is off-set as is the gudgeon pin—allowing the lines to pass straight down the face of the mast—there is no cutting of the derrick timbers except for the boom point sheave.

Prices of Irons—Without Timber, Rope or Clips

Size of mast timber	Inches	10x10	12x12	14x14	16x16	18x18
Size of boom, stiff-legs and sills	Inches	8x10	10x10	12x12	14x14	16x18
Nominal capacity	Tons	3	6	10	15	20
Longest boom (without truss rods)	Feet	36	40	50	54	54
Height of mast for above booms	Feet	24	32	34	36	36
One No. 719 Structural steel mast top with off-set gudgeon pin and collar, boom line conn. pin and washer plate		\$ 18.50	\$ 29.35	\$ 36.95	\$ 52.00	\$ 73.95
One No. 640 Ball and socket mast bottom with off-set pintle, double sheave step, straps to boom and boom shaft		70.00	93.85	120.00	164.55	237.60
One No. 855 Double mast sheaves with brackets		17.85	18.70	25.35	22.40	29.00
Two No. 810 Bottom stiff-leg irons		21.00	23.95	31.40	57.95	84.35
Two No. 805 Top stiff-leg irons or “goose-necks”		52.80	63.00	79.20	145.35	182.65
Four No. 815 Stiff-leg brace irons		18.70	23.70	34.20	52.80	61.60
One No. 717 Mast head chain		6.55	9.30	11.85	18.35	32.25
One No. 772 Steel boom point with side plates and shafts, sheave for boom end, boom lift bail with two sheaves and bail for hoist fall block		47.50	55.45	63.00	76.55	98.85
All necessary bolts for above iron work are included.						
Boom Fall:—One No. 842 Single strapped sheave		10.00	13.00	17.85	20.70	27.00
Hoist Fall:—One Single wire rope block without hook for connection to boom point		11.45	13.35	29.00	33.35	37.00
One single hoist fall block with swivel hook		12.00	13.90	30.70	35.20	40.00
Total of above iron work		\$286.35	\$367.55	\$579.55	\$679.20	\$904.25

Above prices include self-lubricating bronze-bushed sheaves throughout—deductions for plain sheaves—see separate list of derrick parts. Engines, bull-wheels, wire rope, clips and thimbles are priced in other sections of this catalog.

No. 41 Channon Grab Bucket Stiff-leg Derrick with "Rooster" Top



This derrick combined with one of our Mundy Hoists makes an outfit well adapted for excavating on railroads, bridge and general contract work. We furnish either orange-peel or clam-shell buckets depending upon the class of digging. When the winch is used for boom line a standard derrick engine with two friction drums and swinging drum can be used. Digging with grab buckets is hard work on a derrick and larger sized timbers are recommended than those ordinarily used for general hoisting. Bull-wheels are always used on grab bucket work for power swing and for continuous and quick work we recommend an independent swinging engine described in another section of this catalog.

Prices of Irons—Without Timber, Bull-wheel, Rope or Clips

Size of mast timber.....Inches	10x10	12x12	14x14	16x16	18x18
Size of boom, stiff-legs and sills.....Inches	8x10	10x10	12x12	14x14	16x18
Nominal capacity.....Tons	3	6	10	15	20
Longest boom (without truss rods).....Feet	36	40	50	54	54
Height of mast for above booms.....Feet	24	32	34	36	36
One No. 722 Rooster mast top with straps to mast, hollow gudgeon pin and collar, rooster sheave and brackets, center sheave, No. 717 chain and No. 842 single sheave for boom fall.....	\$101.55	\$109.35	\$146.65	\$206.65	\$256.00
One No. 640 Ball and socket mast bottom with center pintle, double sheave step, straps to boom and boom shaft.....	70.00	93.85	120.00	164.55	237.35
One Set of No. 768 Mast sheaves with side plates and shafts.....	18.70	30.35	38.50	52.00	66.00
One No. 771 Grab bucket boom point with double bucket sheaves and pin and boom lift bail with double sheaves.....	58.65	66.00	85.80	99.00	99.00
Two No. 805 Top stiff-leg irons or "goose-necks".....	52.80	63.00	79.20	145.35	182.65
Two No. 810 Bottom stiff-leg irons.....	21.00	23.95	31.40	57.95	84.35
Four No. 815 Stiff-leg brace irons.....	18.70	23.70	34.20	52.80	61.60
All necessary bolts for above iron work.					
Total of above iron work.....	\$341.40	\$410.20	\$535.75	\$778.30	\$986.95

Above prices include self-lubricating bronze-bushed sheaves throughout—deductions for plain sheaves—see separate list of derrick parts. Engines, bull-wheels, wire rope, clips and thimbles are priced in other sections of this catalog.

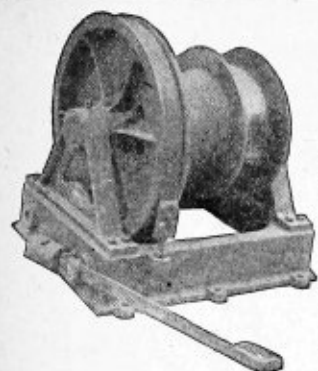


Illustration No. G947

Hayward Counterweight Hoisting Drum

For Grab Bucket Operation

The addition of this drum to a contractor's standard hoisting engine, having two drums and a boom swinging drum, permits the operation of a two line grab bucket as well as raising and lowering the boom and swinging by power.

The back drum is used to raise and lower the boom, the front drum for closing and hoisting the bucket and the counterweight drum for holding the bucket while opening to discharge the material.

The application of this drum and the run of the lines is shown on drawing No. 832 below.

Ordinarily for this work a four-drum engine is required—two drums for the operation of the bucket—one for raising and lowering the boom—besides the swinging drum.

This counterweight drum can be placed alongside the main engine in any convenient position and is operated by a foot treadle alone.

Run of Lines. The bucket "holding" line, which the counterweight drum operates, is attached to the top of the grab bucket, runs up over the sheave at the point of the boom, down to the sheave at the face of the mast, thence down and around the sheave in the mast step to one side of the counterweight drum.

From the other side of the counterweight drum a line is run through a block attached to the upper part of the derrick stiff-leg, down to the counterweight which consists of three pieces, one weighing 100 pounds and two weighing 50 pounds each, making a total of 200 pounds in all, additional 50-pound weights can be supplied on special order.

The closing and digging line of the bucket passes around the power wheel of the bucket and runs same as closing line, to front friction drum of engine.

After the bucket has been filled, hoisted and swung to desired position, the bucket is dumped by stepping upon the foot lever of the counterweight drum and releasing the closing line.

No. 1.—For Orange Peels up to and including 1 yd. and Clam Shells up to and including 1½ yd. \$300.00
No. 2.—For Orange Peels up to and including 1½ yd. and Clam Shells up to and including 2 yd. 375.00

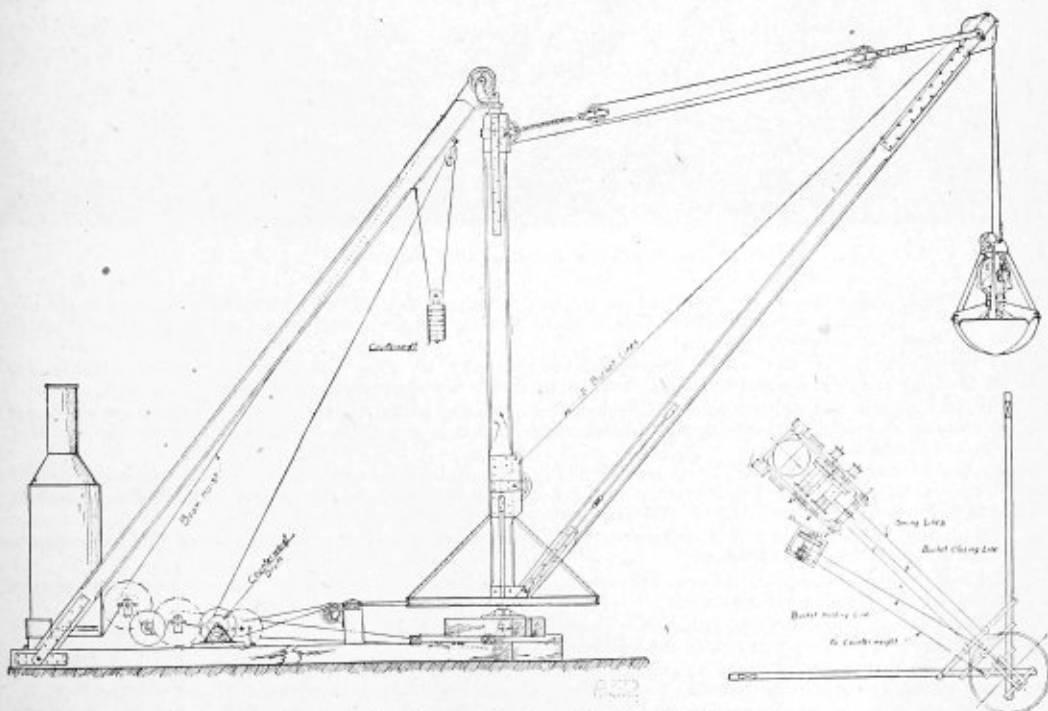


Fig. 832. Showing Application of Counter Weight Drum

Channon Steel Derricks

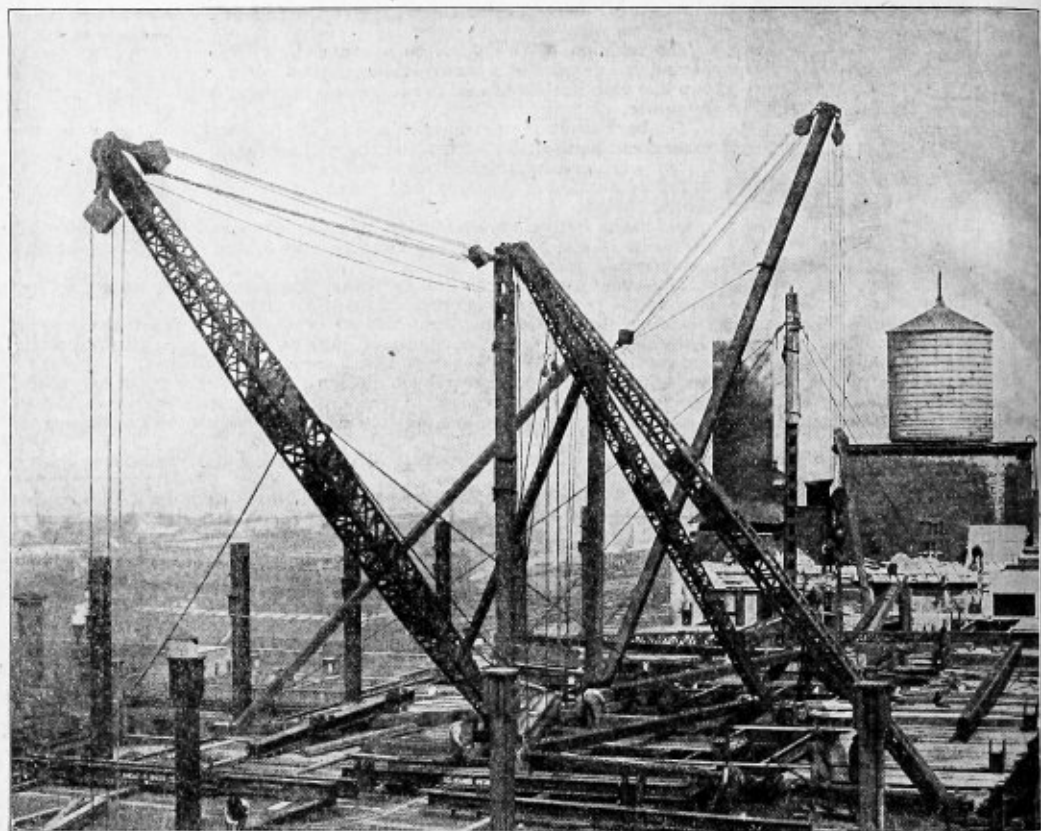


Fig. G2173—On Building Work in Chicago

The derricks shown above were designed for erecting structural steel work on high office buildings in the city of Chicago. The mast and mud sills are about 38 to 45 feet in length, with booms any length desired and in capacities to suit requirements.

The steel work is built to the 1906 specifications of the Amer. Ry. Eng. and M. of Way Ass'n. Steel is open hearth railway bridge grade and the design and workmanship is unsurpassed anywhere.

The mast bottom and step are annealed steel castings, ball and socket type, the step is in two parts with large bolts and can be taken apart quickly; with this arrangement it is impossible for the mast bottom pintle to bind or kick out of the step.

The mast top connection for stiff-legs may be had in the usual goose-neck construction of Swedes iron or mild steel, or in a one-piece, hooded steel casting, working over a hollow steel gudgeon pin with a large bronze bushing oiled by grooves from hollow gudgeon which is protected by a cap from dust and dirt.

The topping lift is attached at mast head by links or bars fitting a large cross pin passing through gudgeon. All links and bars are of Swedes iron.

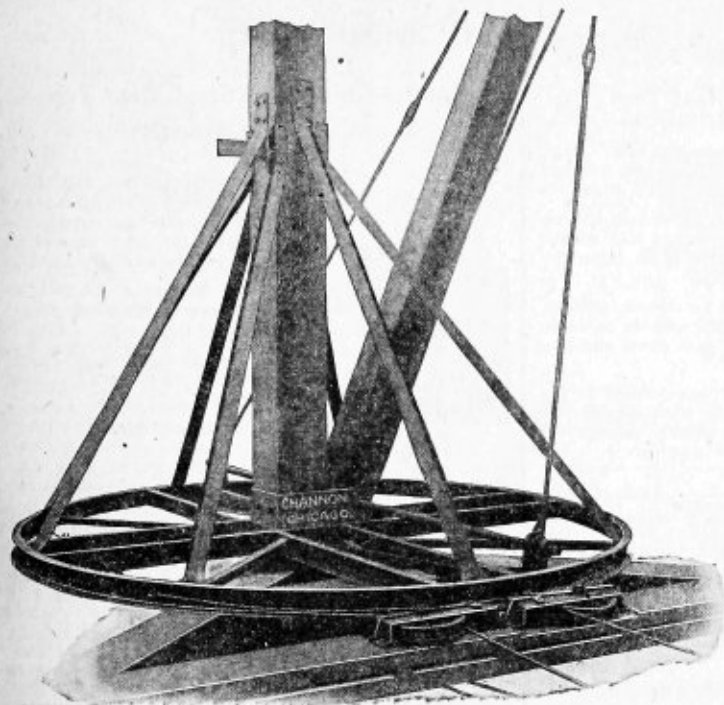
The connections at the point of boom, for topping lift and hoist fall, are by heavy plates centering all stresses properly, as will be noticed in above cut.

The mast is constructed of two channels with plates the entire length in front, or with lacing bars front and back as may be desired or required by the loading.

The sheave in the point of boom is protected by guards, top and bottom. The point is also provided with two connections for swing lines when swung by using winch heads—bull wheels furnished if desired.

The sheaves at the bottom of mast permit the boom to be raised "straight up" as there are no sheaves at the top of masts. The top plate at the heel of boom is cut out for the sheaves so that boom may be raised to vertical position.

Prices on steel derricks quoted upon request.



Showing Photograph of 12 Foot

Channon Steel Derrick Bull- wheels

For Swinging Booms on
Power Derricks

This Bull-wheel is a most valuable feature on any derrick, and will save enough time and labor to pay for itself several times in a season.

May be attached to any of our power derrick mast bottoms.

It takes time and money to swing a derrick by hand with men pulling on the tag line when teams, cars or men are waiting for the derrick.

With our Bull-wheel and special derrick swinging engine the engineer can lift the load and swing it into place in the same time it takes to do the lifting only.

Our wheel is exceptionally strong and well braced.

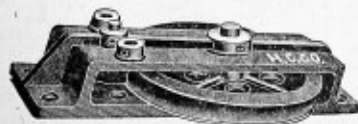
Sizes and Prices Complete with Braces to Mast and Turnbuckle Rods to Boom but Without Guide-Sheaves

No.	Diameter in Feet	For Derrick Booms, Length	Size of Channel Iron Used	Weight Complete, Pounds	Price Complete
1	8	40 ft. or less	5-inch	1100	\$140.00
2	10	50 ft.	5-inch	1200	153.00
3	12	60 ft.	6-inch	1400	180.00
4	14	70 ft.	7-inch	2400	370.00
5	16	80 ft.	8-inch	3200	470.00
6	16 Ex. Hvy.	80 ft.	10-inch	4000	675.00

No. 840 Guide-Sheaves and Rollers in Frame

For leading swing ropes from Bull-wheel to swinging drum of hoisting engine. The small roller or sheave prevents the rope from jumping out of groove of larger sheave. The roller can be moved to three different positions for leading rope at different angles.

Diameter of Large Sheave, Inches	Diameter of Small Wheels, Inches	Diameter of Pins, Inches		Weight, Lbs.	Price Each	
		Large	Small		Common Sheave	Self-Lubricating Sheave
10	2½	1	½	00	\$ 8.00	\$ 9.40
12	3	1½	5⁄8	00	9.90	11.75
*14	4	1¾	5⁄8	00	11.75	16.40
16	5	1½	¾	00	18.65	18.75
18	6	1¾	7⁄8	00	19.35	27.20



*14-inch is the size mostly used.

Channon Derrick Irons (Mast Tops)

No. 720 Mast Top

For Power Derricks



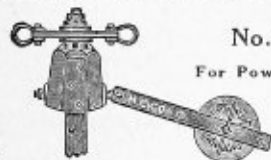
Including Gudgeon Pin and Collar. Straps to Mast with Bolts and Wrought Eye-bolt for attaching Boom Block.

The eye-bolt extends clear through the top casting and the eye is punched and worked out avoiding the possibility of an imperfect weld.

Suitable for power guy or stiff-leg derricks. For guy derricks strapped sheaves or boom block is attached to eye-bolt direct and guy cap for guy ropes added.

For stiff-leg derricks "goose-neck" or top stiff-leg irons are used and chain welded into eye-bolt or attached by shackle through the eye.

Size of Mast Timber, Inches	Diameter of Gudgeon Pin, Inches	Approximate Weight, Pounds	Price as Shown
8x8	2	135	\$26.40
10x10	2 1/2	225	29.00
12x12	3	365	31.40
14x14	3 1/2	460	45.00
16x16	4	765	72.50
18x18	5	1160	91.00



No. 720A Top

For Power Guy Derricks

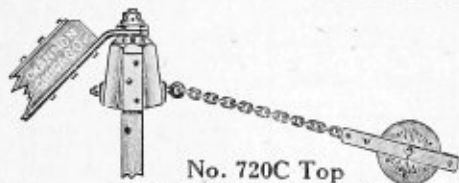
Showing plate steel guy cap and strapped sheave. Cap and sheaves will be found listed in the following pages.



No. 720B Top

For Power Stiff-Leg Derricks

With Chain, Strapped Sheave and Wrought Collar placed at top of the gudgeon pin—can furnish this style or as shown below. Chain allows boom to swing clear against stiff-legs. Block is recommended in place of strapped sheaves.



No. 720C Top

For Power Stiff-Leg Derricks

Chain is welded into eye-bolt which passes through top casting. Chains, blocks and sheaves are listed elsewhere in catalog.

No. 719 Structural Steel Mast Top

With Off-Set Gudgeon Pin



When used with our No. 750 Mast Bottom—the lines lead straight down the front of the mast—no cutting or boring of timber for mast sheaves is necessary—the mast stands plumb.

For stiff-leg derricks a few feet of chain is used between block and pin in mast top.

For guy derricks straps may be used between block and pin or block attached directly to the pin.

Chain and straps are extra.

Size of Mast Timber, Inches	Diameter of Gudgeon Pin, Inches	Approximate Weight, Pounds	Price, as Shown
8x8	2	155	\$18.50
10x10	2 1/2	165	18.00
12x12	3	195	29.35
14x14	3 1/2	215	36.95
16x16	4	245	52.00
18x18	5	280	73.95

Arranged for stiff-leg and guy derricks same as cuts shown at bottom of page for No. 720 top.

No. 725 Mast Top

For Hand Power Derricks

Including Gudgeon Pin and Collar Straps to Mast with bolts. Eye-bolt for Boom Block and two Sheaves with Shafts.

Suitable for either guy or stiff-leg type of derrick.

For guy derricks, use strapped sheaves. For stiff-leg derricks, use chain arrangements same as shown for No. 720 Mast Top.

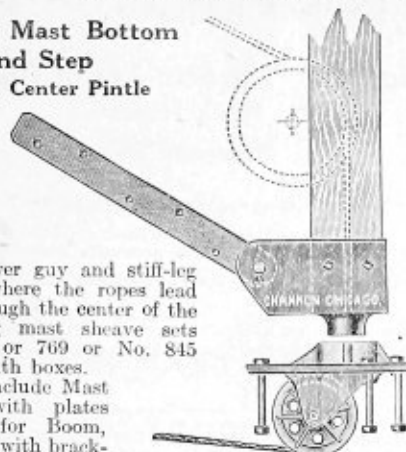
One sheave is larger than the other, permitting the two lines to hand winch, placed usually at the back of the mast, to pass to the drums without interference.



Size of Mast Timber, Inches	Diam. Gudgeon Pin, Inches	Approx. Weight, Pounds	Price with Plain Sheaves	Price with Self-Lubricating Sheaves
8x8	2	165	\$ 31.00	\$ 32.00
10x10	2 1/2	275	33.35	35.70
12x12	3	428	41.35	43.20
14x14	3 1/2	590	51.35	56.80
16x16	4	890	83.00	95.00
18x18	5	1330	106.65	117.50

Channon Derrick Irons (Mast Bottoms)

No. 749 Mast Bottom and Step With Center Pintle



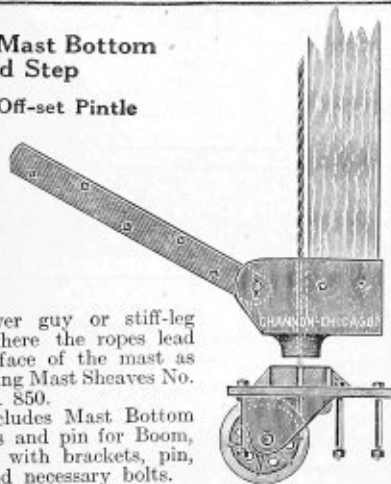
For power guy and stiff-leg derricks where the ropes lead down through the center of the mast-using mast sheave sets Nos. 768 or 769 or No. 845 sheaves with boxes.

Prices include Mast Bottom with plates and pin for Boom, Mast step with bracket, pin, sheaves and necessary bolts.

Use with Mast Top having Gudgeon Pin in Center

For Mast Tmbr., Inches	Aprx. Wgt., Lbs.	With One Sheave		With Two Sheaves	
		Plain Bored	Self Lubr. Bushed	Plain Bored	Self Lubr. Bushed
8x8	285	\$ 28.00	\$ 30.00	\$ 29.35	\$ 33.75
10x10	435	33.35	31.35	35.20	40.00
12x12	775	48.00	50.65	50.65	56.20
14x14	980	62.25	60.65	65.35	73.35
16x16	1880	96.00	100.00	101.35	110.00
18x18	3650	173.35	180.00	177.35	186.65

No. 750 Mast Bottom and Step With Off-set Pintle



For power guy or stiff-leg derricks where the ropes lead down the face of the mast as shown—using Mast Sheaves No. 855 or No. 850.

Price includes Mast Bottom with plates and pin for Boom, Mast step with brackets, pin, sheaves and necessary bolts.

Use with Mast Top having Off-set Gudgeon Pin

For Mast Tmbr., Inches	Aprx. Wgt., Lbs.	With One Sheave		With Two Sheaves	
		Plain Bored	Self Lubr. Bushed	Plain Bored	Self Lubr. Bushed
8x8	285	\$ 28.00	\$ 30.00	\$ 29.35	\$ 33.75
10x10	435	33.35	31.35	35.20	40.00
12x12	775	48.00	50.65	50.65	56.20
14x14	980	62.25	60.65	65.35	73.35
16x16	1880	96.00	100.00	101.35	110.00
18x18	3650	173.35	180.00	177.35	186.65

No. 745 Mast Bottom and Step For Hand Power Derricks



Furnished with Boom Plates and bolts, as shown, with square step for guy derricks and triangular step for stiff-leg derricks.

Used with No. 725 Mast Top

For Mast Timber, Inches	For Boom Timber, Inches	Approximate Weight, Pounds	Price, Complete, as Shown
8x8	6x6	220	\$24.00
10x10	8x8	340	28.00
12x12	10x10	540	38.70
14x14	12x12	705	52.00
16x16	14x14	1460	90.00

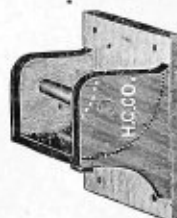
No. 760 Plain Mast Bottom and Step With Bolts



For hand power derricks generally used in combination with No. 770 below.

For Mast Timber, Inches	Inside Measure	Approximate Weight, Pounds	Price, Complete
8x8	7x7	135	\$11.15
10x10	9x9	200	14.65
12x12	10x10	275	17.60
14x14	12x12	465	24.00

No. 770 Plain Boom Seat

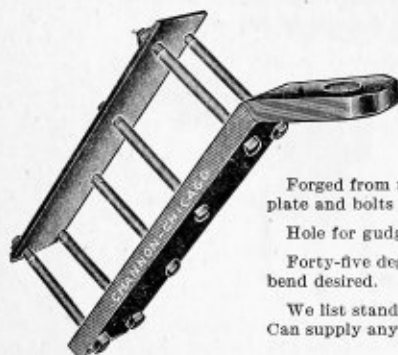


Generally used where Boom is stepped on the face of the mast above the mast bottom.

For Boom Timber, Inches	Approximate Weight, Pounds	Price without Plates or Bolts, as Shown	Price with Boom Plates and Bolts
6x6	68	\$ 5.35	\$ 9.85
8x8	78	8.00	13.35
10x10	159	10.65	16.00
12x12	184	13.75	22.00

Boom plates shown elsewhere in catalog.

Channon Derrick Irons (Forgings)



No. 805. Top Stiff-Leg or Goose Neck Irons

Hammered Steel

Forged from machine steel with bend a short distance from gudgeon pin hole. Washer plate and bolts are included.

Plate for gudgeon pin is punched and worked out—an unusually strong construction.

Forty-five degree bends always furnished unless otherwise notified, but can furnish any bend desired.

We list standard sizes of irons below such as usually supplied with timbers mentioned. Can supply any size irons desired at short notice. Swedes Iron goose-necks at extra price.

Size of Stiff-Leg Timbers, Inches	Diameter of Gudgeon Pin, Inches	Main Iron		Size of Washer Iron, Inches	Diameter of Bolts, Inches	Approx. Weight, Each as Shown	Price of One Iron, as Shown with Bolts
		Size, Inches	Length, Inches				
6x6	2	1 1/4 x 5	30	1 1/4	3/4	90 lbs.	\$20.00
8x8	2 1/2	1 1/2 x 6	30	1 1/2	3/4	110 lbs.	25.40
10x10	3	1 3/4 x 8	36	1 3/4	7/8	155 lbs.	31.55
12x12	3 1/2	1 7/8 x 10	40	1 7/8	1	265 lbs.	38.60
14x14	4	2 x 12	48	2	1 1/4	455 lbs.	72.65
16x16	5	2 1/2 x 14	48	2 1/2	1 1/2	860 lbs.	92.00

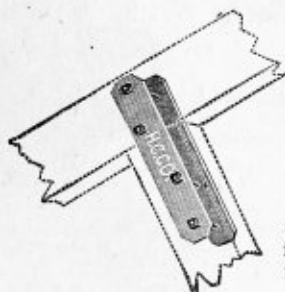
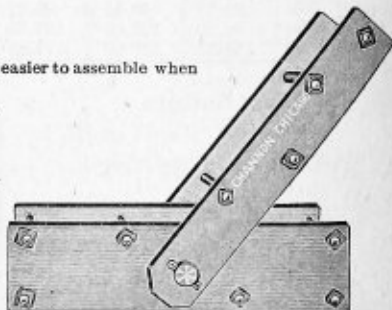
When ordered separately, be sure and state size of gudgeon pin and length of bolts.

No. 810 Lower Stiff-Leg Irons

This type of lower iron is the most easily fitted to the timbers and is easier to assemble when erecting stiff-legs. Pin is tapered slightly. Price includes bolts.

Size of Stiff-legs and Mud-Sills, Inches	Diam. of Pin, Inches	Size of Stiff-leg Irons, Inches	Size of Mud-Sill Irons, Inches	Approx. Weight Each, as Shown	Price of One Iron, as Shown
6x6	1 1/4	1 1/4 x 4	1 1/4 x 8	80 lbs.	\$ 9.90
8x8	1 1/2	1 1/2 x 4	1 1/2 x 8	85 lbs.	10.50
10x10	1 3/4	1 3/4 x 5	1 3/4 x 8	145 lbs.	12.00
12x12	2	1 7/8 x 6	1 7/8 x 8	210 lbs.	15.70
14x14	2 1/2	2 x 8	2 x 10	350 lbs.	29.00
16x16	3	2 1/2 x 8	2 1/2 x 12	565 lbs.	42.00

Always state size of timber and length of bolts wanted.



No. 815 Stiff-Leg Brace Irons

One pair (2) to a set.

Two sets (4) required for one derrick. Price includes bolts. State length wanted.

Size of Timber, ins..	6x6	8x8	10x10	12x12	14x14
Size of irons, inches.	1 1/2 x 5	1 3/4 x 5	1 3/4 x 8	1 3/4 x 8	1 x 10
Length of irons, ins.	36	36	36	40	40
Weight each, lbs....	55	65	90	130	255
Price each.....	\$4.00	\$4.20	\$6.00	\$8.50	\$13.20



No. 820 Boom Plates

For Heel of Wooden Booms

State diameter of pin holes and length of bolts desired if ordered separately.

Price includes the bolts.

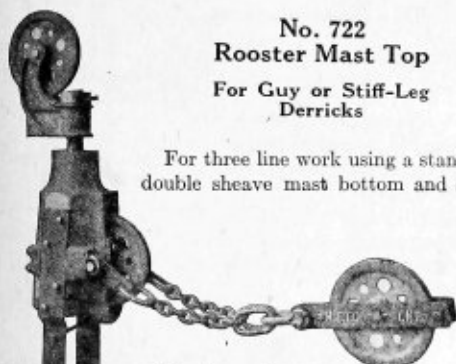
Size of Timber, ins..	6x6	8x8	10x10	12x12	14x14
Size of irons, inches.	1 1/2 x 5	1 3/4 x 5	1 3/4 x 6	1 3/4 x 8	1 x 10
Length of irons, ins.	36	36	36	36	40
Weight each, lbs....	55	65	70	135	255
Price each.....	\$4.70	\$5.60	\$6.60	\$9.55	\$16.00

Channon Derrick Irons (Mast Tops)

No. 722 Rooster Mast Top

For Guy or Stiff-Leg
Derricks

For three line work using a standard
double sheave mast bottom and step.



The boom line leads from the sheave
shown in the center of mast top cast-
ing up through the hollow gudgeon pin
over the top sheave and back to engine
drum. Price complete as shown.

Collar and chain for holding strapped
sheaves can be attached to gudgeon
pin if desired.

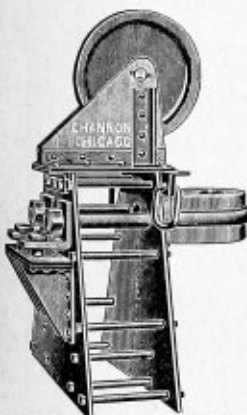
Size of Mast Timber, Inches	Approximate Weight, Pounds	Price with Plain Sheaves	Price with Self-lubricat- ing Sheaves
10 x 10	525	\$ 97.55	\$101.55
12 x 12	750	105.60	109.35
14 x 14	1000	141.35	146.65
16 x 16	1500	200.00	206.65
18 x 18	1800	244.00	256.00

No. 729 "A" Frame Mast Top

For Traveling or
Scow Derricks

Furnished with or with-
the rooster mast sheave
with strands or brackets.

The rooster sheave ar-
rangement, as shown, is
used for three line grab
bucket work with a two
sheave mast step.



Size of Timbers, Inches	Approximate Weight, Pounds	Price without the Rooster Sheave	Price with S. L. Rooster Sheave as Shown
10 x 10	465	\$ 53.00	\$ 88.00
12 x 12	630	70.00	106.00
14 x 14	905	165.00	150.00
16 x 16	1300	147.00	216.00

No. 715 Guy Derrick Cap

When ordered separately,
be sure to state diameter of
hole for gudgeon pin.



Size	Diam. of Mast at Top, In.	Number of Guy Links	Approx. Weight, Pounds	Price with Ring and Links
A	8	4	29	\$ 8.00
B	10-12	4	39	10.00
C	8	5	39	8.60
D	10	5	40	11.15
E	12	5	50	13.35
F	12-14	6	87	16.00
G	14	8	90	19.80
H	16	8	100	24.00

No. 716—Steel Plate Guy Cap



When ordering separately, state diameter of gud-
geon pin.

Size	Diam. of Mast at Top, In.	Number of Guy Links	Approx. Weight, Pounds	Price with Shackles
J	8	4	25	\$16.40
K	10-12	4	32	17.00
L	8	5	24	17.60
M	10	5	30	18.35
N	12	5	35	19.35
O	12	6	40	20.55
P	12-14	6	46	23.00
Q	14-16	8	64	33.00
R	16-18	10	79	40.00

No. 717—Derrick Chains



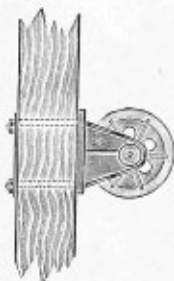
For mast tops of stiff-leg derricks, to permit boom
to swing clear around against the stiff-legs.

End links are furnished to fit eye-bolts or pins at
mast-top and pin in boom topping block.

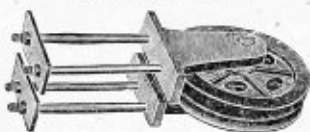
Made of Bullock highest quality dredge chain—
hand forged and tested. Usual length 3 to 6 feet.

Size, Inches	Approx. Wt. per Ft., Lbs.	Approx. Breaking Strength	Approx. Working Load	Price Per Foot
1/2	3	18,000	5,100	\$0.46
3/8	4 1/2	25,000	7,200	.70
3/4	6 1/2	36,000	10,800	1.00
7/8	8 1/2	48,000	14,700	1.20
1	11	61,000	19,200	1.40
1 1/8	14 1/2	78,000	24,000	1.80
1 1/4	17	95,000	29,400	2.00
1 3/8	21	114,000	34,800	2.50
1 1/2	24	134,000	40,200	3.00

Channon Derrick Irons (Mast Sheaves)



No. 855—Mast Sheaves
With Brackets and Bolts
For Face of Mast

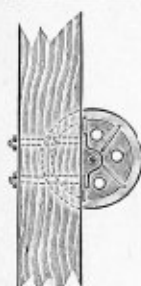


Double

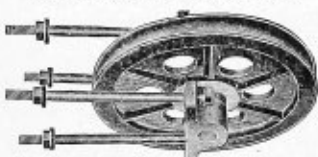
Wire Rope Sheave
Used with Off-set Mast Bottoms

Diam. of Sheaves, Inches	Single Sheave			Double Sheave		
	Weight, Lbs.	Plain Bored	Self-Lub.	Wght., Lbs.	Plain Bored	Self-Lub.
10	35	\$ 7.35	\$12.00	50	\$10.00	\$16.40
12	50	8.00	12.43	75	11.35	18.45
14	90	9.85	13.85	120	12.30	19.05
16	110	10.70	16.00	145	.....	22.65
18	135	12.00	18.65	200	.....	28.00

Always state size of timber or length of bolts wanted.



No. 845—Mast Sheaves
For Center of Mast or for End of Boom
With Shaft Boxes and Bolts



Single

Diameter of Sheaves, Inches	Approx. Weight, Pounds	Price Plain Bored Sheave	Price Self-Lub. Sheave
10	30	\$ 6.90	\$11.60
12	40	7.55	12.20
14	55	8.55	13.30
16	70	10.00	14.85
18	95	12.00	17.10

No. 850—Mast Sheaves

With Wrought Steel Brackets
For Face of Mast



For leading boom line down the face of the mast to the off-set mast bottom.

Sheaves are for wire rope and self-lubricating graphite bronze bushed.

Fig. No.

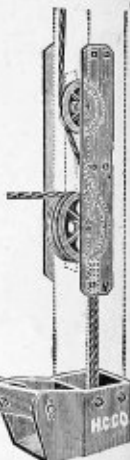
Diameter of Sheaves, Inches	Single Sheave		Double Sheave	
	Wght., Lbs.	Self-Lubricating Bronze Bushed	Wght., Lbs.	Self-Lubricating Bronze Bushed
10	47	\$12.00	61	\$16.40
12	62	12.60	84	18.45
14	77	13.90	108	19.05
16	96	16.00	132	22.65
18	136	18.65	195	28.00

No. 768—Mast Sheaves

Including Shafts, Plates and Bolts

This arrangement may be used with our No. 749 mast bottom for leading the boom and hoist lines to the step sheaves.

Usually located just above the mast bottom. Necessitates boring along hole in mast or cutting out for ropes.



Price does not include the mast bottom casting shown.

Size of Mast Timber, Inches	Approx. Weight, Pounds	Price with Plain Bored Sheaves	Price with Self-Lub. Sheaves
8x8	75	\$10.65	\$14.55
10x10	95	13.20	18.70
12x12	135	23.00	30.35
14x14	175	31.00	38.50
16x16	210	40.00	52.00
18x18	275	53.35	66.00

No. 769

Angle Steel Mast Sheaves
With Shafts, Plates and Bolts

Used with mast bottoms having center pintle to lead the ropes down through the center of the mast to the sheaves in the mast step.

This arrangement used for grab bucket work with rooster top—the two larger sheaves carrying the two bucket lines.

The smaller sheave in regular two line derricks guides the boom line to the large lower sheave as shown in No. 768 arrangement above.

Furnished with self-lubricating graphite bronze bushed sheaves, which require no oil.



Fig. No.

Size of Mast Timber, Inches	Diam. of Large Sheaves	Self-Lubricating Sheaves			
		Wght., Lbs.	Single Line	Wght., Lbs.	Double Line
10x10	14	185	22.40	225	\$31.65
12x12	16	215	23.90	270	34.90
14x14	18	270	29.00	320	42.65
16x16	20	315	33.00	380	49.00
18x18	22	385	40.00	500	62.00

Channon Derrick Irons (Boom End Fittings)

No. 790 Split Boom Band With Two Links and Bolts



Size No.	Inside Diam., Inches	Size of Iron	Weight, Lbs.	Price Each
1	7	$\frac{3}{8} \times 2 \frac{1}{2}$	25	\$ 6.60
2	8	$\frac{3}{8} \times 2 \frac{1}{2}$	27	8.00
3	9	$\frac{3}{8} \times 2 \frac{1}{2}$	30	9.35
4	10	$\frac{3}{8} \times 3$	40	11.75
5	11	$\frac{3}{8} \times 3$	52	14.30
6	13	$1 \times 3 \frac{1}{2}$	75	20.00
7	15	$1 \frac{1}{4} \times 4$	110	22.40
8	17	$1 \frac{1}{4} \times 5$	150	25.35

Any size or diameter forged to order.



No. 800 Flat Eye Band

Forged Eyes—Two Links

Size No.	Inside Diam., Inches	Size of Iron	Weight, Lbs.	Price Each
1	7	$\frac{5}{8} \times 3$	19	\$ 9.55
2	8	$\frac{5}{8} \times 3$	22	9.55
3	9	$\frac{5}{8} \times 3$	30	11.75
4	10	1×3	40	15.25
5	11	1×3	50	16.40
6	13	$1 \times 3 \frac{1}{2}$	63	20.00

No. 785 Plain Flat Band With Two D Links



Size No.	Inside Diam., Inches	Size of Iron	Weight, Lbs.	Price Each
1	7	$\frac{3}{8} \times 2 \frac{1}{2}$	16	\$2.35
2	8	$\frac{3}{8} \times 2 \frac{1}{2}$	17	3.00
3	9	$\frac{3}{8} \times 2 \frac{1}{2}$	19	3.55
4	10	$\frac{3}{8} \times 3$	27	4.40
5	11	$\frac{3}{8} \times 3$	34	5.35
6	13	$1 \times 3 \frac{1}{2}$	53	8.00

No. 787 Split Band

With Extension Straps

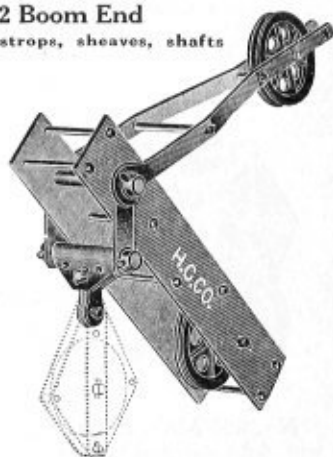


Same as No. 790 except with straps extended and including bolts for boom.

Size No.	Inside Diam., Inches	Size of Iron	Weight, Lbs.	Price Each
1	8	$\frac{3}{8} \times 2 \frac{1}{2}$	46	\$21.15
2	9	$\frac{3}{8} \times 2 \frac{1}{2}$	48	22.90
3	10	$\frac{3}{8} \times 3$	67	26.40
4	12	$1 \times 3 \frac{1}{2}$	117	30.00
5	14	$1 \frac{1}{4} \times 4$	175	34.70

No. 772 Boom End

With plates, strops, sheaves, shafts and bolts.



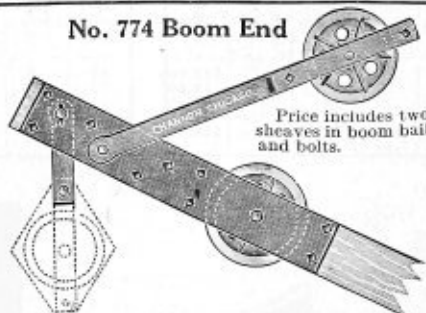
Price includes fittings as shown with two sheaves in the boom bail.

A good strong arrangement.

Price does not include lower block (dotted).

Size of Boom Timber	Diam. of Sheaves	Wght., Lbs.	With Plain Bored Sheaves	With Self-Lubricating Sheaves
8x 8	12	190	\$39.60	\$ 47.50
10x10	14	250	46.00	55.45
12x12	16	385	53.35	63.00
14x14	18	495	63.35	76.55
16x16	20	650	82.00	100.00

No. 774 Boom End



Price includes two sheaves in boom bail and bolts.

Size of Boom Timber	Diam. of Sheaves	Wght., Lbs.	With Plain Bored Sheaves	With Self-Lubricating Sheaves
8x 8	12	185	\$39.60	\$ 47.50
10x10	14	245	46.00	55.45
12x12	16	375	53.35	63.00
14x14	18	485	63.35	76.55
16x16	20	640	82.00	100.00

No. 765 Boom End Sheave

With pin, sideplates and bolts.

Generally used with No. 790 Boom Band.

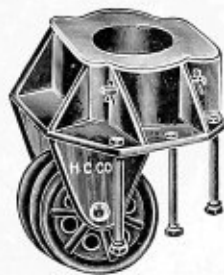


Size of Boom Timber	Diam. of Sheave	Wght., Lbs.	Size of Side Plates	Plain Bored Sheave	Self-Lubricating Sheave
6x 6	10	35	$\frac{1}{4} \times 4$	\$ 8.00	\$ 9.40
8x 8	12	55	$\frac{3}{8} \times 4$	9.15	11.00
10x10	14	80	$\frac{1}{2} \times 6$	11.60	12.00
12x12	16	125	$\frac{3}{4} \times 6$	12.30	14.70
14x14	18	160	$\frac{1}{2} \times 8$	15.25	17.60
16x16	20	215	$\frac{3}{4} \times 8$	17.00	21.00

Channon Derrick Irons (Mast Bottoms)

The improved derrick irons are of the ball and socket type with oil reservoir and gib or locking steel keys to prevent mast from unstopping or "kicking out."

The bearing surfaces in this type are always in contact—even with the mast out of plumb.



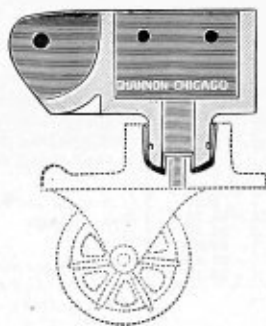
No. 600 Mast Step

With Self-Lubricating Sheaves

Adapted for guy or stiff-leg derricks—without change.

Has gibs or locking keys.

Price includes mast step, as shown with two sheaves, pin, gib keys and necessary bolts.



No. 640 Mast Bottom

Used with No. 600 step. Illustration shows center pintle type. Off-set pintle furnished at the same price.

Price includes mast bottom (no step or sheaves), boom plates (not shown) and pin for boom.



No. 670 Mast Step

With Self-Lubricating Sheaves

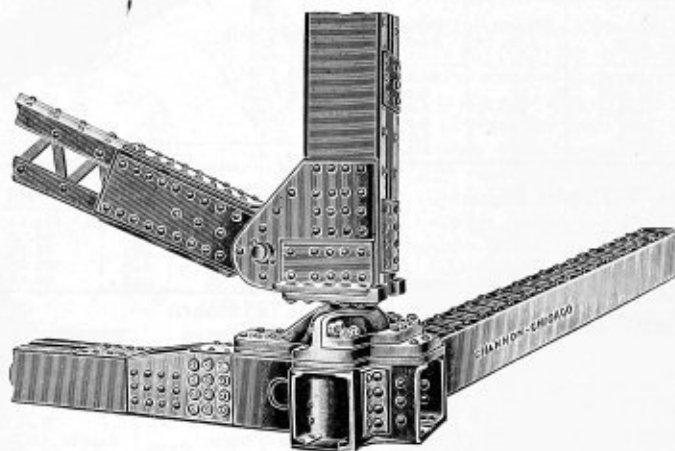
Adapted for barge or traveling derricks. No. 640 mast bottom fits this step. Sheaves and pin are above the deck and easily taken out.

Price includes step casting only with two sheaves and pin.

Mast Tmbr., Ins.	Boom Tmbr., Ins.	Diam. of Cup, Ins.	Apprx. Wght., Lbs.	Price
10	8	8 1/2	275	\$40.00
12	12	8 1/2	360	50.00
14	12	11	450	67.00
16	14	11	625	80.00
18	16	11-15	1600	116.00

Mast Tmbr., Ins.	Boom Tmbr., Ins.	Diam. of Pintle, Ins.	Apprx. Wght., Lbs.	Price
10	8	8 1/2	175	\$30.00
12	12	8 1/2	265	40.00
14	12	11	455	50.00
16	14	11	1240	80.00
18	16	11-15	1900	116.00

Diam. of Cup, Ins.	Hght. and Diam.	Diam. of Sh'ves	Apprx. Wght., Lbs.	Price
8 1/2	16x24	14	800	\$60.00
11	17x38	16	1425	74.00
15	25x60	22	4100	166.00



No. 675 Special Cast Steel Locked Ball and Socket Mast Bottom and Step

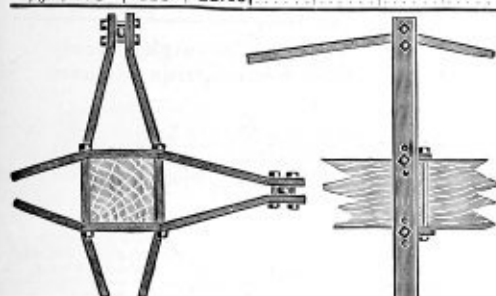
As furnished with all steel derricks. Same arrangement can be supplied for heavy wooden derricks. Prices quoted upon request.

Channon Derrick Irons (Miscellaneous)

No. 700 Boom Truss Rods With Turnbuckle and Strut



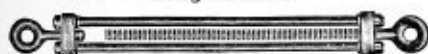
Diam. Rod, Inches	Lgth. Rod, Feet	Aprx. Wgt., Lbs.	Price, Each	Diam. Rod, Inches	Lgth. Rod, Feet	Aprx. Wgt., Lbs.	Price, Each
3/4	25	55	\$16.40	7/8	55	135	\$22.85
3/4	35	72	17.60	7/8	65	160	24.65
3/4	45	89	18.65	1	35	120	28.90
3/4	55	107	19.90	1	45	150	24.65
3/4	25	68	17.60	1	55	180	27.00
3/4	35	91	18.80	1	65	210	29.35
3/4	45	113	21.65				



No. 701 Strap Truss Rods

Made to order any size or length desired.
Prices quoted upon request.

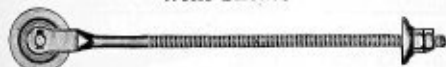
No. 702 Guy Tighteners Long Pattern



Size No.	Diam. of Screw, Inches	Length of Take-up, Inches	Weight, Pounds	Price, Each
10	3/4	30	20	\$ 6.80
12	3/8	30	26	8.25
14	1	30	37	11.00
16	1 1/4	30	62	15.00
18	1	72	66	20.00
20	1 1/4	72	105	23.00
22	1 1/2	72	165	32.00

Any diameter or length made to order.

No. 703 Guy Tightener With Sheave



Size No.	Diam. of Screw, Inches	Length of Take-up, Inches	Weight, Pounds	Price, Each
24	1	48	23	\$16.60
26	1 1/4	48	35	21.00
28	1 1/2	48	48	30.00
30	2	72	100	37.80

No. 704 Guy Shackle With Sheave

Size No.	Size of Shackle, Inches	Diam. of Sheave, Inches	Weight, Pounds	Price, Each
32	1	5	10	\$3.20
34	1 1/4	6	14	5.30
36	1 1/2	8	24	8.30



Turnbuckles



Eye and Eye

See prices in another section of this catalog.

No. 706 Boom Sheave with Bail For Supporting Boom at Center



Price includes self-lubricating bronze bushed sheave, wrought straps, casting for underneath the boom and necessary bolts.

Diameter of sheave . . . Inches	12	14	16
Approximate weight . . . Pounds	57	74	86
Price Each	\$18.65	\$0.55	\$22.85

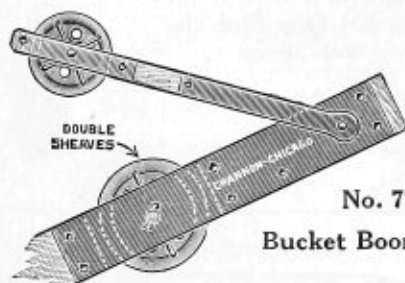
Union Guy Gripper For Taking Up Slack in Derrick Guys, Etc



A guy can be tightened in about one-eighth the time usually consumed by old-fashioned methods. Cannot slip, for the harder the pull, the tighter the grip.

Size No.	For Wire Rope, Diam., Inches	Weight, Pounds	Price, Each
1	3/8 in. and smaller	30	\$12.55
2	1 in. to 1 1/8 in.	33	15.10
3	1 1/2	40	21.00
4	2	45	30.00

Channon Derrick Irons (Boom Fittings, Etc.)



No. 771 Grab

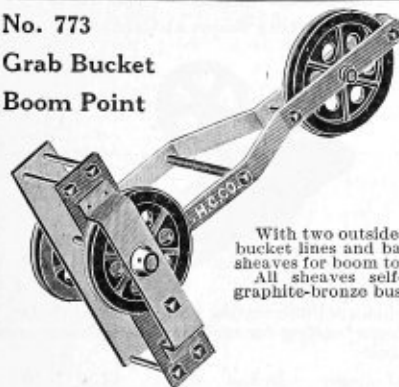
Bucket Boom Point

With boom bail and two sheaves and two sheaves for bucket line—sheaves self-lubricating bushed.

Size of Boom Timber	Size of Sheaves		Weight, Pounds	Price
	Bucket	Boom		
10x10	16	12	260	\$58.65
12x12	18	14	430	66.00
14x14	20	16	515	85.80
16x16	24	18	770	99.00

No. 773

Grab Bucket Boom Point



With two outside sheaves for bucket lines and bail with two sheaves for boom topping lines.
All sheaves self-lubricating graphite-bronze bushed.

Size of Boom Timber	Size of Sheaves		Weight, Pounds	Price
	Bucket	Boom		
10x10	16	12	245	\$ 72.00
12x12	18	14	400	78.40
14x14	20	16	485	100.00
16x16	24	18	725	120.00

No. 767



Special Grab Bucket Boom Point

This point is exceptionally heavy and stiff. It was gotten up by a large bridge company for very hard digging. Two sheaves are used for grab bucket, the third sheave for miscellaneous hoisting. Weight about 825 pounds.

Price.....\$135.00

No. 842 Strapped Sheaves



Diam. of Sheaves, Inches	Single Sheaves			Double Sheaves		
	Wt., Lbs.	Plain Bored	Self-Lubr.	Wt., Lbs.	Plain Bored	Self-Lubr.
10	35	\$ 6.65	\$ 8.00	55	\$ 9.35	\$12.00
12	50	8.00	10.00	80	12.65	17.00
14	75	10.65	13.00	120	16.00	20.00
16	95	14.00	17.85	150	20.90	24.00
18	150	20.00	22.30	240	27.00	34.00

No. 841 Tandem Wrought Steel Frame Swing Rope Guide Sheaves



Diameter of Sheaves, Inches	Approximate Weight, Pounds	Price with Self-Lubricating Bronze Bushed Sheaves
10	78	\$17.60
12	112	23.65
14	190	30.65
16	334	39.00

No. 827 Center Oiling Sheave Pins

With Compression Grease Cups



Grease is forced through the shaft to the bearings.

Diam. Shaft	Inside Length	Wt., Lbs.	Price Each	Diam. Shaft	Inside Length	Wt., Lbs.	Price Each
1 1/8	10	7	\$2.20	2 1/8	14	17	\$2.90
1 1/8	12	8	2.35	2 1/8	16	16	4.40
1 1/8	14	10	2.65	2 1/8	12	20	4.80
1 3/8	10	11	3.00	2 1/8	14	22	5.35
1 3/8	12	12	3.20	2 1/8	14	28	10.00
1 3/8	14	14	3.60	2 1/8	16	35	11.15
2	10	13	3.60	3	14	41	14.15
2	12	15	4.00	3	16	45	16.25

Sheaves are listed elsewhere in this catalog.

No. 865 Mast Cleats

With Bolts

Used with hand power derrick having single drum winch using Manila rope for lashing line to back of mast.



Size, inches.....	10	12	14	16	18
Weight, pounds.....	8	9	12	20	35
Price each.....	\$1.45	\$1.60	\$2.15	\$3.55	\$5.35

Channon Derrick Fittings



**Fall Line
Balls**

**With Two Wrought
Steel Loops**

No.	Approximate Weight, Pounds	Approximate Capacity, Tons	Price, Each
1	50	2	\$ 5.25
2	68	3	5.85
3	105	5	8.80
4	115	8	9.35
5	218	8	16.40
6	230	12	17.30
7	250	20	18.65
8	300	12	23.45
9	320	20	26.50
10	500	12	33.50
11	520	20	35.20
12	550	30	37.60



Fall Line

Hooks with Ball

**With Two Wrought
Steel Loops and Hook**

No.	Approximate Capacity, Tons	Approximate Weight, Pounds	Price, Each
13	3	73	\$ 8.20
14	5	86	9.35
15	3	120	11.75
16	5	125	16.15
17	8	140	19.90
18	8	250	27.00
19	12	260	31.45
20	20	290	38.10
21	12	330	37.50
22	20	360	44.60
23	12	535	48.00
24	20	560	53.90

No. 709 Cast Cheek Plate Weights for Wire Rope Blocks

Used on fall line blocks to overhaul the rope where many parts of line are used—see application in illustration below.

For Wire Rope Blocks, size.....Inches	12	14	16	18	20
Weight of Light Cheeks.....Pounds	100	100	100	150	200
Weight of Heavy Cheeks.....Pounds	200	200	200	300	400
Price, per pound.....	\$0.05½				

No. 708 Open Link Erectors' Hook

View at the right shows application of hook as well as the cast cheek plates No. 709 above.

Used in heavy steel erection work in connection with blocks having shackles to facilitate quick handling of sling chains.

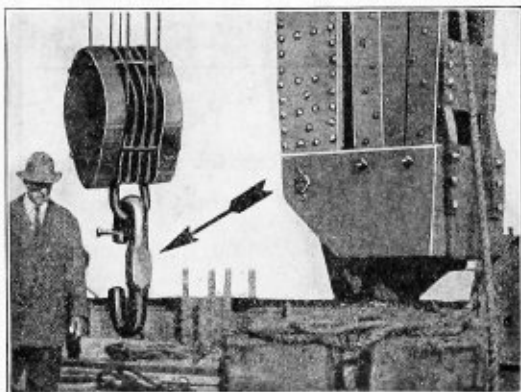
Forged to order of best quality iron in sizes 2 to 6-inch diameter of iron.

Any length or opening.

Price upon request.



State Size
Wanted



Channon Derrick Hooks, Chains, Etc.

No. 620—Derrick Grab Hooks



Size No.	Nominal Capacity, Tons	Size of Iron, Inches	Weight, Pounds Each	Price, per Set of Two Hooks
1	2½	1 x 3	18	\$ 9.35
2	5	1 x 3½	30	13.75
3	10	1½ x 4	45	18.50
4	15	2 x 5	75	24.00
5	25	2 x 6	125	39.50

No. 621—Derrick Grab Hooks with Chain



The chain has ring on one end and grab hook on the other end. Chain may be shortened by hooking grab hook into chain, as shown in cut.

Capacity cannot be guaranteed, as a very wide spread with a short chain may exert stresses many times in excess of the load.

Chain is "BBB" Quality—Hooks No. 621, see above.

Size No.	Nominal Capacity, Tons	Size of Chain, Inches	Length of Chain, Feet	Aprx. Wgt., Lbs.	Price as shown
6	2½	½	10	75	\$14.25
7	5	¾	14	135	23.00
8	10	¾	16	225	31.50
9	15	1	17	375	45.75
10	25	1¼	20	550	80.00



No. 622
Derrick Foot Hooks
and Chains

"BBB" Quality Chain

Size No.	Nominal Capacity, Tons	Size of Chain, Inches	Length of Chain, Feet	Aprx. Wgt., Lbs.	Price as shown
11	2½	½	5	55	\$17.30
12	5	¾	7	105	28.80
13	10	¾	10	200	31.50
14	15	1	15	440	36.90

No. 623—I-Beam Clamps

Size No.	Cap., Tons	Max. Size Beam	Wgt., Lbs.	Price Each
15	1	10	20	\$10.60
16	2	15	30	12.60
17	3	20	45	15.85

Clamps of any design or size forged to order.



No. 624

Stone Setters' Grabs



With one "safe" hinged point for finished face of stone. Regular opening about 24 inches.

Size No.	Nominal Capacity, Tons	Approximate Weight, Pounds	Price Each
18	½	40	\$ 9.20
19	¾	45	10.60
20	1¼	65	12.45
21	2	80	13.85
22	3	100	15.85

No. 625—Stone Sled



Size 6 ft. long by 3 ft. wide of 5/16-inch plate reinforced by three 1½ x ¾ steel bands and supplied with pulling chains. Weight 385 lbs. Price.....\$41.00

Stone Tongs



Fig. G626



Fig. G627

Furnished promptly any size or style desired. State opening wanted, capacity and style.

Prices quoted upon request.

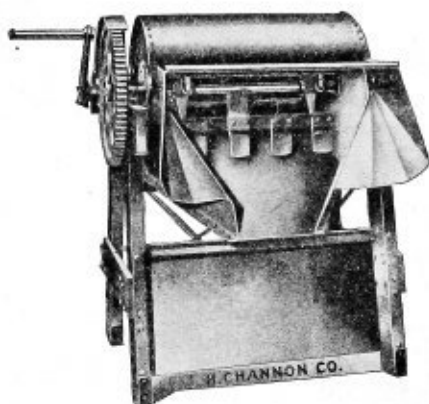
The Northfield Slush Mixer



Made especially for slushy-wet mixtures only. It is the best for rapid contract work. Capacity 30 to 60 cubic yards per day, according to conditions. Makes a fine mortar mixer when operated by power at about double the speed of hand turning. Dumps automatically when turned by hand and the best results on slush concrete are obtained by hand turning. Some have used this mixer for plaster with good success. On slush concrete it mixes a big heaping wheelbarrow full of dry materials to the batch. It will turn out a 4 cubic foot batch of slush concrete every minute.

Prices

- Slush (hand) mixer complete with cranks, weight 356 pounds.....\$64.00
- Extra for power attachment with one tight American split steel pulley, extra gear, shafting, etc., all complete to fit either machine, weight 47 pounds.....\$7.50
- Extra for power attachment with one tight and one loose American split steel pulleys and with Roberts patent bushing for the loose pulley, extra gear, shafting, etc., all complete to fit either machine, weight 81 pounds.....\$14.50
- Extra if equipped with patent tilting folding rollers so that one man can wheel mixer about like a two-wheeled freight handler's truck, weight 30 pounds.....\$7.00



The Berlin Six Concrete Mixer

It Does the Work of Six Men.

It will mix from 30 to 90 cubic yards per day, having a capacity of 6 cu. ft. of unmixed material and 4½ cu. ft. of mixed concrete. You can mix the sloppy top dressing with no danger of slopping over as the discharge end is completely closed. It can be trailed from the rear of the wagon which carries your wheelbarrow and other tools. No extra team is required.



Showing Man Shoveling in

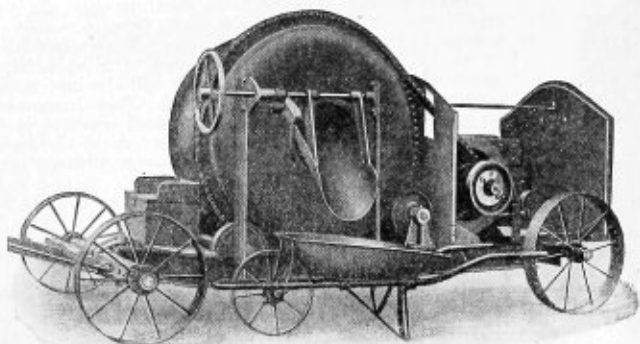


"Berlin Six," Showing Discharge Chute Open

Weight 1300 pounds. Price.....\$225.00

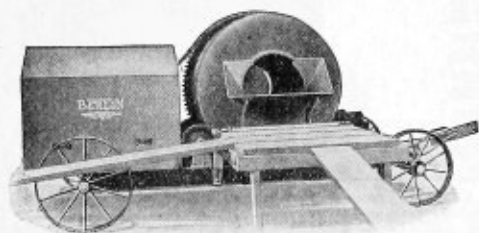
The New 1915 Berlin Concrete Mixer

Low Charge—Chain Driven



Showing Discharge Side with Auto-Hood Removed

Showing Charging Side—With Low Down Platform (furnished)



The Low Charge Platform saves all the mechanism of the side-loader, also the weight—an important consideration in a small portable machine which is frequently moved. The frame is "low-down" and the incline but very slight—2 feet 6 inches above ground.

This loading platform is included in price of machine, is made of well seasoned lumber and hinged to the mixer—easily taken off for transportation.

The New Features in Mixer Construction

One. Direct Roller Chain Drive from engine fly wheel shaft to drum of mixer—there is no countershaft and there is only one chain and that is steel roller bushed.

Two. Planetary Reducing Gear and self-adjusting Friction Clutch—speed is reduced internally—grease lubrication.

Three. Discharge Chute automatically locked and easily controllable to allow concrete to flow slowly or quickly as desired.

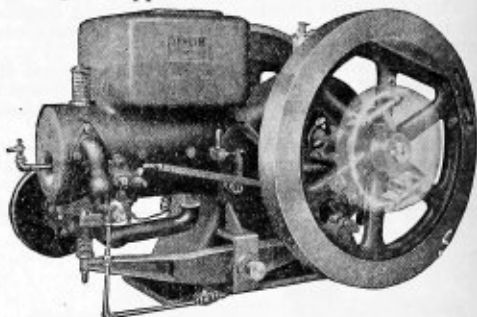
Four. Chain is steel roller bushed heavy type such as is found on large heavy chain driven machines and not common agricultural link-belted.

Five. Sectional drum sprockets.

Six. "Underslung" Frame construction of 6-inch channel steel making for low charging and easy turning—the wheels are large with wide tires.

Seven. The Gasoline Engine is of exceptionally sturdy construction and designed for the mixer—made in the same shop as the mixer. The cylinder, hopper, bed, main bearing and head—are cast in one piece. The water-cooling hopper is large and of proper shape for good cooling—in addition there are four tubes running through the hopper which assist in perfect cooling. Ignition is of the simple, reliable make and break type with gear-driven, built-in magneto—no batteries needed.

The Hopper-Cooled Gasoline Engine



Starts in coldest weather—it cannot be flooded and there are no batteries to freeze.

An excess of gasoline can be pulled into the cylinder—but as the exhaust valve is below the cylinder, all excess runs through the exhaust valve port, thereby eliminating all trouble from flooding when starting. Dougie lubrication. Dust-proof enclosed crank-case. Gasoline tank in base.

Specifications and Prices

Size Number of Mixer	No. 6	No. 11
Capacity, unmixed material, cubic feet	6	11
Capacity, mixed concrete, cu. ft.	4	7
Capacity, per hour in cu. yds.	5-8	8-11
Price, complete, on trucks:		
With Gasoline Engine, housed	\$405.00	\$735.00
With Steam Engine and Boiler		\$655.00
With Steam Engine only		\$755.00
With Electric Motor	465.00	\$955.00
Without Power with Pulley or Sprocket	280.00	\$335.00
Extra—For Batch Hopper	\$40.00	\$54.00
For Water Meas. Tank	40.00	40.00
For Boilers built for Ohio, Mass., Detroit, Sask., or Alberta Specifications		60.00

Above prices include mounting on low down underslung truck with tongue, also folding charging platform shown, standard charging chute, housing, clutch and Magneto for gasoline engine machines.

The Schaefer Concrete Mixer

This Machine Differs from Other Mixers in Several Important Points

First.—It has a substantial foundation with cast frame members, machined joints and turned bolts of large size. This is the same style of frame used on contractors' hoisting engines and has four times the sectional area of the ordinary channel or I beam construction and much less vibration.

This frame is machined carefully for engine cylinders and bearings—keeping all parts in absolute alignment.

Second.—This is the only mixer that we know of using a horizontal steam engine. The engine is really a part of the mixer frame, as the cylinders and bearings are mounted directly on it.

Third.—The engine is direct connected to drum without the use of a countershaft—as the pinion on the crankshaft meshes directly with the drum gear. The large bore and stroke permit of slow speed and long wear.

Dust cover protects all moving parts of engine, which is furnished with grease cups throughout.

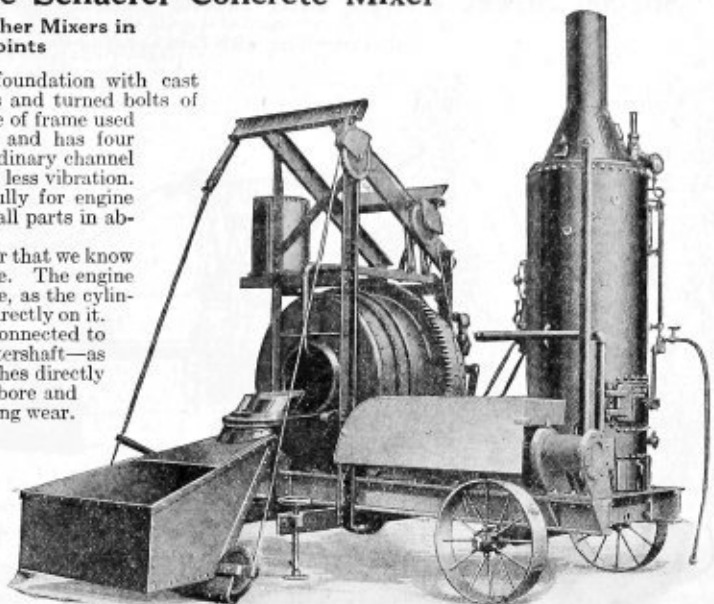
This machine is substantially made with few and simple parts, large shafts and bearings, large rollers and truck wheels. On account of the rigid construction and absence from vibration, will last a long time without replacement of parts

Drum is made of hardest tank steel with rings cast solid of semi-steel turned inside and out. The rings are riveted to the shell which is riveted to flanged heads with rounded corners. A drip ring is fitted in the opening to prevent slopping of contents.

The internal blade disposition forces the materials to the center of the drum—then the lower half of the material passes to the discharge side of the drum and is lifted again by the cups or buckets—if the discharge chute is down the drum is quickly emptied, but if the chute is up the material is thrown to the bottom again.

Roller Path Rings and Rollers

Roller rings or track for rollers are perfectly round—they are turned inside and out. The track rollers are large size with wide treads and large bearings—see dimensions below. Rollers are charcoal iron with deep chill and ground to a true circle. Rollers are keyed to their shafts which revolve in large babbitted bearings fitted with compression grease cups, which force the grease out at the ends of bearings—the best method of lubrication for contract work where cement and other gritty dust fills the air around the mixer.



Steam Mixer on Trucks with Power Side Loader and Automatic Water Tank.

Discharge Chute is controlled by one lever and chute is locked automatically. With the bell crank lever motion an in and down motion is obtained—in, to get into drum as far as possible, and down to get away from the inside wings—mixer is discharged in 10 to 20 seconds, depending upon consistency of material.

Side Loader or power hopper is of the simple pivoted type operated by friction hoisting drum with screw thrust. The hopper throat enters the drum and avoids spilling—throat end is partially enclosed to strengthen it and is provided with deflector plate and breaks up material and avoids clogging of hopper. Jack screws are furnished on hopper side to counteract thrust on one side when raising hopper.

Automatic Water Measuring Tank is really automatic—when once the proper amount of water is adjusted for the day's work—it requires no further attention. The power loader operates a three-way valve—filling, measuring and discharging the proper amount of water.

Sizes, Capacities, Etc.

Number of Mixer	Capacity, cu. ft. Dry Material	Capacity cu. ft. Mixed Concrete	Capacity cu. yds. per hour with Chugging Chute	Capacity cu. yds. per hour with Power and Batch Hopper	Size of Drum in inches	Revolutions of Drum per Min.	Diam. and Face of Drum Rollers in inches	Length of Roller Bearings, inches	Thickness of Drum Roller Track	Size of Rear Truck Wheels, inches	Bore and Stroke of Engine, inches	H. P. of Engine and Boiler	R. P. M. of Engine and Pulley	Weight on Trucks without Power, pounds	Weight on Trucks with Electric Motor, pounds	Wt. on Trucks with Eng. & B. Tr. Side Loader and Water Tank, lbs.
11	11	7	11	15	42x36	22	10x2	5 1/2	3/4	24x4	6x7 1/2	6-7	175	2200	3500	6600
15	15	10	15	22	48x38	22	14x2 3/4	6 1/2	1 1/4	30x5	7x8	8-9	145	3300	6000	8300
21	21	14	22	30	54x32	21	14x3 1/4	6	1 1/4	30x6	7x8	9-12	180	4000	7000	8900
30	30	21	30	42	60x45	21	14x3 3/4	8	1 1/4	30x6	7x9	12-14	220	4600	8000	10800
40	40	28	40	55	60x50	21	14x3 1/2	8	1 1/4	30x8	9x9	18-20	160	5500	9000	12800

Prices quoted upon request.

We carry complete Equipment for Concrete Jobs.

Special Street Paving and Road Building Concrete Mixers

Self-Propelling with End Loading Bucket

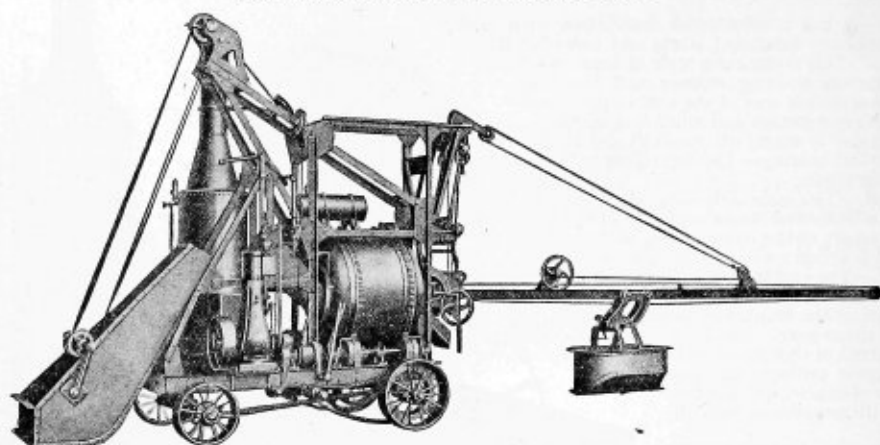


Fig. G. Showing No. 14 Special Paving and Road Building Mixer with 20 Ft. Delivery Boom and Bucket

This mixer was especially designed for laying concrete footings for streets and roads, but it can be used for any class of work. The machine is mounted to discharge at the rear and is provided with traction drive for moving it along the streets when laying base, enabling it to be always kept at the exact location for most rapid work with least handling or hauling of material. This enables the supply piles to be made continuous along the sides of the street and the mixer placed in the center between the piles and moved along as condition require, to always keep it in most convenient position to the supply of material and delivery of concrete.

No platforms or runways are required and if the material is placed sufficiently close to the machine it can be shoveled directly from the supply piles to the charging bucket, eliminating the use of wheelbarrows at the charging end.

The reversible traction drive is fitted with a friction clutch. In order to move the machine a few feet ahead it is only necessary to throw in the clutch. To stop the machine, throw out the clutch.

The traction drive is connected to both rear wheels, and the drive is sufficiently powerful to propel the machine up a considerable grade.

Provision is made for steering the machine while moving it by its power.

The delivery boom and bucket is a great time and labor saver. It is the most economical means of spreading the concrete on wide streets or roads, eliminating the use of wheelbarrows or carts. One man attends to discharging the concrete and delivering it.

The concrete is discharged from the mixer into a bucket which travels on an I-beam track which is connected to the frame by a universal joint, allowing it to swing from one side to the other in an arc of 180 degrees.

The bucket holds a full batch of the mixing drum, although contractors have found it advisable to make two trips of the bucket for each batch, which can be usually done in the time required to load the charging bucket.

The bucket is operated by power transmitted from the main drum gear to a reversible sheave drum around which a cable is passed and which is attached to both ends of the bucket trolley. One workman operates both the discharge of the drum and the movement of the bucket and the bucket is so designed that it practically spreads the concrete on the street on its return from the end of the beam to the drum of the mixer.

Number.....	11	14	22
Capacity per batch in cubic feet, loose material.....	11	14	22
Capacity per hour in cubic yards, loose material.....	18	22	32
Capacity per hour in square street yards.....	90	120	180
Number of men required, including engineer and foreman.....	17	24	30
H. P. furnished steam engine.....	6	7	10
H. P. furnished steam boiler.....	8	9	12
H. P. furnished gasoline engine.....	7	8	15
H. P. furnished electric motor.....	7½	10	15
Mixer on trucks without power.....	6400	8000	9800
Mixer on trucks with steam engine and boiler.....	8800	10500	13200
Mixer on trucks with gasoline engine.....	8100	10200	13000
Concrete delivery boom 20 feet long and bucket complete.....	2250	2400	2550

Concrete Hoist Tower Equipment

For Gravity Concrete Distributing Systems

This hoist power arrangement, combined with a system of spouting, comprises a complete, flexible and economical plant for pouring concrete into forms.

Concrete is discharged from the mixer into the hoist bucket, which travels in guides inside the hoist tower and is automatically dumped into the receiving hopper, from which it travels through lines of spouting into the forms.

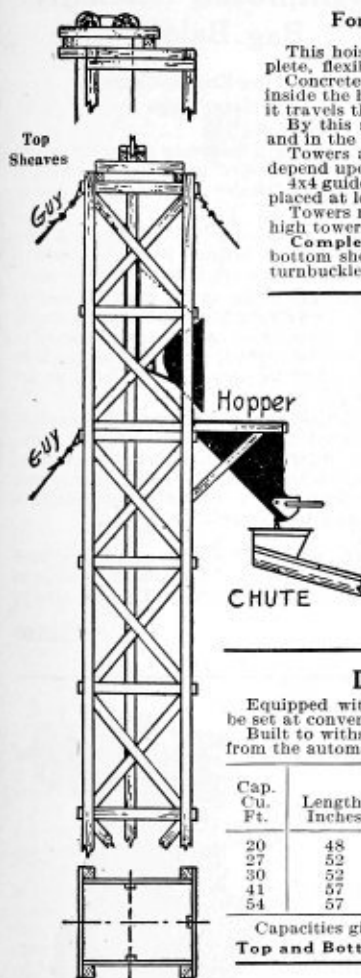
By this system concrete is placed just where desired with the fewest number of men and in the shortest possible time.

Towers are usually built of wood for ordinary conditions and the size of timbers will depend upon the height and size of equipment used.

4x4 guides should be used to fit channel guides of bucket and the top sheaves should be placed at least 10 feet above hopper bracket.

Towers must be securely guyed at the top and at the distributing hopper and for very high towers at intermediate points.

Complete Tower Outfit consists of hoist bucket, receiving hopper, one set top and bottom sheaves, necessary wire rope for hoisting and guylines, also clips, thimbles and turnbuckles and spout to suit requirements.



Concrete Hoist Bucket

This bucket is rigid in construction and will stand rough usage.

The channel steel guides are flared at the ends and run entire length of the frame.

The roller casters in front also tends to guide the bucket better and reduces friction.

Cap. Cu. Ft.	Hght. Over- all Ft. In.	Lgth. Over- all Ft. In.	Width. Betw. Guides Ft. In.	H. P. 60 ft. per Min.	Wght. Lbs.	Price Each
14	5 4	4 6	3 8	9	450	\$93.50
21	5 8	5 6	3 8	12	575	104.50
27	6 0	5 6	4 6	18	725	125.70
30	6 0	5 6	4 6	24	750	131.50



Distributing Hopper

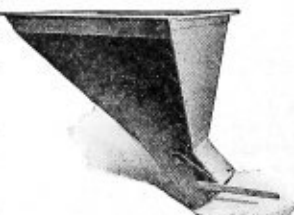
Equipped with controllable gate with lever which can be set at convenient angle to operator.

Built to withstand up to the discharge of concrete mass from the automatic bucket.

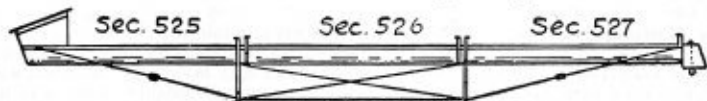
Cap. Cu. Ft.	Length, Inches	Width, Ins.	Depth, Inches	Size Gate, Inches	Price Each
20	48	48	54	12x12	\$ 80.10
27	52	56	58	12x12	104.70
30	52	56	61	12x12	109.35
41	57	60	62	12x12	121.00
54	57	60	70	12x12	142.70

Capacities given above are water measure.

Top and Bottom Sheaves, 14-in. with shafts and boxes, per set of three..... \$36.00

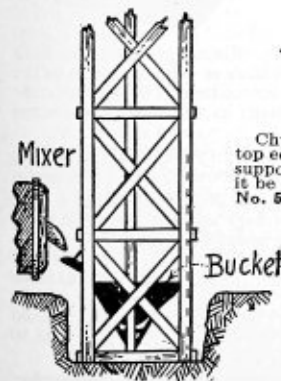


Concrete Chutes or Spouting

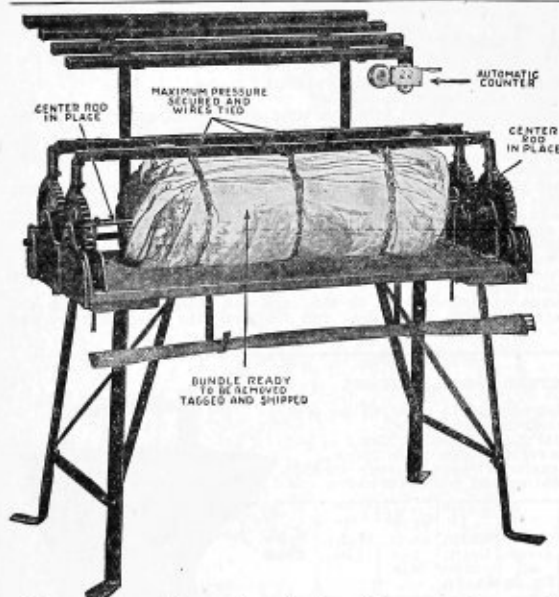


Chutes are of the open type with reinforcing angles running the entire length along the top edges and with heavy cross braces every three feet. All sections have balls for use with supporting cables, also tie clips and punched angles for receiving truss rods and frame should it be desired to convert several sections into trussed sections at any time.

No. 526 Plain Chutes, per running foot, 14 ga.....	\$1.80
Large remixing hopper for use at head of main line for attaching to distributing hopper.....	add \$ 7.65
Small remixing hopper for use at head of swivel connection or swivel head spout.....	add \$ 5.75
Splash hood with swivel drop hook built to section of chute for use on bottom section of main line or end of swivel head spout.....	add \$ 5.75
No. 536. Flexible spout, hopper section, 24-in. sq. at top, 14 gauge.....	each 18.25
No. 537. Flexible spout, tubular section, 10-in. diam., 3 ft. long, 14 ga.....	each 8.00
Trussed Chutes complete with large remixing hopper and splash head:	
30 feet long, No. 16 gauge, trussed bottom only.....	91.00
45 feet long, No. 14 gauge, trussed bottom and top.....	150.00
56 feet long, No. 12 gauge, trussed bottom, top and sides.....	210.00



We also supply Concrete Buckets, Cars, Wheelbarrows, Shovels, Etc.



The Improved Economy Bag Baler

For Bundling Empty Cement or Plaster Bags

To count and bundle empty sacks for return to the mill is a nuisance and a disagreeable job that every cement dealer and contractor has to contend with.

To properly count and bundle sacks is a very important operation because it can be a source of direct loss, if the work is improperly done.

You want credit for every good cement or plaster sack you return to the manufacturer. In order to expect this credit it is necessary to comply with the regulations of the railroads in bundling, and to be sure that you have an accurate count.

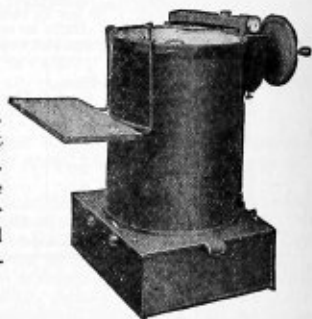
This sack baler will pay for itself in increased credits allowed in a short time. It will count your sacks accurately and bundle them perfectly. It enables you to return the sacks quickly and receive credit for them, instead of permitting a large quantity to accumulate.

Has an automatic counting device which accurately counts all sacks up to fifty. When fifty sacks have been placed on the table a bell rings. The counter is also equipped with a locking device, which makes it possible to place a small number of sacks on the table, representing a return from some small customer. The dial always indicates the number on the table.

Price of Improved Economy baler \$25.00

The Century Bag Cleaner

A quick, easy and efficient machine for cleaning and counting empty bags. Is simple in construction, and well built from the best of material. It is light and self-contained so that it can be easily moved from one job to another. All bearings and working parts are located so that they can be oiled, and the cement cannot get into them. It is furnished for hand or power, and with or without counter. The hand machine does not run hard, but, of course, will not clean as fast as the power machine. The power machine is a better proposition for continuous use, as it requires so little power to operate it.



It is estimated that from 6 to 10 ounces of cement is retained in each empty bag. Figuring only 4 ounces in each sack shaken by hand experts state that approximately eight hundred thousand bags of cement return to the mills or is wasted each year. The Century cleaner not only saves this waste but it saves freight by reducing the weight of bags returned. It saves labor, as one man can thoroughly clean more bags in this way than several men can shake poorly by hand.

Each sack is counted as it is taken off automatically, and a bell is set to ring for every fifty for bundling so that there can be no mistake in the count. A tabulating counter carries totals up to ten thousand when it repeats.

Shaking bags by hand is a slow, expensive operation, and injurious to the health. It is difficult to get a good reliable man to do it, and a few hundred bags poorly done is a day's work. Any ordinary man or a boy can thoroughly clean several thousand bags on a Century machine, and you know that the count is right.

Power machine with counter	Prices
Power machine without counter	\$116.00
Hand machine with counter	100.00
Hand machine without counter	109.00
	93.50

Contractors' Portable Material Elevators

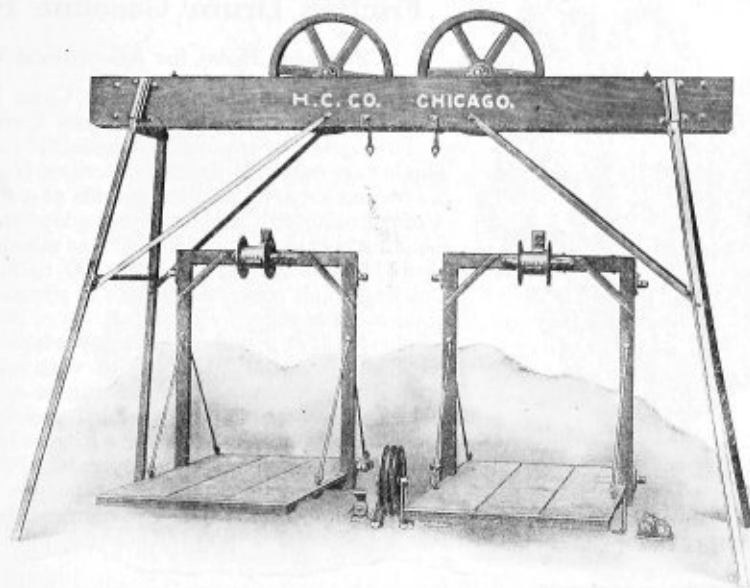


Fig. G. Showing overhead horse, with top sheaves, which sets on top of the building, also shows the two cages in position with lower sheaves between them.

Will Supply Material for 100 Masons

We furnish cages fitted for wire guides or wooden guides, as desired, at same price.

This is a complete double cage outfit for the elevation of brick, mortar, etc., in high buildings; as the cages run at a high rate of speed, distance to be elevated does not materially lessen the capacity. Can be operated by horses or by reversible power hoist.

Two cages are used, so that one cage, with its wheelbarrow, etc., balances the other, leaving only the weight of the material to be hoisted by the engine or horse. When one cage is going up, the other is always coming down—one cage is always in position to be loaded while the other is being unloaded. The cages may be stopped at any point.

Wire hoisting rope is provided for as many stories as ordered; the extra rope not used is wound on drum, shown at the top of each cage. The hoisting rope is endless with the ends of the rope attached to the tops of the two cages. From the top of one cage, the rope passes up and around one of the top sheaves, down to one of the bottom sheaves, back to sheave on engine around which it is wrapped two or three times—then back to the other bottom sheave and up to and around the other top sheave then down to top of other cage. Where hoist is used, it can be set 15 to 25 ft. away—but when horse operated, the snatch block must be set as far away from the bottom sheaves, as the height of vertical travel.

The head of the elevator or overhead "horse" supporting the upper sheaves, is made of hard pine strongly trussed and braced by angle iron legs and braces. Safety stops or ratchets and pawls are provided, which hold the load safely at any point.

The cages are all steel construction with the exception of the platform or floor which is hard wood and 4 ft. wide by 6 ft. The distance between guides is 52 in. The distance between floor of cage and underside of cross-beam is 48 in.

Cages, unless otherwise ordered are fitted for wire guides on account of greater convenience in moving from floor to floor; eccentric tighteners are furnished for the wire guides.

Cages arranged for 2x4 wooden guides furnished at same price, but 2x4 guides are not included.

Outfit complete for 50 ft. travel including overhead horse with two large top sheaves and safety stops, two cages with drums, one set of bottom sheaves, 275 ft. $\frac{1}{2}$ in., 6x19 Reliance Swedes Iron Elevator Hoisting Cable, but without guides, weight about 2100 lbs. Price.....\$160.00

Extras—Hoisting Cable, add for each additional 10 ft. of travel..... 1.75

Guides are extra:

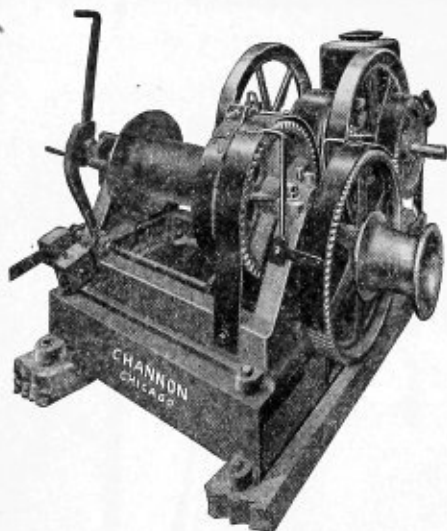
$\frac{3}{8}$ diam. 6x7 Galv. Wire Guide Ropes (4 ft. required for each foot of vertical travel), $2\frac{1}{2}$ ¢ a foot.

2x4 Wooden Guides, pine, spliced and bolted per lineal ft. 18¢.

For horse operation including Snatch Block, extra Hoisting Cable and Space Horse Clamp... \$22.00

Single Cages only are sometimes furnished. Price, Cage only..... 47.00

Note—In estimating length of guides be sure to include the distance from top landing to top of horse, also remember that four guides are needed for every outfit.



Channon-Mundy 4 H. P. Friction Drum Gasoline Hoists

A Portable Hoist for All-around Work

Adapted for Hoisting Single Cage Elevators, Pile Driving, Silo and Chimney Construction

This hoist was originally designed for handling the single cage material elevator described below and has a hoisting capacity of 1000 pounds at a speed of 100 feet per minute; it is equally well adapted for general hoisting within its capacity, such as pile driving with drop hammers weighing from 500 to 800 pounds, hoisting small concrete buckets in silo and chimney construction, etc.

The outfit is a self contained, portable unit, consisting of a Mundy power hoist with cone friction drum direct connected by gearing to a four horse power, up-to-date hopper cooled gasoline engine, all complete and ready to run. Engine is extremely simple and easy to start and operate. Fuel tank capacity is $7\frac{1}{2}$ gallons; hopper capacity, 9 gallons.

Equipped with turned and polished winch head on pinion shaft, 7 inches in diameter by 8 inches long, and $10\frac{1}{2}$ inches in diameter at ends; this winch head is used for hoisting piles when pile driving.

The drum is 8 inches in diameter by 16 inches long with flanges $4\frac{1}{2}$ inches high; drum will hold about 1,000 feet of $\frac{3}{8}$ -inch cable or 150 feet of 1-inch Manila rope. Hoist is geared 7 to 1. Drum has foot brakes, ratchets and pawl and screw thrust.

Approximate weight, 3,100 pounds.

Price.....\$535.00

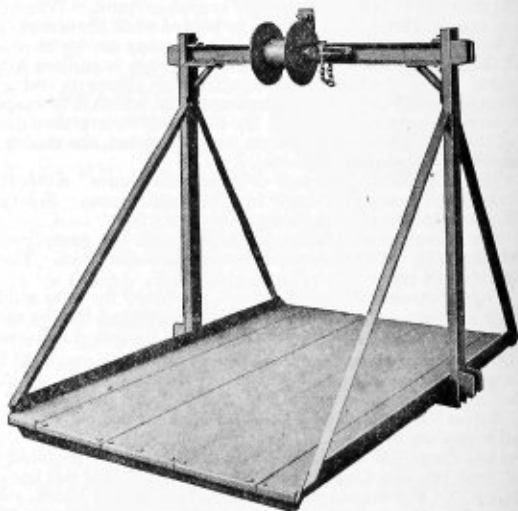
Single Cage Material Elevators

Where it is necessary to deliver material to several floors, the use of the single cage elevator has been found advantageous.

With a double cage elevator, one cage is always going up while the other is going down, consequently when one cage is stopped at an intermediate floor, the other cage remains suspended in the hatchway and can not be used.

The cage shown in illustration is the same as furnished with our double cage outfits and is of all steel construction except the hardwood platform which is 4x6 feet. Made for either wire or 2x4 wooden guides.

Price, cage only.....\$65.00



Single Elevator Cage

Builder's Reversible Gasoline Hoists

With Sheave Wheels for Operating Double Cage Material Elevators

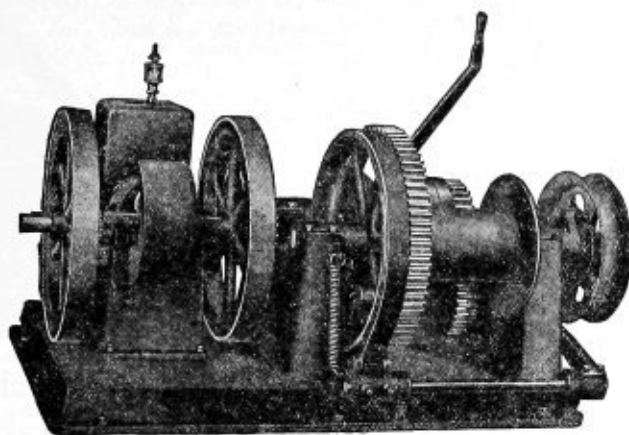


Fig. 2183

The sheave for elevator cable is 12 inches diameter and when engine is run at normal speed, the elevator platforms have a speed of 150 feet per minute. The drum for direct hoisting will hold about 700 feet of $\frac{1}{2}$ wire rope; this drum can be run independently of the cable sheave and makes a valuable addition to the outfit. The gears are 3-pitch with $3\frac{1}{2}$ -inch face.

The entire outfit is built in a very substantial manner, bearings are liberal and babbitted with best babbitt metal. The clutch and main shafts are 2-inch diameter. Hoist is provided with reverse clutch mechanism and foot-brake with ratchet.

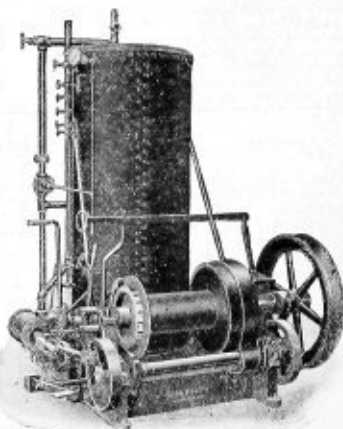
The engine is of the Hopper Cooled Type, with gasoline supply in base, and is furnished with all fittings, such as Batteries, Muffler, Spark Coil, Wrenches, Oil Can, Oilers, etc.

Sizes and Prices

Size No.	H. P. Engine	Size of Drum	Geared	Hoisting Capacity on Drum	Floor Space, inches	Net Weight	Shipping Weight	Price Each
45	4 $\frac{1}{2}$	8 $\frac{1}{2}$ x 15"	9 to 1	1200 lbs. at 100 F. P. M.	31 x 63	2400 lbs.	2700 lbs.	\$435.00
50	6	8 $\frac{1}{2}$ x 15"	9 to 1	1600 lbs. at 100 F. P. M.	31 x 63	2650 lbs.	3000 lbs.	480.00
55	8	8 $\frac{1}{2}$ x 15"	9 to 1	2400 lbs. at 100 F. P. M.	57 x 63	3450 lbs.	3800 lbs.	565.00
55	Belted	8 $\frac{1}{2}$ x 15"	9 to 1	Depends Upon Power Used	31 x 36	1400 lbs.	1500 lbs.	235.00

Mundy Horizontal Double Cylinder, Single Friction Drum, Link-Reversing, Brick Masons' Engines

Size Number of Engine	Horse-power Usually Rated	Dimensions				Weight Hoisted With Clutch Wheel, pounds	Weight Hoisted, Single Rope, Average Speed on Drum, pounds	Dimensions of Boilers				Estimated Shipping Weight with Boiler Complete, pounds	Prices upon Request
		Cylinders		Hoisting Drums				Diameter, inches	Height, inches	Number of Tubes, 2-inch Diameter	Length of Tubes, inches		
		Diameter, inches	Stroke, inches	Diameter, inches	Length, inches								
261	8 $\frac{1}{2}$	6	9	18	1000	2000	28	68	40	42	4500		
263	10 $\frac{1}{2}$	8	10	20	1350	2500	32	80	55	52	5000		
265	12 $\frac{1}{2}$	10	12	20	2000	3500	34	84	60	56	6400		
267	16 $\frac{1}{2}$	10	14	22	2600	4000	36	84	65	56	7000		
269	20 $\frac{1}{2}$	12	14	24	3400	5000	38	90	77	62	8000		
271	22 $\frac{1}{2}$	10	14	26	3900	6500	40	90	85	62	8600		



Round Turn-Over Buckets

Used for handling all sorts of materials, concrete, dirt, sand, clay, stone, etc.

Supplied with a secure side latch—when this latch is released the bucket automatically dumps by gravity. Has strong steel bail, trunnions and stops.

Size No.	Capacity Cu. Ft.	Coal Capacity Pounds	Width Over-all, Inches	Height at Top of Bail, Inches	Depth Bucket, Inches	Approx. Weight Pounds	Price Each
134	6	300	31	37	21	150	\$30.00
135	8	400	34½	41	22	175	38.00
136	11	550	39	44	22	220	48.00
137	14	700	44	49	25	285	52.00
138	17	850	46½	51	26½	320	58.00
139	21	1050	48	56	30½	420	67.00
140	27	1350	50½	60	33½	500	80.00
141	42	2100	58½	71	40	750	105.00



Fig. 154 Top Swing Fig. 153 Center Swing

Barrel Shaped Ore Buckets

The sides are of such shape that no part can catch upon the timbering or sides of the shaft—the rivets are counter sunk.

Bottom of Fig. 154 bucket is "dished" so that the ring to which dumping chain is attached does not interfere with the bucket standing fairly on the ground.

Size No.	Capacity		Height Inches	Diameter at Top, Center and Bottom, Inches	Fig. 154		Fig. 153	
	Cu. Ft.	Pounds Ore			Wgt., Lbs.	Price Each	Wgt., Lbs.	Price Each
2	6½	750	30	21x24x17	140	\$35.00	150	\$37.00
3	9	1100	32	24x27x21	200	40.00	215	44.00
4	11	1300	37	24x28x22	250	50.00	270	55.00
	15	1700	37	28x34x23	390	61.00	410	75.00

Water Buckets

Made of the best steel, with side wearing strips and bail of wrought iron. In the bottom is an automatic valve, which is tight, durable and never out of order. Buckets are smooth on outside, and will not catch in shaft.

Capacity, gallons.....	40	50	60	75	100	125
Diameter, middle, inches.....	20	19	22	24	26	28
Diameter, ends, inches.....	16	15	18	18	21	23
Length, inches.....	36	48	44	48	52	56
Gauge steel.....	12	12	10	10	8	8
Weight, pounds.....	170	220	275	325	425	490
Price, with strips on side.....	\$50.00	\$60.00	\$50.00	\$60.00	\$70.00	\$80.00
Price, without strips.....	\$30.00	\$40.00	\$43.00	\$52.00	\$61.00	\$70.00
Capacity, gallons.....	150	175	200	250	300	350
Diameter, middle, inches.....	30	32	33	36	38	40
Diameter, ends, inches.....	24	25	26	28	30	32
Length, inches.....	60	64	66	69	72	76
Thickness steel, inches.....	¾	¾	¾	¾	¾	¾
Weight, pounds.....	590	625	770	880	935	1000
Price, with strips on side.....	\$95.00	\$110.00	\$125.00	\$135.00	\$145.00	\$155.00
Price, without strips.....	\$83.00	\$96.00	\$110.00	\$118.00	\$125.00	\$135.00



Straight Side Mining Buckets

These buckets are largely used in lead and zinc districts. They are similar to Nos. 134 to 141 shown above, except that they are smaller in diameter and longer.

Used also as coal buckets by railroads and as caisson and concrete buckets by contractors. Strong and well made, side catch and gravity dump.

Size No.	Capacity Cu. Ft.	Coal Capacity Pounds	Diameter Inches	Depth Inches	Approximate Weight Pounds	Price Each
142	6	300	22	28	155	\$ 42.00
143	8	400	25	30	175	48.00
144	10	500	26	32	200	55.00
145	12	600	28½	33	250	59.00
146	14	700	30	35	300	69.00
147	16	800	32	35	375	83.00
148	20	1000	34	40	415	93.00
149	24	1200	35	43	475	100.00
150	30	1500	37	48	580	150.00



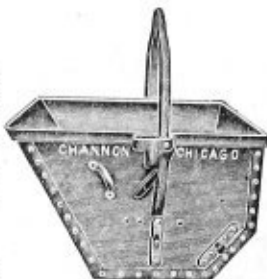
Class B Contractors' Dumping Buckets

For handling Concrete, Mortar, Stone, Sand, etc.,

These buckets are self-dumping and self-righting. Dumping is made automatic by so shaping and balancing the body that it is top-heavy when filled and bottom-heavy when empty. When the catch is released the bucket automatically dumps—after dumping it rights and locks itself.

Buckets are strongly made, bail, trip, stops, etc., are all heavy forgings to withstand hard usage.

Size	Number	101	104	106	107	108	109
Capacity.....	cubic feet	8	14	21	27	36	41
Width over all.....	inches	35	38	45	47	52	54
Length.....	inches	31	40	46	50	54	58
Depth.....	inches	19	25	28	30 1/2	33	36
Price.....	each	\$42.00	\$62.00	\$87.00	\$105.00	\$125.00	\$142.00



Self-Dumping and Self-Righting Buckets

With Flaring Side

The top of the bucket is from 8 to 10 inches wider than the bottom, which permits it to be rapidly filled and quickly and cleanly dumped.

Simple in construction and easily handled. Well adapted for sinking shafts, sewers, etc.

Sizes, Prices

Size Number of Bucket	Capacity Cubic Feet	Width Over All, Inches	Lgth., Inches	Depth, Inches	Price
86	3	30	26	15	\$25.00
87	4 1/2	32	29	18	28.00
88	6	34	31	19	32.00
89	8	36	33	20	35.00
90	10	41	36	21 1/2	40.00
91	12	44	40	23	45.00
92	14	46	42	25	55.00
93	21	48	47	28	75.00
94	27	53	50	31	90.00
95	36	65	58	33	110.00
96	42	66	59	34 1/2	120.00



Coal Hoisting Tubs

Self-Dumping and Self-Righting

With side-catch as shown at left or with back-lever catch at right at same price.

Coal Capacity Pounds	Capacity Cubic Feet	Weight Pounds	Price Each
400	8	200	\$ 40.00
600	12	330	65.00
800	16	440	80.00
1000	20	485	88.00
1200	24	525	100.00
1750	35	800	140.00
2240	44	860	150.00

Be sure to state if side of back catch is desired.



Long's Locomotive Coaling Buckets

Counter-balanced Bottom Dump with Trigger release

Used by railroads and lighterage companies in connection with cranes for coaling locomotives and steamers.

The dump is easy and the lock is positive. The bottom door is counterweighted and locks automatically after dumping.

Size No.	Capacity Cu. Yds.	Capacity Coal Pounds	Diameter Inches	Depth Inches	Height Closed Inches	Weight Pounds	Price Each
151	1 1/4	650	30	36	51	500	\$ 90.00
152	1 3/4	1000	37 1/2	34 1/2	53	750	100.00
153	1	1350	37 1/2	46	64 1/2	825	115.00
154	1 1/4	1700	46	40	61	1300	140.00
155	1 1/2	2000	46	50	69	1400	175.00
156	2	2700	54	46 1/2	77	1600	230.00

Larger sizes upon request. Special prices in quantities.

Special buckets of any kind furnished promptly.



"Unionlock" Automatic Buckets

A Two Line Bucket Largely Used for Depositing Concrete Under Water

A controllable bucket by which a large mass may be dumped quickly or in a thin stream as desired. It has no spring catches or locks. Handled by the hoisting engineer.

This hingeless bucket with its self-adjusting doors leaves no opening between the doors to let the grout waste out. It is automatically tight and the sliding doors keep it so. The bail links draw the door tightly together. The doors are cleaned on the edges of the bucket.

Built substantially throughout—no castings.

Number	134	135	136	137	138	139	140	141
Cap., cu. yds.	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	4
Approx. weight, lbs.	600	800	1000	1500	2000	2500	3000	3600
Price, bucket	\$125.00	\$140.00	\$150.00	\$200.00	\$300.00	\$350.00	\$400.00	\$550.00
Price of dump hook	18.00	21.00	25.00	29.00	34.00	39.00	44.00	49.00



Stuebner Controllable Concrete Bucket

Central Discharge

This bucket was especially designed for placing concrete into narrow forms—bucket is furnished with a device to regulate the drop of the bottom doors, permitting the latter to be opened up to widths of 4 to 18 inches.

Makes an ideal spreader for floor slabs.

Operating mechanism is very powerful—making it possible to dump a portion of the load and check the flow of the remainder.

Size No.	Cap. Level Full Cu. Ft.	Lgth. Inches	Height Inches	Height to Top of Bucket Inches	Height to Top of Bail Inches	Approx. Weight Pounds	Price Each
516	18	36	45	36	45	750	\$130.00
517	25	42	49	40	47	850	150.00
518	32	45	49	45	51	1050	160.00
519	39	48	49	49	57	1250	200.00
520	48	57	49	50	58	1550	220.00
521	60	64	49	55	65	1820	290.00
522	71	70	49	57	65	2100	325.00



Excelsior Bottom Dump Concrete Bucket

Tilting Bottom, Dump-Clean Discharge

The original and best known bottom dump concrete bucket.

An upward pull on the handle bar dumps the bottom as shown and discharges contents—a downward pull quickly closes and locks it in place until again released.

Contents are deposited in a circular pile without scattering a portion of the charge.

Size No.	Capacity Cu. Ft.	Cubic Yards	Lgth. of Top Inches	Hgth. Inches	Height to Top of Bucket Inches	Height to Top of Bail Inches	Weight Pounds	Price Each
502	10	$\frac{1}{3}$	34	27	30	35	450	\$ 95.00
504	14	$\frac{1}{2}$	40	28	31	40	575	120.00
505	18	$\frac{3}{8}$	30	30	33	42	650	130.00
506	21	$\frac{3}{4}$	46	31	34	44	745	140.00
507	27	1	48	33	36	47	850	150.00
508	34	$1\frac{1}{8}$	53	36	39	50	1025	183.00
509	41	$1\frac{1}{2}$	59	39	42	53	1150	200.00
510	54	2	60	41	44	59	1650	265.00



Derrick Skips



Fig. 712

Light Steel Skip

Standard Size, 35 Cubic Feet

The box is 5x6 feet with sides 14 inches deep and of No. 8 steel, riveted and braced. The corners of steel angles 2x2x $\frac{1}{4}$ inches, top band, 1 $\frac{3}{4}$ x $\frac{3}{8}$ inches. Chain bar steel, 2 $\frac{1}{4}$ x $\frac{3}{4}$ inches.

Three $\frac{1}{2}$ -inch diameter chains, each 5 feet long, with dumping trigger.

No. 120. Weight, 700 lbs. Price, each,\$88.00

Heavier skips of any size quoted upon request.

Oak Derrick Skips

Dumps by pulling the trip line. Made of 2-inch oak. Well ironed. $\frac{1}{2}$ -inch short link chain.

No.	Cap., Cu. Yds.	Dimensions	Weight, Lbs.	Price, Complete
122	1	5 ft. x 5 ft. x 14 in.	500	\$52.00
123	1 $\frac{1}{2}$	5 ft. x 5 ft. x 20 in.	550	66.00
124	2	6 ft. x 6 ft. x 18 in.	625	75.00

We can also furnish irons complete for making wood stone boxes.

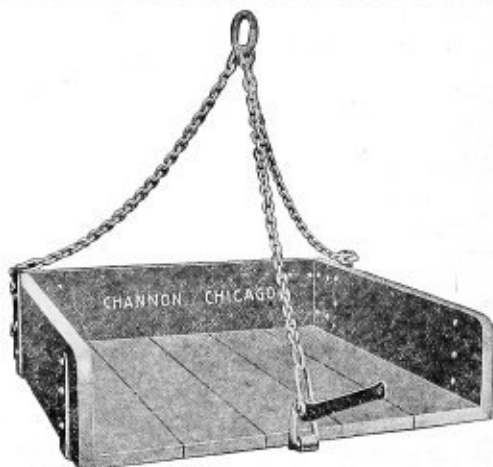


Fig. 713

Extra Heavy Reinforced Pressed Steel Stone Skips

For Derrick and Cableway Work

These skips are pressed out and heavily reinforced as will be seen by illustrations. They are made for heaviest kind of rough work.

The chains are best quality short link with large hooks and rings.



Fig. 714A

No.	Capacity, Yards	Size Body, Inches			Steel in Body, Inches	Weight, Pounds	Price
		Width	Length	Depth			
126	1	48	60	18	$\frac{1}{4}$	725	\$ 66.00
127	1 $\frac{1}{2}$	54	72	18	$\frac{1}{4}$	850	92.00
128	2	60	72	22	$\frac{3}{8}$	1350	150.00

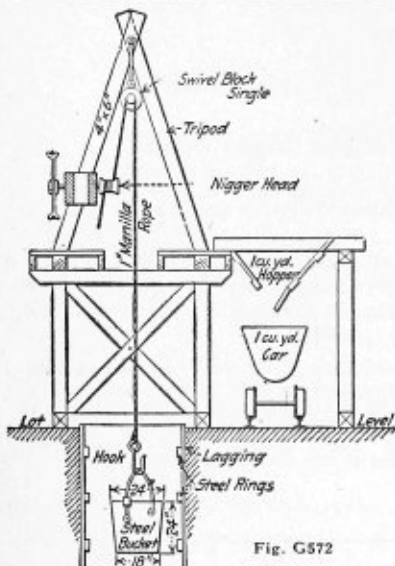


Fig. G572

Hand Power Outfits

Where there are only a few holes to sink, hand power outfits are sometimes used. They consist of a wooden tripod, to two legs of which are attached a drum with shaft and boxes, somewhat similar to our No. 27 derrick. Price, iron work only.....\$53.00

Canvas Tripod Covers

Made of any weight of canvas desired.
Price on application.

Bullock Steel Caisson Rope

For operating power winches.
3/8" diameter, per foot.....\$0.20



Our Champion Hawserlaid manila rope (with the red strand trade mark) has been found to give the greatest satisfaction on caisson work. This rope consists of three three strand ropes laid together, making nine strands in all and twisted very hard.

Sizes 3/4-inch and larger, per pound.....\$0.20

Channon New Style Cargo Hoisters or Caisson Blocks



These blocks have swivel hooks, are galvanized and have wooden projecting cheek sheaves, self-lubricating graphite, bronze bushed.

No. 32. 7 1/2-inch shell, for 1-inch rope.....\$ 8.40

No. 33. 8 1/2-inch shell, for 1 1/4-inch rope.....\$10.65

No. 34. 10-inch shell, for 1 3/4-inch rope.....\$14.00

No. 35. 11 1/2-inch shell, for 1 3/4-inch rope.....\$17.35

Chicago Caisson Equipment

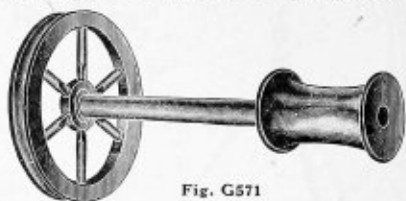


Fig. G571

Caisson Sheave and Winch Head

Used in sinking deep shafts, foundation holes or caissons, for large buildings. These shafts are usually 4 to 12 feet in diameter and sunk to bed rock, then filled with concrete. The shafts are lined with wood lagging supported by steel split rings. The men and materials are lowered and hoisted by means of a bucket attached to a manila rope which is wrapped around the winch head shown in cut.

Power is supplied through an endless wire rope which is wrapped two or three times around the sheave, which revolves constantly. A number of these outfits are operated at one time over a line of holes by a hoisting engine at one end.

Price of turned winch head with shaft and sheave, as shown in Fig. G, 571, above.....\$20.00

Steel Caisson Rings

These rings are made in two pieces bent to a circle, of any size iron and in usual diameters of 4 to 12 feet. Per lb.....\$0.06

Caisson Bucket Hooks

Price, as shown, each.....\$2.00



Caisson Buckets

These buckets are the approved type and size used on all caisson work in Chicago.

They are made of galvanized iron with riveted and soldered seams, making them water tight. They have three iron bands and center swing bail.

Price each.....\$20.00



Hayward "Standard" Orange-peel Buckets

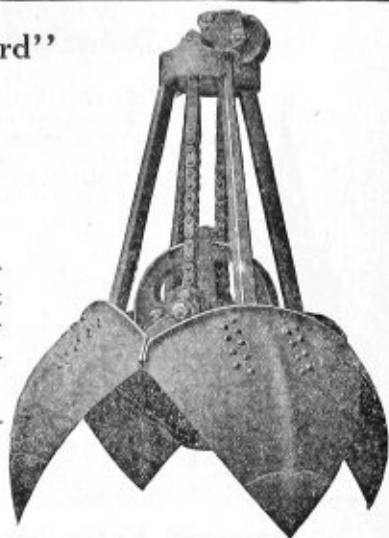
Four Blades

Requires two operating lines, one for closing and digging, the other for holding when automatically discharging.

All parts are interchangeable.



Closed



Open

This popular type is adapted for all classes of dredging, excavating or digging material from its natural state as well as for rehandling of materials and will withstand the most severe usage.

Every part is interchangeable and replaceable and all wearing parts are furnished with replaceable bronze bushings. The materials are of the best quality. The blades and blade arms are of flanged steel and the connecting rods are forged from a solid bar of steel.

This Hayward Orange-Peel bucket is constructed with four curved triangular blades and when closed tight forms a tight semi-spherical bowl, which contains the excavated material.

When open, the blades resemble sharp spades, and are so adjusted that the maximum digging effect is produced, with but a slight tendency to lift the bucket while closing.

Horizontal arms are riveted to the blades, and their inner ends are bolted to a central block or casting, while the outer ends are hinged to the vertical connecting rods, which are pivoted at their upper ends to the upper center block or casting.

The power wheel for closing the bucket is secured to the lower center casting, and is eccentric in shape, so that it gives its maximum power just as the bucket commences to close. It is well braced and the shaft is extended on either side to receive the cams, to which are attached the two flat power chains. An idler sheave is attached to the upper casting to deflect the closing rope, the holding rope being attached to the upper casting on the opposite side.

All bolts and pins are of Norway iron. The standard blades for all buckets have removable cast-steel points, which add greatly to the life of the blades.

A new feature is the oscillating head, which allows the bucket to hang central under all conditions.

Power wheels are now furnished for wire rope; chain power wheels furnished when ordered.

Outside power wheel shaft bearings are used on all buckets 21 cu. ft. capacity and larger. The outside cutting points or shoes are replaceable at small cost. Inside points furnished when ordered.

Sizes and Prices

No.	Capacity	Approx. Weight, Pounds	Closed				Open				Price F. O. B. Ohio Factory
			Diameter Ft. In.		Height Ft. In.		Diameter Ft. In.		Height Ft. In.		
11	4 cu. ft.	950	3	0	4	8	3	9	5	1	Prices quoted upon request
12	5 cu. ft.	1000	3	2	4	9	3	11	5	3	
13	7 cu. ft.	1100	3	6	5	0	4	3	5	7	
14	9 cu. ft.	1200	3	10	5	2	4	7	5	10	
15	12 cu. ft.	2200	4	3	6	2	5	2	6	10	
16	15 cu. ft.	2350	4	7	6	6	5	6	7	2	
17	21 cu. ft.	3800	5	1	7	6	6	3	8	4	
18	1 cu. yd.	4200	5	8	7	10	6	10	8	9	
19	1¼ cu. yds.	4600	6	0	8	0	7	3	9	0	
20	1½ cu. yds.	5350	6	4	8	2	7	8	9	4	
21	1¾ cu. yds.	7750	6	4	9	4	7	10	10	4	
22	2 cu. yds.	8500	7	0	9	10	8	6	11	0	
23	2½ cu. yds.	9500	7	8	10	2	9	3	11	6	
24	3 cu. yds.	10500	8	0	10	4	9	7	11	10	
25	4 cu. yds.	12500	8	10	10	10	10	6	12	6	

Sizes up to 1 1/4-yd carried in our Chicago stock. Send for complete Bucket catalog.

Hayward Dwarf and Hand Power Orange-Peel Buckets

3 and 4 Blade

These little buckets are largely used by bridge contractors, etc., in sinking steel cylinders for foundations, also used for sinking pipes, digging and cleaning wells and removing obstructions where quarters are cramped.

They operate exactly like the larger orange-peels and will dig almost any material. Of course, the harder the material the less it will fill, but in time it will reach the desired depth which is only limited by the length of the operating ropes.



Size No.	Bowl Capacity	Blades	Minimum Weight	Closed		Open		Price F. O. B. Ohio Factory
				Diam., Ft.	Height, In.	Diam., Ft.	Height, In.	
	Cu. In.		Pounds					
1	100	4	30	0	10	1	5	0 11½ 1 6
2	220	4	35	0	11	1	6	1 1 1 7
3	300	4	40	1	1	1	7	1 3 1 9
4	1500	3	95	1	7	2	4	1 11 2 7
5	1 cu. ft.	3	100	1	10	2	6	2 2 2 10
5B	1 cu. ft.	4	160	1	10	2	10	2 2 3 2
6	2 cu. ft.	4	500	2	2	3	7	2 9 3 11
7	2½ cu. ft.	4	550	2	7	3	10	3 2 4 4

Prices upon Request

Hayward Extra Heavy Standard Orange-Peel Buckets

This bucket is constructed along the same general lines as the "Standard" type, but its parts are built heavier and stronger throughout. Both blades and blade arms are made from heavier plate, while the solid forged steel connecting rods are very substantial, heavy members. The sizes of bolts, bushings, etc., are also larger to withstand the rough work that this bucket is designed to do.

The lower center is made of crucible cast steel. The blade points or shoes are also cast steel of the outside type. Inside points if desired.

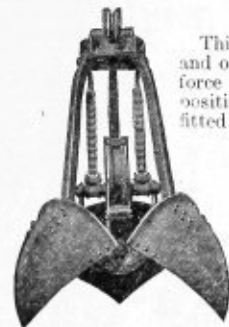
No.	Capacity	Approx. Weight, Pounds	Closed		Open		Price F. O. B. Ohio Factory
			Diam., Ft.	Height, In.	Diam., Ft.	Height, In.	
26	21 cu. ft.	4200	5	1	7	6	\$ 682.50
27	1 cu. yd.	4600	5	8	7	10	747.50
28	1¼ cu. yds.	5000	6	0	8	0	812.50
29	1½ cu. yds.	8500	6	4	9	4	1137.50
30	2 cu. yds.	9500	7	0	9	10	1267.50
31	2½ cu. yds.	10500	7	8	10	2	
32	3 cu. yds.	11500	8	0	10	4	
33	4 cu. yds.	18000	8	10	12	0	
34	5 cu. yds.	20000	9	6	12	6	
35	6 cu. yds.	22000	10	2	14	3	
36	8 cu. yds.	26000	11	4	15	0	
37	10 cu. yds.	32000	12	0	16	0	

Prices Upon Request



Hayward Three-Sided Orange-Peel Buckets

This bucket has three blades and is very powerful. For use where boulders, broken rock and other hard odd-shaped material is to be dug or handled. The three blade points either force the material inside the bowl, or, if the material has uneven surfaces grasp and hold it positively to assure quick handling. The blade arms extend lower into the bowl and are fitted with braces—eliminating all side strains.

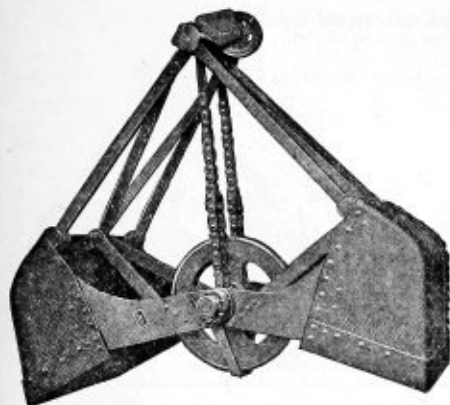


No.	Capacity	Approx. Weight, Pounds	Closed		Open		Price F. O. B. Ohio Factory
			Diam., Ft.	Height, In.	Diam., Ft.	Height, In.	
38	21 cu. ft.	4300	5	1	7	8	6 3 8 6
39	1 cu. yd.	4800	5	8	8	0	6 10 8 11
40	1¼ cu. yds.	5300	6	0	8	2	7 3 9 2
41	1½ cu. yds.	8500	6	4	9	6	7 10 10 6
42	2 cu. yds.	9000	7	0	10	0	8 6 11 2

Prices upon Request

Send for complete Hayward catalog showing all styles of Buckets.

Hayward Class "E" Clam-shell Buckets



Open



Closed

Latest Improved Type—with "Ore Bowls" and Flat Side Chains

This is the most popular clam-shell and while this type, like all clam-shells, is essentially a rehandling bucket for loose materials, such as coal, sand gravel and crushed stone, when equipped with digging teeth will dig successfully materials such as sandy loam, light clays, etc.

The teeth furnished are in one piece for each side of bucket—one side interlocks with the other.

The Class E Bucket has a wide opening, shallow, tray-like shell or bowl resembling a shovel which allows the material to slide more easily into the bucket while closing. In proportion to size these buckets carry larger loads and are built to handle harder materials, such as crushed stone, broken slag, packed sand and ore. This type is now equipped with heavy, reinforced, bronze-bushed steel bearings on the ends of the blade arms also have manganese steel oscillating idler sheaves and shrouds—making the closing rope longer last than on any other bucket on the market.

The Hayward type of Clam-shell Bucket is made of two shells, or blades. Vertical arms are riveted on either side of the blades, and their upper ends are connected to the main shaft on which the power wheel for closing the bucket is located. The outer ends of the blades are fitted with lugs which receive vertical connecting rods, which are pivoted at their upper ends to the upper center block or casting. The power wheel and cams are made of one casting.

The upper center casting is so constructed that the four connecting rods work from one center, allowing the casting to oscillate and the bucket to hang central under all conditions. An idler sheave is attached to the upper casting to deflect the closing rope, the holding rope being attached to the upper casting on the opposite side.

The materials used are of the best quality. The blades and blade arms are of flange steel, the upper center and power wheel are substantial castings, the connecting rods are of steel, and all bolts and pins are of Norway iron.

All similar sections and parts of the buckets are interchangeable, and are made on the duplicate part system and are bushed throughout with phosphor-bronze bushings, which can be replaced, when worn, without the aid of a mechanic.

The shoes are made of plate steel so constructed that they form a shoulder on either side of the blades. They are riveted to the blades and may be easily replaced when worn.

Power wheels are now furnished for wire rope—chain power wheels furnished when ordered.

Sizes and Prices

No.	Capacity Cubic Yards	Approx. Weight Pounds	Closed			Open			Prices f.o.b. Ohio Factory	Net Extra for Teeth		Wt. of Teeth	
			Height Ft.	Length In.	Width Ft.	Height Ft.	Length In.	Width Ft.		O. H. Steel	Mangan- ese Steel		
43	1½	2000	5	0	4	1	3	4	5	6	5	11	200
44	¾	2550	5	9	5	0	3	4	6	8	7	1	200
45	1	2800	6	6	5	7	3	4	7	2	8	3	200
46	1¾	3200	6	6	5	7	3	11	7	2	8	3	360
47	1½	4000	7	1	6	2	4	2	8	0	9	0	400
48	1⅝	4200	7	1	6	2	4	6	8	0	9	0	400

Larger sizes up to 7½ cubic yards quoted upon request.

Sizes up to 1½ yd. carried in our Chicago stock—Send for Complete Catalog showing all styles of buckets.

Hayward Class "C" Clam Shell Buckets

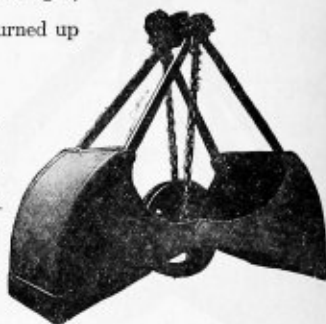
With Round Bowl and Round Link Side Chains

This is the lightest clam-shell bucket we have—it is supplied with round link side-chains and is designed primarily for handling coal, also other classes of light, loose materials.

Plate steel shoes cover the cutting edge of the bowl—the ends being turned up and riveted to the sides. **Made to order only.**

Sizes and Prices

No.	Cap'ty Cubic Yards	Aprx. Wt., Lbs.	Closed						Open						Price F. O. B. Ohio Factory
			Height		Length		Width		Height		Length				
			Ft.	In.	Ft.	In.	Ft.	In.	Ft.	In.	Ft.	In.	Ft.	In.	
49	1 1/2	1800	5	2	4	2	3	4	5	9	5	11	Prices upon Request		
50	1 3/4	2150	6	3	5	0	3	4	6	11	7	9			
51	1	2350	6	6	5	6	3	4	7	3	7	9			
52	1 1/4	2400	7	2	6	2	3	11	8	0	8	9			
53	1 3/8	3700	7	2	6	2	4	2	8	0	8	9			
54	2	4500	7	7	6	2	5	0	8	4	8	9			
55	2 1/2	5500	8	3	7	0	5	0	9	5	9	6			
56	3	7000	8	5	7	0	5	10	9	5	10	0			



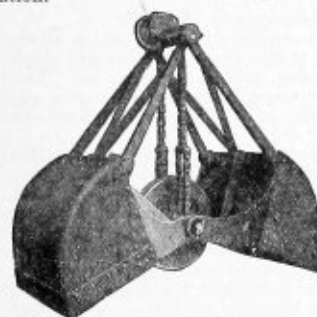
Hayward Class "E" Clam Shell Buckets: Regular Bowls

Built for handling coal, sand and other loose materials. The connecting rods are reinforced and the blades braced in such a manner that it is impossible for the latter to spread. The steel plate shoes now extend from the top of the bowl on one side to the top on the other.

Flat link side chains give the bucket equal closing or gripping power from start to finish of the closing operation.

Sizes and Prices

No.	Cap'ty Cubic Yards	Aprx. Wt., Lbs.	Closed						Open						Price F. O. B. Ohio Factory
			Height		Length		Width		Height		Length				
			Ft.	In.	Ft.	In.	Ft.	In.	Ft.	In.	Ft.	In.	Ft.	In.	
57	1 1/2	2100	5	2	4	2	3	4	5	9	5	11	Prices upon Request		
58	1 3/4	2500	6	2	5	0	3	4	6	10	7	9			
59	1	2700	6	5	5	6	3	4	7	3	7	9			
60	1 1/4	3000	6	5	5	6	3	10	7	3	7	9			
61	1 1/2	3800	7	3	6	2	3	11	8	2	8	9			
62	1 3/8	4000	7	3	6	2	4	2	8	2	8	9			
63	2	4800	7	5	6	2	5	0	8	3	8	9			
64	2 1/2	5800	8	5	7	0	5	0	9	5	10	0			
65	3	6500	8	5	7	0	5	10	9	5	10	0			
66	4	9000	9	3	9	0	5	10	11	2	11	4			
67	5	11000	9	9	9	6	6	2	11	8	12	0			
68	7 1/2	17500	11	2	10	5	7	0	12	10	14	3			



Hayward Class "G" Clam Shell Buckets: Ore Bowls

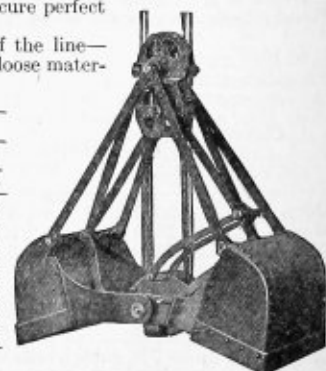
Rope Reeved Type

This type may be operated by three to seven parts of line which are led over manganese steel sheaves, placed at an angular relation with one another to secure perfect rope leads. Sheaves are ground and fully protected by guards.

This bucket may be operated in the usual manner or in the "bight" of the line—a two part holding line furnished if desired. Regular bowl is furnished for loose materials—ore bowl for heavier dredging.

No.	Cap'ty Cubic Yards	Weight Pounds		Closed						Open					
		Light	Heavy	Height		Length		Width		Height		Length			
				Ft.	In.	Ft.	In.	Ft.	In.	Ft.	In.	Ft.	In.		
69	1	3200	4200	7	10	5	7	3	4	8	7	8	3		
70	1 1/4	3500	4500	7	10	5	7	3	11	8	7	8	3		
71	1 1/2	4000	6000	8	10	6	2	4	2	9	9	9	0		
72	1 3/4	4200	6200	8	10	6	2	4	6	9	9	9	0		
73	1 3/8	4500	6500	8	10	6	2	4	10	9	9	9	0		
74	2	5250	7500	9	3	6	11	4	10	10	6	9	9		
75	2 1/2	5500	7750	9	6	7	0	5	3	10	9	10	0		
76	3	6250	8500	10	3	7	0	6	2	11	6	10	0		
77	4	9000	13000	11	6	9	0	6	2	13	6	11	6		
78	5	10500	15000	13	3	9	6	6	2	15	3	12	3		

Prices Quoted Upon Request.



Send for complete catalog showing all styles of clam-shells.

"Page" Scraper Excavating Buckets

Class "S" Standard Bucket

This type carried in stock 1 to 2½ yd. sizes

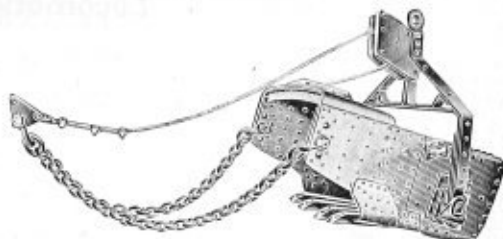
For general excavation work in material which can be plowed with four horses.

Shell of tank steel, well reinforced and fitted with manganese steel cutting edge. All pin holes bushed with steel bushings. Trunnions are cast steel fitted with non-rotating steel pins.

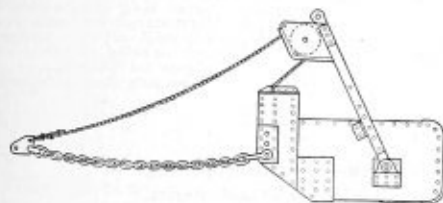
Hoisting bails of bar steel (as shown in cut) for sizes below two yard. Larger sizes have chain hoisting bails. Teeth can be furnished at extra price.

Catalog Number	No. 200	No. 201	No. 202	No. 203	No. 204	No. 205	No. 206	No. 207
Capacity, cubic yards	¾	1	1½	2	2½	3	3½	4
Weight, without teeth, pounds	2,200	2,500	2,800	3,200	4,850	5,850	6,550	7,000
Price, without teeth	\$575.00	\$607.00	\$678.00	\$750.00	\$907.00	\$1,036.00	\$1,180.00	\$1,313.00
Teeth extra.—Sizes up to 2½ yard, \$20.00 per tooth; larger sizes, \$30.00 per tooth; for standard 2 part teeth.								

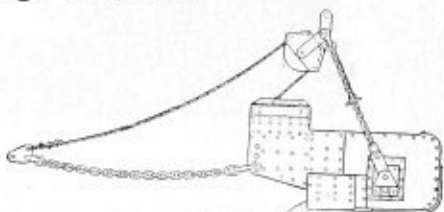
The Well-known "Drag-Line Bucket"



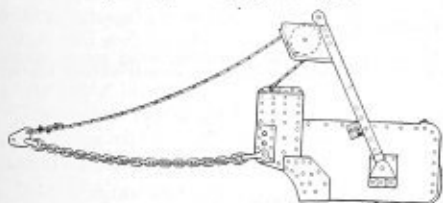
Special Types of Page Buckets



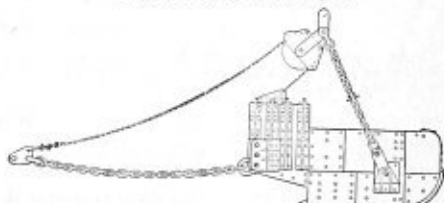
CLASS L
Light Type—Cap. ¾ to 2 yds.



CLASS C
Standard Type—1 to 5 yds.



CLASS M
Light Type—Cap. ¾ to 2 yds.



CLASS H
Heavy Type—1 to 6 yds.

Description of Different Classes

Class L.—For handling light material that can be excavated without plowing. Hoisting bail of bar steel—chain pulling bail. These buckets not supplied with teeth. Tank steel cutting edge.

Class M.—Same as Class L, but with manganese steel cutting edges and cast steel trunnions fitted with non-rotating pins and steel bushings for all pin holes—thus greatly increasing the life of the bucket. Can be used for handling sand, crushed stone, etc. Not supplied with teeth.

Class S.—The standard stock bucket is fully described at top of this page.

Class C.—Similar to Class S, except that a heavier manganese cutting edge is used, adding greatly to the life of the bucket when excavating material containing boulders or hard pan. Furnished with two-part teeth and chain hoisting and pulling bails.

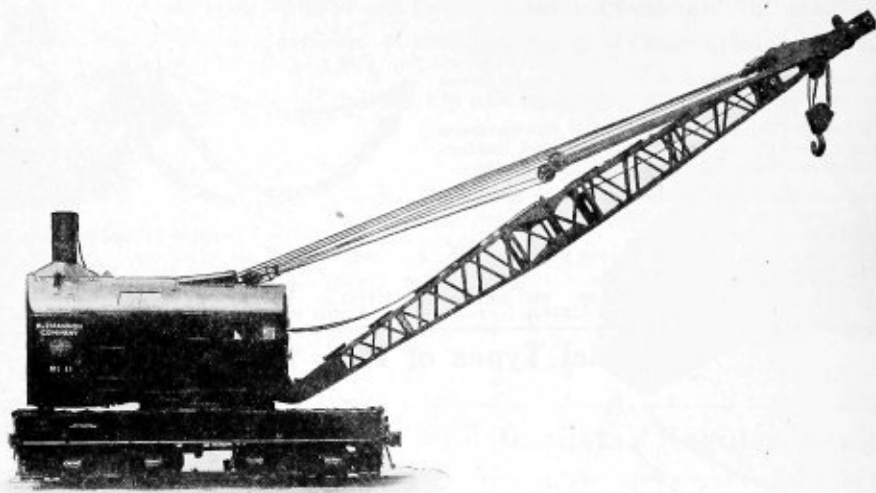
Class H.—Buckets are recommended for excavating the hardest materials that a drag-line excavator will handle. Used for excavating hard-pan, cemented gravel, boulders and blasted rock, and, in this service, they hold their shape and do not show excessive wear. A very heavy manganese steel cutting edge is used—all pin holes are steel bushed. Trunnion and loading chain pins are non-rotating. Steel castings are used for making loading chain connections. Furnished with standard two-part teeth and chain hoisting bails.

Capacity in Cubic Yards	¾	1	1½	2	2½	3	3½	4	4½	5	6
Class L, weight, pounds	1,450	1,500	1,700	2,000	3,000						
Class L, Price, each	\$495	\$535	\$573	\$610	\$750						
Class M, weight, pounds	1,650	1,750	2,000	2,300	3,500						
Class M, Price, each	\$555	\$588	\$634	\$688	\$828						
Class C, weight, pounds	3,500	4,000	4,500	6,000	7,000	7,500	8,000	8,600	9,100	9,600	
Class C, Price, each	\$800	\$875	\$935	\$1,094	\$1,250	\$1,407	\$1,563	\$1,688	\$1,813	\$1,938	
Class H, weight, pounds	4,800	5,500	5,900	7,100	8,800	9,400	9,900	10,500	11,500	12,800	15,200
Class H, Price, each	\$938	\$1,032	\$1,125	\$1,407	\$1,563	\$1,688	\$1,813	\$1,938	\$2,063	\$2,188	\$2,438

Prices of Class C and H include standard two part teeth with base of carbon steel and removable point of Manganese steel.

Derricks and Excavators for use with scraper buckets quoted upon request

Locomotive Cranes



**Standard 60 ton steel Erecting Crane with 50-foot Boom—self propelling.
All Castings of steel—Air Controlled Frictions—Pile Driver attachments.
This machine is fast displacing the old style Derrick Car.**

Capacities of Standard Locomotive Cranes

Built in sizes 5, 12, 15, 20, 25, 30, 40 and 60 tons capacity with four or 8-wheeled trucks, self-propelling, using steam, electric or gasoline power, with any style or length of boom to operate pile hammers, grab buckets, drag buckets as well as any hoisting work within capacity.

Wrecking Cranes

Wreckers built in 75, 100, 120, 150 and 160 tons capacity—these may also be fitted with long booms for erection purposes.

General Description of 60-Ton Steel Erecting Crane

Developed to meet the demand for a crane to handle quickly large ungainly units, such as bridge trusses or even complete bridges of moderate size—they are also used where unusual height is required, special booms up to 137 feet having been provided.

Mechanically they have many desirable features. Every important casting is of steel. The clutches for the motions of hoisting, slewing, traveling and varying the boom radius are operated by air cylinders controlled by valves, giving ease and speed of operation. Operating valves, together with the hand levers and brakes, are conveniently placed directly in front of the operator, whose position is so located that he has unobstructed view of the work at all times.

Two slewing speeds are provided for light or heavy work, controlled by a steel clutch that is always in either high or low speed. Slewing is accomplished without reversing the engines, by a train of cut spur and worm gearing, operated by friction clutches.

There are five provisions for hoisting or holding the load—the main hoist, an auxiliary hoist for handling light loads with a single line—the boom hoist, and two independent winch heads, one on each side of the crane.

Both the main and auxiliary hoists have extra large friction clutches and hoisting drums of large capacity. On the main hoist there is a screw brake of ample size to handle the maximum loads—auxiliary hoist is controlled by a quick acting foot brake. The mechanism for varying the boom radius is controlled by a steel clutch and automatic brake—due to the use of the improved Hindley worm, running in an oil tight case—the boom may be raised or lowered with the full load suspended.

The engines are double—accurately finished and of ample capacity. Link motion is provided for reversing. Bearings are of very large size with replaceable bronze bushings—those for the main shaft are placed on the outside of the frames so as to be readily accessible.

Gearing is of steel or bronze throughout—all being accurately machine cut. Large powerful friction clutches of a superior type with friction surfaces of special asbestos composition are used and adjustments and replacements are simple matters.

Complete provision is made for adequate lubrication below the car body as well as above. Convenient oil pipes lead to all bearings not easily reached by the operator; in fact, accessibility of all parts is a feature. Machinery is arranged to facilitate examination and is not too closely crowded together.

The cars, or trucks, fulfill all M. C. R. requirements, as well as those of the Interstate Commerce Commission.

The heavy roller path attached rigidly to the car body is accurately machined to assure perfect alignment and long wear. A hollow steel center pin receives the unbalanced tension due to load, also forming the center of rotation of the superstructure.

The special system of side frames and cross-beams gives the most rigid support to the machinery—doing away with structural material or heavy, flat castings generally used.

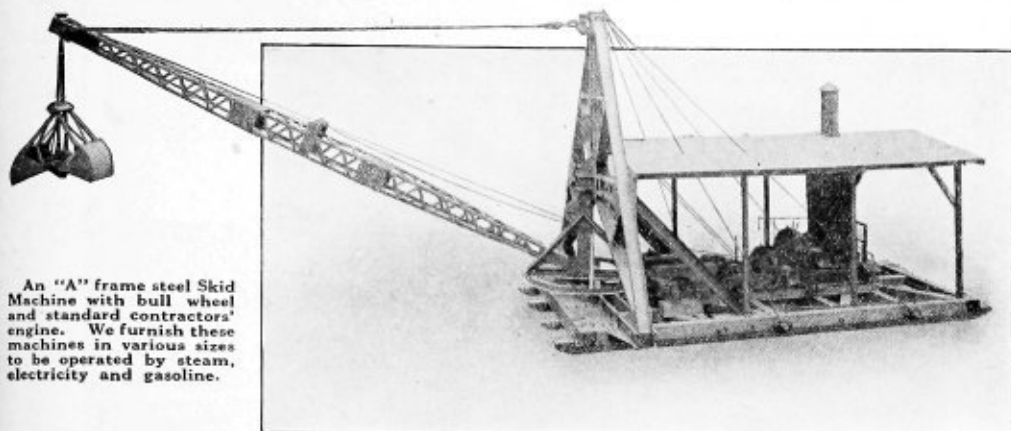
For grab bucket work, this machine is the fastest and most reliable in the field—one drum is controlled by free releasing clutch of fast action, the other by an independent cone clutch. Boilers furnished for any inspection desired.

Prices quoted upon request.

No. 565 Skid Excavators

Steel Boom and A Frame

With Clam-Shell or Orange-peel Buckets



An "A" frame steel Skid Machine with bull wheel and standard contractors' engine. We furnish these machines in various sizes to be operated by steam, electricity and gasoline.

This type of machine may be used in three ways. The first, as shown here, is a machine with a bull-wheel, stationary topping lift and automatic bucket.

The second style is made by adding a sheave and substituting a sheave block at the apex of the "A" frame; with this change a variable topping lift may be used.

The third style is when the bull-wheel is entirely eliminated, two swivel blocks are placed on the "A" frame sill, two more on the "A" frame and the lines led to the engine drums, making what is called an automatic or gravity swing, but with this swing material can be discharged on one side only.

This machine can be knocked down and set up more quickly than one built entirely of wood.

All its material is light and comes in smaller pieces, so that it is far easier to handle and transport from one place to another, saving time, money and labor.

The "A" frame and engine can be removed from the platform and placed on a scow, making a **standard type of dredge**.

By adding a few truss rods and extra timbers, the machine can be mounted on wheels, making a **machine of wide gauge**.

Its "A" frame and sill may be mounted on an ordinary flat car and used as a **traveling machine** on a standard gauge road. When so arranged, however, it can only be used on railroad sidings as the "A" frame would project too far to use on main railroad lines.

If the machine is rigged to use a variable topping lift, the bucket may be eliminated, and the machine then used as a **regular derrick**.

The popular size (as shown) will handle a 1-yard Clam-shell or a $\frac{3}{4}$ -yard Orange-peel bucket with a 40 ft. boom.

The Operating Lines.—Instead of being led through a casting at the foot of the mast, as in the usual derrick, in this machine these lines are led from the point of the boom down to the upper part of the mast, under two sheaves, then up and over two sheaves just above the top of the house line and from there back to the engine drums. The lead is direct to the engine drums and not over deflecting sheaves.

The Platform is built entirely of wood fitted with substantial castings and tied with strong rods and bolts. It is mounted on four or more skids (depending upon the size of the machine) and upon which it is moved as the work progresses.

The bull-wheel may be operated by auxiliary swinging drums fitted to the main hoisting engine, but we recommend a separate engine for this purpose. The increase in cost is more than compensated for by the ease with which the machine is then operated.

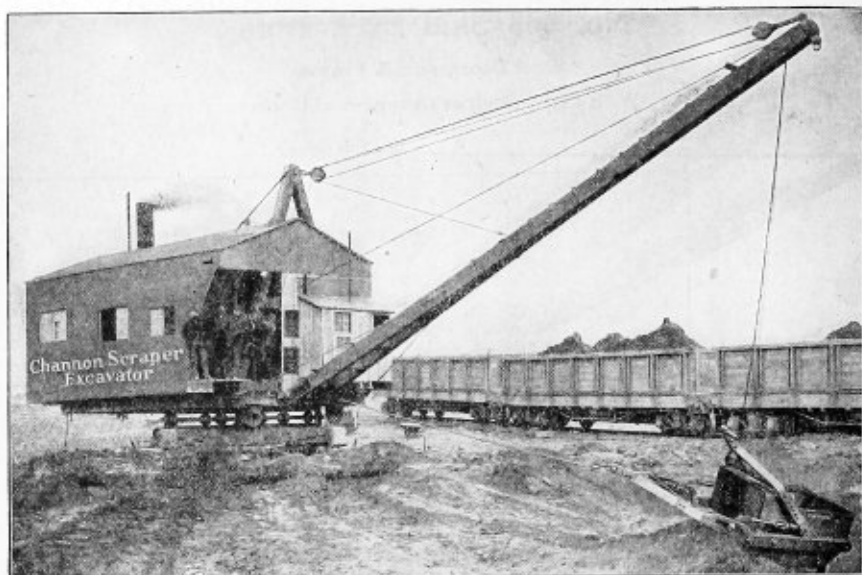


Fig. G. $1\frac{1}{2}$ yd. Machine, with 60 ft Boom, Digging Gravel and Loading Into Cars.

The Channon Scraper Excavator

Model 08—Wooden Frame

For Digging Waterways, Building Levees, Making Railroad Cuts and Fills, Digging Ore from Open Cut Mines, Loading Cars, Stripping Coal Beds, Digging and Back-Filling Sewers and Trenches, for Use in Gravel and Sand Pits or for Handling Loose Material of any Kind.

Advantages.—Machine rotates in a complete circle, loading and discharging material on both sides, front and rear.

Operates from the ground level and the scraper is pulled toward the machine—digs lower and discharges higher than other types—can be quickly erected and transported—handles large yardage at small cost.

The Channon Scraper Excavator, briefly described, consists of an upper platform or turntable, rotating upon a lower or skid frame, which is moved upon rollers, using planks laid on the ground for runway.

The long boom and machinery are placed on the upper platform which revolves like a locomotive crane on eight or more track wheels, having shafts attached to an outer ring and radiating to a slip ring sliding between the top and bottom center castings, making a perfect roller bearing.

These rollers bear on and travel between two circular T-rail tracks, one attached to the underside of the upper platform, the other to the top of the lower frame. Around the lower rail circle is passed the wire ropes for turning the upper platform, which rotates opposite to and counterweights the bucket and load.

The patented scraper bucket is hauled **toward** the machine, which is moved (by its own power) on the maple rollers **away** from the cut.

As machine rotates in a complete circle, it will, of course, dig and automatically discharge material on any side, as well as front and rear.

All operating levers are banked in quadrant at front of machine, where the engineer has an unobstructed view of the cut. Machines can be operated by two men (engineer and fireman).

Machine will dig economically any material that **can not** be plowed by four horses. The engines and boilers are amply large for even harder digging, but, of course, the capacity is then reduced very materially. We do not recommend our excavator for hard pan, shale clay, cemented gravel or the like, though it will handle such material after it has been blasted.

When writing, be sure to mention size of cut, character of material and general conditions of the work.

Send for catalog 37 giving complete description.

The Channon Scraper Excavator—(Continued)

Or "Drag-Line" Scraper

The first revolving derrick excavator with the scraper type of bucket was placed on the market by this company in 1904—its success was immediate and since then hundreds of these machines have been built.

This machine is especially adapted for digging economically canals or waterways and through cut work of any description, wasting the material on one or both sides. Its freedom from complicated parts, ease of handling and transportation makes it a desirable machine for general work as well as for large contracts.

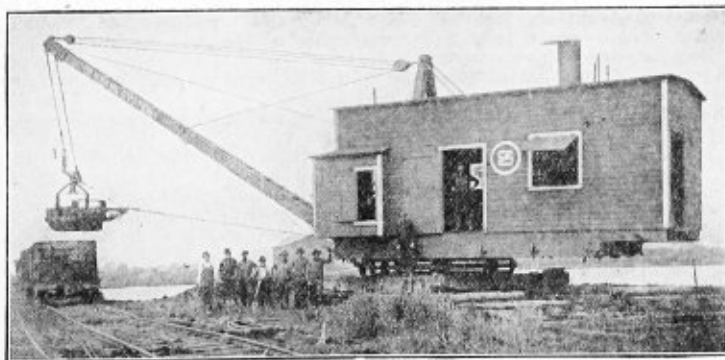
It is readily adapted to many changes. It can be used as a pile driver by suspending a pair of leaders from the point of the boom—by detaching the bucket and adding a fall block. It makes the finest kind of a rotary derrick—for very deep foundations, excavations or for loading material out of cars—it will handle perfectly a clam-shell or orange-peel bucket. Other particulars will be found in Catalog 37 covering this machine.

General Specifications

1½-yard Machine—the Popular Size

Scraper bucket.....	Capacity 1½ cubic yards
Main engine, special Mundy, with large frictions and gearing.....	9x10 double cylinders, double friction drums
Boiler, vertical, high-pressure, with Jerrold tube setting.....	50-in. diam., 102 ins. high; 155—2-in. diam. tubes
Swinging engine, special Mundy, compound geared.....	5x8 double cylinders, link-rev. motion
Winch, iron frame, screw brake.....	Double purchase
Wire rope, Bullock brand.....	Plough steel
Diameter rail circles, center to center of T-rails.....	13 feet
Boom, length center to center.....	50 feet
Digging radius, from center of machine boom at 30 degrees.....	50 feet
Width of machine.....	14 feet
Length of skid frame.....	22 feet
Length of turntable platform.....	29 feet
Height of "A" frame.....	18 feet
Clearance height under boom point to ground level, boom at 30 degrees.....	30 feet
Clearance height under boom point to ground level, boom at 60 degrees.....	48 feet
Size of load orange-peel or clam-shell bucket will handle in average earth.....	1½ yards
Weight, machinery and ironwork.....	Approximately, 45,000 pounds
Weight, timber.....	Approximately, 46,500 pounds
Weight, complete machine, in running order.....	Approximately, 50 tons
Capacity, in average earth.....	Approximately, 750 yards in ten hours

With a 50-foot boom set at an angle of 30 degrees, machine will dig at any point in a circle, 100 feet in diameter.



1½ yd.—55 ft. Boom Digging and Dumping Into Small Cars

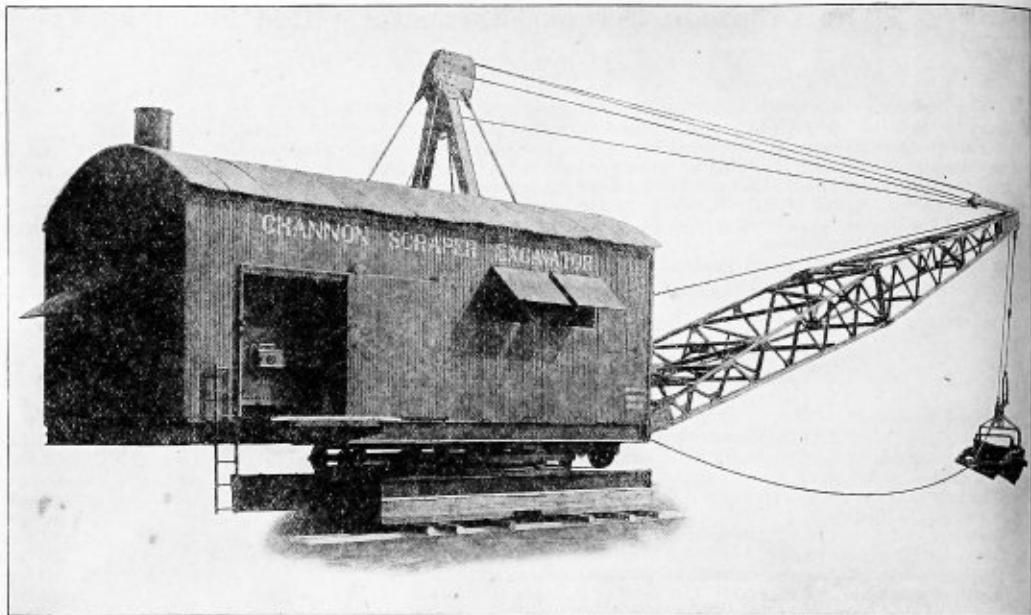


Fig. No. G. Model 1460 Steel Excavator—discharging into hopper

The Channon All-Steel Scraper Excavator

Model 1460 Latest Improved Type

It is a well known fact that a scraper bucket, on account of its scraping action and direct pull, will handle very much harder material than other digging buckets not employing this principle. This feature combined with the use of a long boom revolving in a complete circle accounts for the popularity of this machine.

This machine is the evolution of our Model 08 wooden frame outfit—the principle is the same, but the entire machine is constructed of structural steel. All stresses are concentrated within the swing circle, making a well balanced outfit. It is well designed, properly braced and cover-plated throughout. Made in sections for shipment and easy erection.

The scraper excavator resembles, in a general way, the well known locomotive crane, in having its operating mechanism mounted upon a rotary turntable—the weight of the machinery, etc., counterbalancing the load and the weight of the long boom. It presents, however, many new features in construction, the merits of which have been fully demonstrated under severe service.

The patented scraper bucket is hauled toward the machine, which is moved (by its own power) away from the cut.

As machine rotates in a complete circle it will, of course, dig and discharge material on any side, as well as front and rear.

All operating levers are banked in quadrant at front of machine, where the engineer has an unobstructed view of the cut.

Machine will handle economically material that can not be plowed readily by 6 horses; the engines and boiler are amply large for even harder digging, but, of course, the capacity is then reduced very materially. We do not recommend our excavator for rock, hard pan, shale clay, cemented gravel, or the like, though it will handle such material after it has been blasted.

The excavator is especially adapted for digging economically canals or waterways and through cut work of any description, wasting the material on one or both sides.

Its freedom from complicated parts, ease of handling and transportation make it a desirable machine for general work as well as for large contracts. Our machine has been used successfully in cutting irrigation ditches, building levees, railroad embankments, stripping gravel, coal, ore and phosphate beds and loading the excavated material into cars at a lower cost per yard than with other machines used for the same class of work.

Our Model 1460 Machine is fully described in Catalog No. 427 and No. 430.

Model 1460—All-Steel Scraper Bucket Excavator—(Continued)

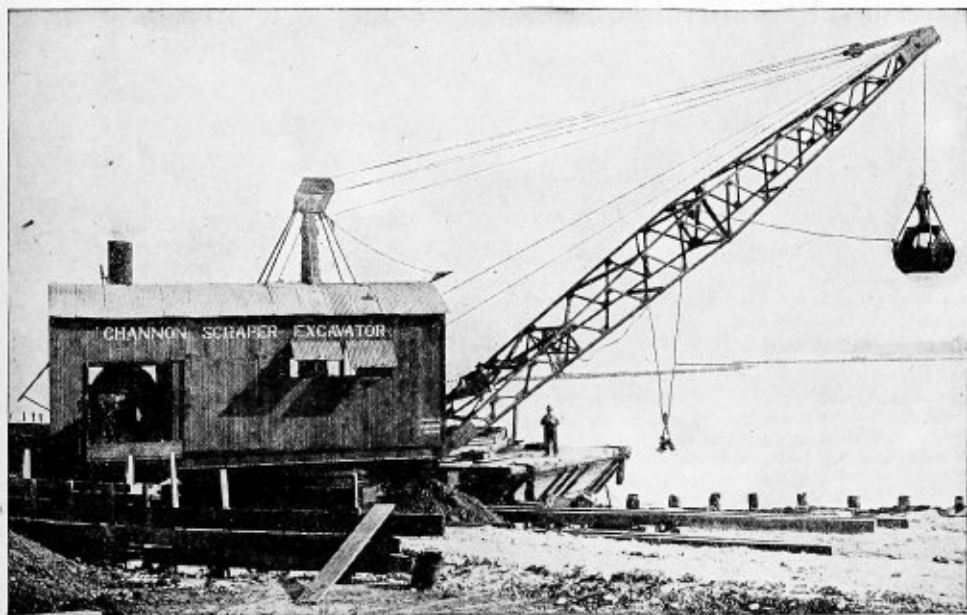
General Specifications

1½-yard Machine—the Most Popular Size

Scraper bucket.....	Capacity, 1½ cubic yards
Boom, length.....	60 feet
Main engine, special Mundy, with large frictions and steel gearing.....	9x10 double cylinders, three friction drums
Boiler, high-pressure, locomotive firebox type.....	54 in. x 12 ft. x 3 in.
Swinging engine, special Mundy, compound geared.....	5x8 double cylinders, link-rev. motion
Wire rope, Bullock brand.....	Plough steel
Diameter rail circles, center to center of T-rails.....	14 feet
Digging radius, from center of machine boom at 20 degrees.....	65 feet
Width of machine.....	14 feet, 6 inches
Length of skid frame.....	18 feet
Length of turntable platform.....	28 feet
Height of "A" frame.....	20 feet, 9 inches
Clearance height under boom point to ground level, boom at 20 degrees.....	26 feet
Size of grab bucket will handle, orange-peel.....	1½ yards
Size of grab bucket will handle, clam-shell.....	2 yards
Weight, complete machine, in running order.....	Approximately, 45 tons
Capacity, in average earth.....	Approximately, 50 to 100 yards per hour

With boom set at an angle of about 20 degrees, machine will dig at any point in a circle 130 feet in diameter.

For further particulars, ask for Catalog No. 427.



Model 1460 Steel Excavator with Clam-Shell Bucket—Unloading Scows

Bishop Derrick Excavator

(Patented)

Operated with Two-Drum Engine Having a Swinging Gear,
Dumps by Hand Line, or Automatically, as Desired

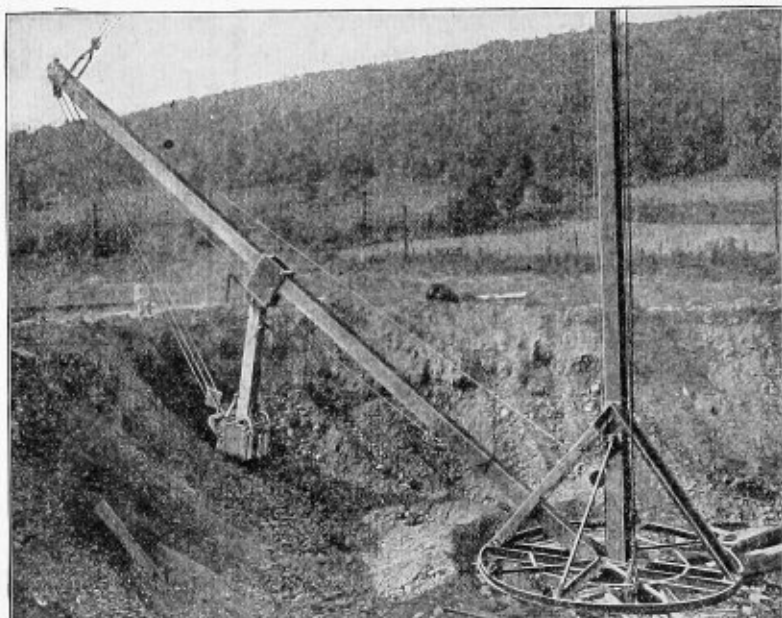


Fig. 2169

Can be used with any derrick having a square boom

The range is from the base of the derrick to the end of the boom, and below the base of the derrick the length of the dipper arm used. The ultimate strength of a crowding engine on a shovel is the weight of the boom. This machine has the entire weight of the boom on it at all times when digging.

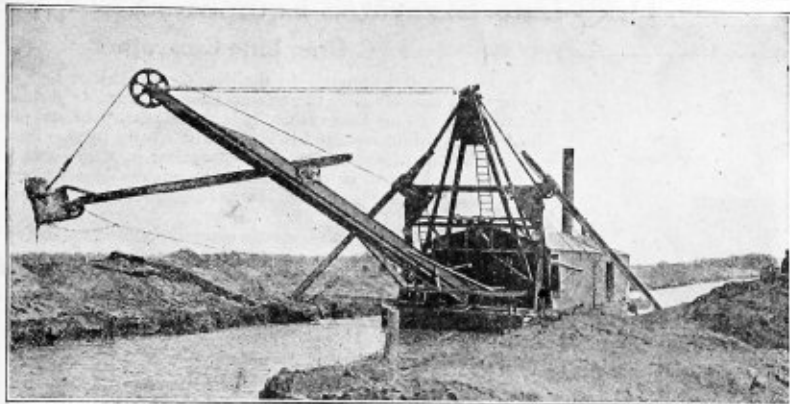
The operator slacks gently on the digging line drum until the carriage rolls down the boom, bringing the shovel down to the desired position and then releases entirely and the dipper swings back under the boom, the large end of the cam operating the grip and at the same time the operator lowers the boom, thus bringing the entire weight of the boom on the dipper. Should the dipper, however, be too far in to the bank, the boom can be raised and the dipper drawn out after it is full. As the dipper arm raises up, the carriage follows with it.

The carriage is constructed of steel plates and contains four rollers. The end of the dipper stick is provided with a cast-iron eccentric, or cam-shaped shoe, and when the dipper arm is raised toward the boom the pressure is released, permitting the carriage to roll down the boom; but when the dipper arm is released, the large end of the cam presses the lower grip plate against the wire and holds the carriage until the dipper stick has been raised sufficiently, when the small end of the cam releases the grip and the carriage follows up the boom.

Prices of Carriage and Dipper

Size	$\frac{1}{2}$ yard	$\frac{3}{4}$ yard	$\frac{1}{2}$ yard	1 yard
Price	\$1,200.00	\$1,350.00	\$1,500.00	\$1,575.00

Includes manganese steel lip and teeth.

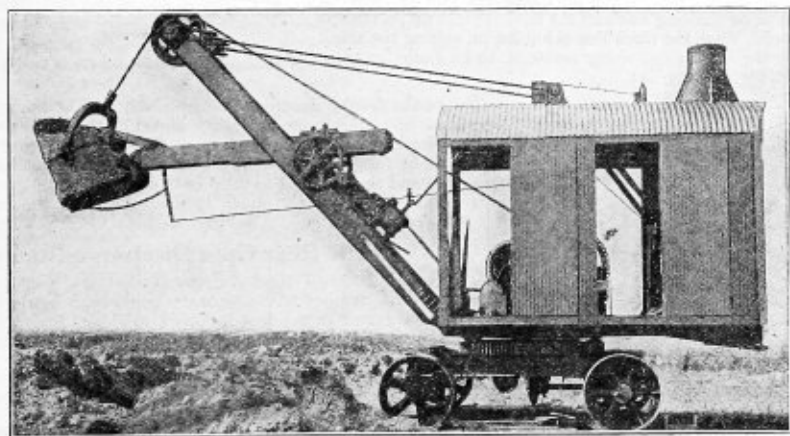


Steel Dipper Dredge
Single Line Type

The single line steel dredge has for more than 10 years been recognized as the most efficient type. This machine can be furnished with sectional steel hull, the sections of which pack so closely that the entire hull can be loaded on one ordinary flat car, and can be quickly assembled at low cost. The dredge is equipped with wide range spuds and hollow steel dipper handle.

Furnished with dippers ranging in capacity from 1 to $2\frac{1}{2}$ cubic yards. The length of boom usually ranges from 35 to 70 feet.

The main hoisting engine is of heavy design, fitted with compound gears and actuated by means of a substantial band brake. The swinging engine is of the central valve reversing type, compound geared, the gearing of both engines being of the highest grade steel. The hull, "A" frame, spuds, boom and circle and the dipper handle are of steel and steel sheaves of liberal size and strength are provided. By reason of these features this form of dredge is highly popular with experimental extractors.



Revolving Steam Shovel
Single Line Type

This machine employs a simple single cable, double cylinder, horizontal, compound geared, link reversing hoist, fitted with outside band friction and steel gears, also a rotating as well as a crowding engine of the same reliable design.

The boiler is of the vertical type, of ample size and power and designed for 145 pounds working pressure.

The boom is of all steel construction and the fittings are of heavy cast steel.

The dipper handle is our new welded design of hollow steel construction. The foot castings are of steel and rigidly secured to the dipper and the racking is of steel cast in a single section. The dipper is extra heavy, designed for hard continuous service, and the pins, bushings and teeth are of manganese steel.

We recommend this shovel for road, street, sewer and trench work, basements, clay deposits and stripping and for sand and gravel pits.

Usually furnished with a $\frac{3}{4}$ -yard bucket.

Drag Line Excavator Equipment

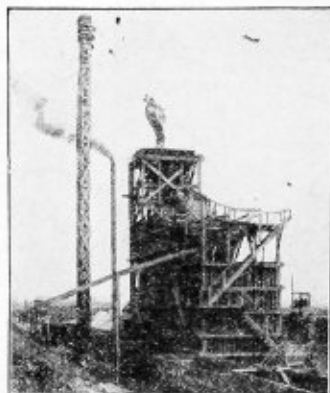
Drag Line Excavators

For rapidity and economy in the digging of bank or bed materials, in the dry or from under water, there is no more satisfactory device than the Dull Improved Drag Line Excavator. It is shovel, conveyor and elevator, all combined in one equipment; and it is operated wholly by one man. Low in first cost and in maintenance expense, economical in wages and power costs for operation, and rapid in direct and dependable delivery of materials, this excavator shows yardage cost so low as to make its use very profitable in many lines of work.

The Dull Drag Line Excavator is extensively used for delivery of materials to sand and gravel washing plants, and many outfits have been furnished in connection with plants of this character—not only with new Dull plants, but also for older plants of other original design. In this work there is often special advantage in the ability of the drag line excavator to dig from below water as readily as in the dry. It is also adapted for carrying the material back into the worked-over excavations.

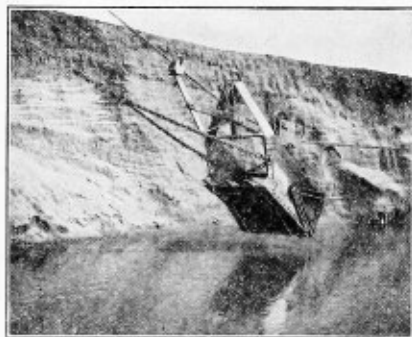
Method of Operation

The excavator bucket is suspended from a trolley as shown in the illustration, which runs on an inclined wire rope track, extending from the upper end of a mast of proper height—50 to 100 feet—to any suitable anchor—a tree or a "dead man"—out where the materials are to be dug. The inclination must be such that the bucket and trolley will run rapidly and freely down.



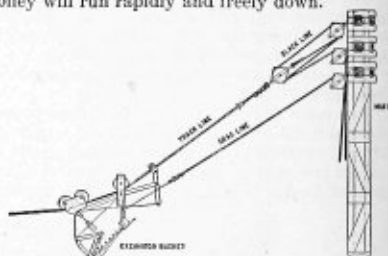
Equipped with 1½-Yard Bucket
Capacity 600 Yards—10 Hours

A two-drum hoist operates the excavator. From one drum runs a rope to the top of the mast, where it is reeved through a pair of blocks, one attached to the mast, and the other to the track rope. This is called the "slack line," as it slackens and tightens the track line. The rope from the other drum runs from the block on the mast to the draft chains on the front of the bucket. When the clutch on the drag line drum is released the bucket runs down the trolley, its speed is controlled by a brake at the hoist. Reaching a point over the material to be dug, the track line is lowered by paying out the slack line at the hoist. When the bucket rests on the material the hoist hauls in on the drag line and the bucket picks up its load as dragged forward. Then the slack line is hauled in, raising the track line and lifting the bucket out of the material, to be hauled rapidly up to the track by the drag line.



One and One-Half Yard Bucket

discharge gate which opens when the dump trolley strikes the dump casting on the track line and causes the wire rope connection to lift the gate. Thus the load drops directly out of the rear end of the bucket. The bucket body is of heavy plate steel well fitted and securely riveted. The wearing parts—digging lips and bottom runners—are of the best grade manganese steel. The gate is reinforced with heavy angle iron and bar stiffeners. All prices quoted upon application and buckets furnished to meet your special requirements.



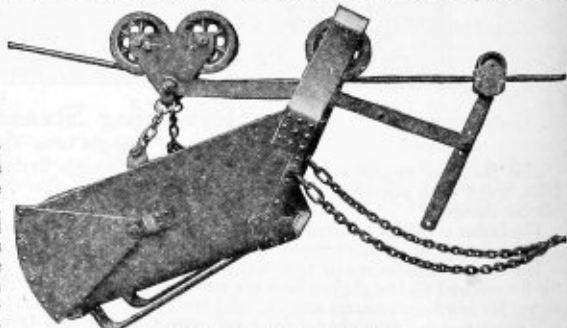
Arrangement of Rear Gate Discharge Bucket,
Style "D"

At the desired dumping point—which may be anywhere along the track line—the dumping trolley ahead of the bucket strikes a stop-casting clamped to the track line. See the illustration above. Then a slight farther movement forward causes the rear dump gate to open and the material to drop out.

This completes the cycle of operation and the bucket then is allowed to run down for another load.

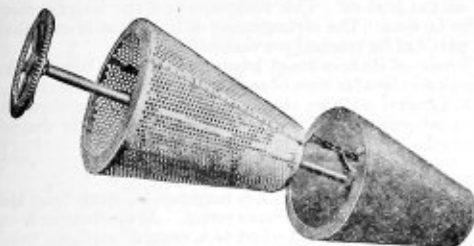
The Rear Gate Discharge Bucket

The Dull Rear Gate Discharge Bucket, while of familiar general form, is a distinct advance over other styles in that it eliminates the delay and power loss involved in the old plan of tipping the bucket for forward charge. The Dull Bucket has a hinged rear-end



"Style D" Improved Bucket

Screens for Washing Sand and Gravel



Dull's Conical Screens and Continuous Inclined Shaft

necessary to get rid of the muddy water. This is done by a conical separator tank.

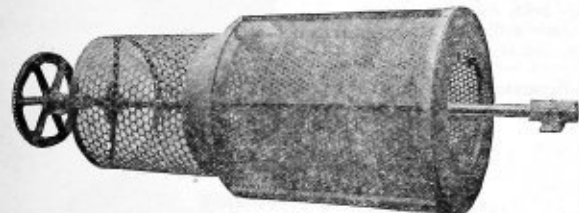
It will be noticed that all the screens are mounted on one shaft. The object in this arrangement is to dispense with a separate drive for each screen, with the attendant line shafting, bearings, gears, sprockets, chains, etc. One single pair of gears drives all the screens.

It is the large end of the screen that does the principal work. It has more perforations, more wearing surface and is equivalent to a much larger screen of other types. It therefore has greater efficiency, requires less power and has small upkeep expense. The screens have longitudinal joints and can be dismantled without disturbing the shaft. Walkways are also provided on both sides of the screens, to make them accessible.

This type of screen does not require so much timber work for supports, neither does it require so great a height to install. It is made in three different sizes, depending on the capacity required and the nature of the material. The first screen has usually $1\frac{1}{2}$ -inch or $1\frac{3}{4}$ -inch perforations, and all material over this size is discharged through the small end of the screen into the first bin. The washing process now takes place as described above. The second screen usually has $\frac{3}{4}$ -inch perforations and the third screen is made with $\frac{3}{8}$ -inch or $\frac{1}{2}$ -inch perforations, depending upon what class of trade the owner of the plant has, and how coarse he wishes his sand. Pipe nozzles are placed at the discharge end of the screens, for injecting water to prevent the material from discharging too rapidly and carrying over some of the finer parts. This fresh water is a rinsing water also and keeps the material from piling up in the spouts beneath the screens. The sand, water, soils and impurities are discharged from the settling box or tank. The sand settles to the bottom of the tank, and the water, carrying the impurities, passes over the opening at the top of the tank and is carried away by a launder.



Arrangement of Plant Using Dull's Inclined Conical Screens



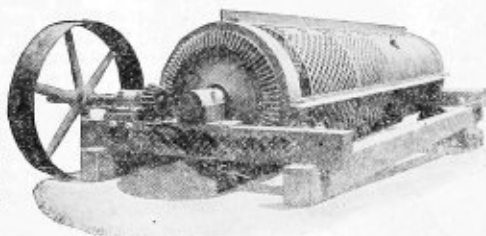
Jacketed Cylinder Screen

Information Gladly Furnished

Owing to the many various conditions under which these plants must be built, it is impossible to quote any prices in this catalog, but we will gladly furnish any information desired upon receipt of your specifications. In writing for prices kindly give capacity desired, description of material, number of sizes of gravel you wish to grade and size of each grade, amount of impurities, clay, loam, silt, etc.

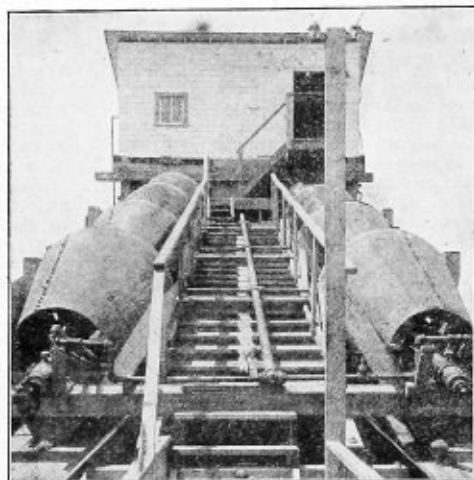
It is sometimes advisable for plants already built to use the cylinder type of screen, to avoid making extensive changes in framework. The illustration at left shows the Jacketed Cylinder Screen. It has a sand jacket for use in a dry process screening plant.

The illustration below is not a washing screen, but simply a standard type for stone sizing. Built in various styles and sizes.



Stone Screen of Standard Design

Screens for Washing Sand and Gravel—Continued



A Double Set of Inclined Conical Screens

The arrangement of the screens on the shaft is best described by the illustration. It shows a double set of inclined conical screens, with the coarser screen at the top and the finest at the bottom. The walkways and the water system can also be seen. The arrangement of this plant is such that every part can be reached conveniently.

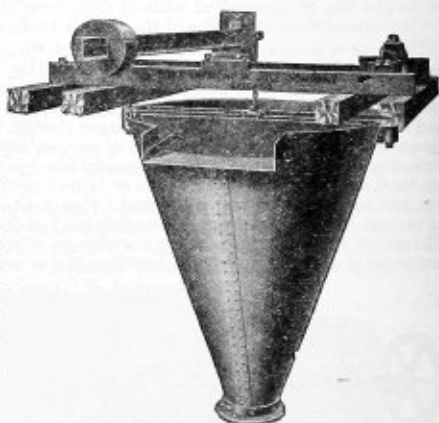
By reason of its important advantages and its conspicuous success in service this type of screen has won foremost rank in sand and gravel washing equipment, and is the standard for all work wherein some other type is not particularly desired or required.

Conical Separator Tank

The Conical Separator Tank is suspended directly from the supporting and operating lever system. At the bottom is an outward-opening valve, attached to a central rod down from the counter-weighted lever beam.

The suspension and connections are such that the weight of sand accumulation in the conical tank, overcoming the counterweight, causing a slight lowering of the tank and a farther lowering of the valve rod, opening the valve to permit escape of sand until reduction of weight causes closing of the valve. The soil water flows away at the top outlet, before which is a baffle plate to assist settlement of the sand, by permitting escape of the water only from below the surface.

The illustration below will best explain the method employed.

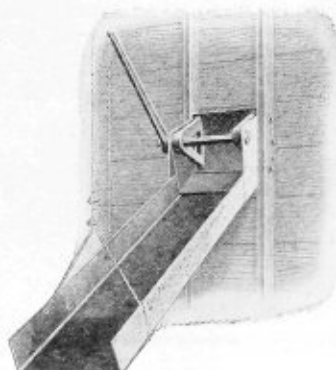


Conical Sand Separator

Loading Spouts and Gates

For loading from the bins, gates are provided. These gates are of types best suited to the particular kind of sand and gravel, with spouts hinged for raising and lowering, under control of counterweights. The Segmental Gate, shown in the illustration, is rotated on the same axis as the spout. It is very easy to operate and will not jam. In simple form it is particularly well adapted for use on the gravel bins. For the sand bins special consideration is necessary, and a special design has been constructed which, with toggle operating lever and eccentric action, is easy to operate, closes tightly to prevent leakage, and is self adjusting to allow for wear.

When writing your specifications for the Conical Separator it is necessary to give the capacity and description of material.



Segmental Gate

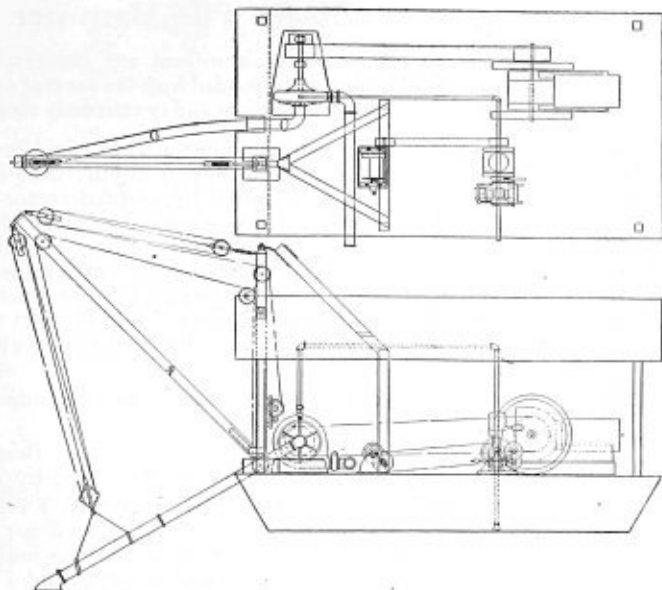
Regarding Inquiries

We solicit your inquiries relative to complete Sand and Gravel Handling Plants, small or large, and can furnish all the necessary machinery and equipment, including power, such as engines, boilers or motors, crushers, elevators, hoisting engines, pumps, piping, valves, shafting, belting, bearings, etc.

In order to make recommendations and quote prices for the most suitable equipment, we must have information as complete as possible regarding the conditions to be met: we should know the length of the track line span, the size of excavator bucket desired or number of yards required per hour, the number of sizes of sand and gravel wanted, the maximum size boulders in the deposit, and the approximate percentage of oversize gravel exceeding $1\frac{1}{2}$ inches and information relative to water supply, if washing and screening is desired.

The cost and character of a thoroughly satisfactory equipment are dependent upon proper consideration of, and adaptation of these various conditions.

Gasoline Driven Sand and Gravel Dredging Plants



We here illustrate the side elevation and plan of a sand and gravel dredging plant mounted on a scow and driven by a gasoline or kerosene engine, including an auxiliary power piston pump primarily for priming the large dredging pump. The piston also furnishes clear water under pressure to the main bearing of the dredging pump, giving, as nearly as possible, perfect lubrication and at the same time keeping the packing always in good condition.

The piston pump can also be arranged to pump water from the scow. This is accomplished by valves and pipe connections.

The piston pump is driven by a small gasoline engine, usually by means of gears. The same engine is employed to drive a single friction drum belt driven hoist. This hoist is used in connection with a stiff leg derrick for raising and lowering the suction line.

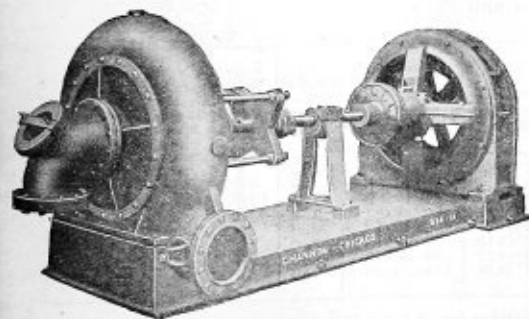
The derrick is also equipped with a single drum derrick winch for raising and lowering the boom.

We can furnish all of the machinery, wire rope, blocks, pipe, hose, etc., to equip an outfit of this kind. We can also furnish the same equipment with electric or steam power, of any size desired.

Dredge Pumps

For Sand and Gravel

Electrically Driven



The illustration shows a 10-inch heavy duty sand and gravel dredging pump direct connected to a 150 H. P. electric motor, the motor being mounted on an extension cast base and connected to pump by means of a flexible coupling.

These units can be furnished with either a constant or variable speed motor and pump of any size desired.

When pumping against high heads we recommend a heavy marine thrust bearing.

When requesting quotations give complete data relative to head, including length of both suction and discharge lines, also information relative to available electric current.

The Union Double Acting Steam Pile Hammer

Operated by steam or air without any changes, operates equally well in fixed leaders or suspended from the boom of a derrick or crane. Requires very little head-room and is extremely simple.

This type of modern double-acting, rapid-fire pile hammer delivers a succession of blows so rapidly that each blow falls before the movement caused by its predecessor has ceased; in this way an effect which is practically continuous is obtained, that the pile may be said to be literally pushed into the ground and when the hammer is stopped, the earth grips the pile firmly and holds it securely and penetration is obtained that would be impossible with a drop hammer, while the fact that the blows do not split or broom wood piles or sheeting, gives it an additional advantage.

The small dimensions of these machines admit of their use where head-room is limited.

Another advantage lies in the fact that this hammer may be suspended under any derrick boom or by chain hoist or tackle of any kind as well as in the ordinary pile driver leads.

Showing Base for Round Piles

Principle of Operation.—On opening the inlet valve or throttle, steam or air is admitted to the lower end of the cylinder, raising the ram to the top of its stroke; a valve actuated by a rod and locking lever then admits the steam or air to the upper end of the cylinder and the lower end being opened to exhaust, the free fall of the hammer is thus accelerated by the pressure on the top of the piston and the force of the blow correspondingly increased. The frame or body is one single casting and forms the cylinder, valve chest and ram guides and encloses the ram and valve mechanism thus protecting them from injury. The safety buffers and pile plate are also within the frame, so that nothing but the steam inlet is exposed. The piston and rod is a solid steel forging, the ram head is of steel and secured to the rod by a taper key; the piston, piston rod and ram head together form the "ram." The ram head moves in guides machined in the frame. Since weight is the chief requirement, all parts are heavy and of more than ample strength and are easily accessible.

All hammers have an automatic by-pass in the cylinder so that they **can not be started** unless they are **landed or resting** on the pile. Hammer is extremely simple, there are **only two bolts** in the entire movable working parts. **Prices** on the No. 4 and larger sizes include base for round piles and jaws for wood sheeting or driving cap for steel sheeting. The round pile base or steel sheeting driving cap for Nos. 2 and 3 hammers are \$75.00 extra including the anvil block.

Sizes, Capacities and Prices

Size No.	Price Each	Weight of Ram, pounds	Approximate Shipping Weight, pounds	Number of Strokes per Minute	Downward Force of Blow, Steam plus Ram, pounds	Size of Cylinder, inches	Overall Dimensions Height, Width, Depth inches	Air Required 80 Lbs. Pressure, Cu. Ft.	Boiler H. P. Required 80 Lbs. Pressure	Guides for Leaders		Size of Hose, inches
										Distance Between Jaws, inches	For Channel Iron, inches	
7	Prices upon Request	70	365	300	364	2 3/4 x 5	31x10x 6	40	3	10	3	3/4
6		129	850	250	636	3 1/4 x 7	40x14x 8	60	5	14	3	1
5		214	1400	200	1085	4 1/4 x 9	47x17x 9	100	8	17	4	1 1/4
4		363	2500	150	1683	5 1/4 x 12	60x20x11	150	10	20	4	1 3/4
3		663	4500	135	2470	6 1/4 x 14	74x23x13	200	15	23	5	1 3/4
2		890	5500	130	3300	7 1/4 x 16	81x25x15	300	18	25	6	1 3/4
1		1548	8000	110	5800	9 1/4 x 21	94x28x18	600	30	28	8	1 3/4
0		2550	12100	100	7800	10 1/2 x 24	118x28x20	750	50	28	8	2 3/4

The No. 7 Hammer is suitable for driving 1-inch wood sheeting; No. 6 for 2 to 3-inch; No. 5 for 2 to 4-inch; No. 4 for 2 to 6 in. wood sheeting, light steel sheeting, light round or square piles. The No. 3 is suitable for minor work, small round or square wood piles, 3 to 6 in. wood sheeting and light steel sheeting. No. 2 for general work, small concrete piles, medium round or square wood piles and sheeting and ordinary steel sheeting. The No. 1 and 2 are adapted for medium and large concrete piles, heavy steel sheeting and large wood piles.

Township or Horse Pile Driver

With this driver the hammer is usually raised by horse-power, although a hand-power winch is sometimes used or a small power hoist with single drum for handling the hammer and a winch head for hoisting the piles into place ready for driving.

The hand winch is bolted to the ladder, but the winch method is very slow and but very little used.

For small bridge work and other light driving, the hammer is more often operated by horse-power—the smaller sizes being hoisted direct, that is without the use of a purchase block. The larger sizes have one end of the line fastened to a suitable post, driven into the ground, while the other end is passed through a tackle block which is fastened to the main hoisting line and leads to the whistle-tree direct.

Tackle blocks can also be used instead of sheaves at top and bottom, on the smaller sizes, when so desired.

Lines and blocks are not included in prices below. For the lines, we use Channon No. 1 Manila rope, 4 strand for the hammer line and 3 strand for the pile line and two side guy lines, two wood snatch blocks generally furnished. The rope sizes range from $\frac{3}{8}$ to $1\frac{1}{2}$ for hammer lines and $\frac{5}{8}$ to 1 inch for the other lines.

***Ironwork Complete**, includes hammer with steel die fitted, nippers without block, two No. 1 top sheaves with shafts, boxes and bolts, channel iron liners with bolts and washers, one pair each Nos. 1 and 2 toggles with bolts.

The woodwork consists of the framing as shown, fastened together with bolts so as to be readily taken down for transportation, with turned ladder rungs, maple rollers, and nipper block. All painted and knocked-down f. o. b. cars, Chicago.

Prices without Lines or Blocks

Wt. of Hammer, Lbs.	Dimen. of Hammer		Height of Leaders, feet	Length of Channel Guides, feet	Price of Ironwork Only, Complete	Price of Woodwork Complete	Price of Complete Driver but without Lines or Blocks
	Between Jaws, inches	Width of Jaws, inches					
500	13	4 $\frac{1}{2}$	24	23	*\$ 80.00	\$130.00	\$210.00
600	13	4 $\frac{1}{2}$	24	23	* 87.00	130.00	217.00
700	14	4 $\frac{1}{2}$	26	25	* 92.00	155.00	247.00
800	14	4 $\frac{1}{2}$	26	25	* 96.00	155.00	251.00
1000	16	5 $\frac{1}{2}$	28	26 $\frac{1}{2}$	* 125.00	187.00	312.00
1200	16	5 $\frac{1}{2}$	28	26 $\frac{1}{2}$	* 132.00	187.00	319.00

Standard Contractors Pile Driver

This style of gravity drop pile driver is usually operated by a double friction drum hoisting engine, though a single drum engine with a winch head can be used.

We furnish driver with extension sills as shown or with short sills where engine is located away from the driver.

We can furnish either ironwork only, or ironwork and woodwork complete, ready to set up. When a complete outfit is ordered, we assemble the entire leaders in the shop, and when taking apart, mark all joints to facilitate erection in the field. The framework is of Norway pine, head-block of oak or maple, ladder rungs of turned oak, wedged in and rollers of maple; all bolted together, no nails being used. Prices include painting and "knocking down" for shipment and delivery on cars, Chicago.

***Price of Ironwork Complete** includes pile hammer with round steel pin fitted; No. 1 top sheaves with shafts boxes and bolts; No. 3 bottom sheave with shaft, boxes and bolts; one pair each No. 1 and No. 2 toggles with bolts; and channel iron liners with bolts and washers. Lines and blocks quoted upon request.

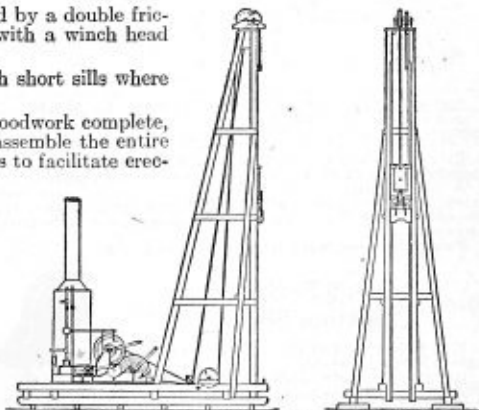
Prices without Lines, Blocks or Pile Cap.

Weight of Pile Hammer, pounds	Dimensions of Pile Hammer		Height of Leaders, feet	Length of Channel Iron Liners, feet	Price of Ironwork Complete (see above)	Price of Woodwork with Short Sills	Price of Woodwork with Extension Sills as shown	Price of Ironwork and Woodwork Complete with Extension Sills
	Distance Between Jaws, inches	Width of Jaws, inches						
1500	18	6 $\frac{1}{2}$	30	27 $\frac{1}{2}$	*\$140.00	\$200.00	\$253.00	\$400.00
1800	18	6 $\frac{1}{2}$	30	27 $\frac{1}{2}$	* 153.00	200.00	253.00	425.00
2000	19	7 $\frac{1}{2}$	35	32	* 186.00	270.00	300.00	500.00
2500	19	7 $\frac{1}{2}$	40	37	* 206.00	366.00	400.00	610.00
3000	20	8 $\frac{1}{2}$	50	47	* 253.00	675.00	700.00	990.00

Larger sizes quoted upon request. Freight rates are liable to be prohibitory for the long leaders on the large sizes. Where ironwork only is ordered, we furnish working drawings for woodwork. When a pile cap is used the No. 1 and No. 2 toggles are not required.

Hoisting Engines will be found listed on another section of this catalog.

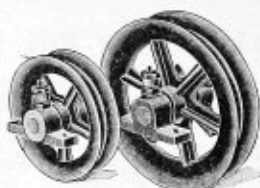
Do you use waste? We have a grade for every purpose. Get our Prices.



Showing Extension Sill for Engine and Pile Cap, below Hammer

No. 1 Pile Driver Top Sheaves

Are pressed tight on shafts and have plain bored boxes tapped for Comp. grease cups which save considerable time going up and down for examination and oiling.



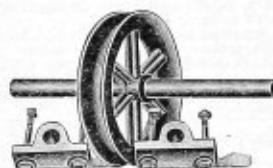
No. 2 Pile Driver Top Sheaves

Are pressed tight on their shafts and have babbitted open boxes to receive oily waste.



No. 3 Pile Driver Bottom Sheaves

Run loose on shaft following travel of rope across drum. Set screwed boxes with bolts.



Sizes of Sheaves, Inches

For Hammers, Pounds	Hammer Line		Pile Line		Bottom	
	Diam. Sheave	Size Rope	Diam. Sheave	Size Rope	Diam. Sheave	Size Rope
500 to 800	9	1 1/4	6	1	12	1 1/2
1000 to 1800	12	1 3/4	9	1 1/4	16	1 3/4
2000 and over	16	2	12	1 1/2	20	2

Prices of Sheaves

For Hammers, Lbs.	Prices Including Shafts, Boxes and Bolts		
	No. 1 Top Sheaves, per Pair	No. 2 Top Sheaves, per Pair	No. 3 Top Sheaves, Each
500 to 800	\$10.00	\$12.50	\$12.80
1000 to 1800	14.00	17.00	16.50
2000 and over	19.00	21.00	21.00

Prices of No. 1 Top Sheaves include four 3/8 connection Powell iron compression grease cups.

A set of pile driver sheaves consists of one pair (two) one for hammer line and one for pile line, top sheaves Style No. 1 or No. 2 and one No. 3 bottom sheave.

Furnished for wire lines at same price.

No. 6 Swiveling Bottom Sheave

Will follow lead of line and is adapted for horse or power driving.

In ordering state thickness of timber and whether for Manila or wire rope.

Price 9-inch sheave..... \$20.00

Price 12-inch sheave..... 25.35



Lindly Head Block

Inclined guide rollers permit the pile line to run out in any direction without friction or wear.

Sheaves are pressed on the shafts which run in babbitted boxes.

No. 0. For steam hammers weighing 16,000 lbs. . . \$135.00

No. 1. Large size for drop hms. 2,000 lbs. or over. . . 100.00

No. 2. Small size for drop hms. 1,800 lbs. and under. . . 60.00

Same price for wire or Manila rope. Specify which.



With Block

No.	For Hammers, Pounds	Price of Nippers Only	Price of Nippers with Block
5	300 and under	\$16.00	\$22.00
4	500 to 800	18.00	24.00
3	1000 to 1200	25.00	32.00
2	1500 to 2000	32.00	40.00

Adjustable Trips

Used in horse driving with nippers for striking short blows. Raised or lowered in the leaders by a small line.

Striking plates are of cast iron to give necessary weight.

Give size of leaders.

No. 4 for hammers 500 to 800 lbs. \$11.00

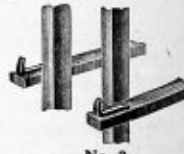
No. 3 for hammers 1000 to 1200 lbs. 15.00

No. 2 for hammers 1500 to 1800 lbs. 16.00



No. 1

Toggle Irons



No. 2

Weight Hammer	No. 1 Toggles		No. 2 Toggles	
	Open- ing, Ins.	Price per Pair	Center of Leaders to Hooks, Ins.	Price per Pair
500 to 800	13	\$ 7.65	6 1/2	\$3.35
1000 to 1200	18	12.00	9	4.40
1500 to 2500	22	14.00	11	5.75
Over 2500	26	17.00	13	7.20

Channel Iron Linters

These are the wear irons placed on the inside of the leaders between which the hammer operates.

Prices include drilling and countersinking and bolts.

Size of channels 4 5 6 7 8

Price per foot. . . \$0.48 \$0.60 \$0.69 \$0.85 \$1.00

Double this price to get running foot of leaders.



Pile Points or Shoes for Hard Driving

The round points are the most popular and are generally in stock. Any style in two or three days.

Round Pile Points

Size, Inches	Wght., Lbs.	Price Each
6	35	\$1.85
8	80	3.20
10	150	5.50

Special prices in quantities.



Round

Square Pile Points

Size, Inches	Wght., Lbs.	Price Each
4x4	14	\$1.20
5x5	22	1.60
6x6	36	2.00



Square

Wedge Pile Points

Size, Inches	Wght., Lbs.	Price Each
9x2 1/2	17	\$1.35
9x3	26	1.65
9x3 1/2	33	2.20

Prices include spikes.

Wedge

Use Ajax 4-strand Manila Rope for Hammer Lines.

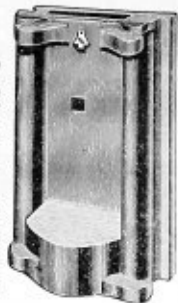
Drop Pile Hammers

Careful attention has been given to the design of these hammers to concentrate as much weight as possible in the base and to have the hammer as long as the size of the leaders will permit, giving longer bearing in the guides.

Allow $\frac{1}{4}$ -inch play for channel iron liners, that is $\frac{1}{4}$ inch on each side.

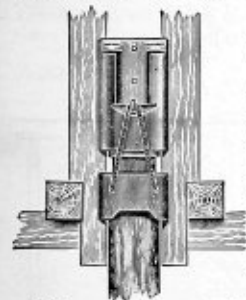
We supply two forms of pins, a triangular die or pin for use with nippers for horse or winch drivers and a turned steel pin to which the hoisting line is attached direct when hammer line is operated by a friction drum.

Be sure to specify which is wanted.



Weight of Hammer, Pounds	Distance Between Jaws, Inches	Width of Jaws, Inches	Price of Hammer, Including Steel Pin Fitted
500	13	4 $\frac{1}{4}$	\$25.00
600	13	4 $\frac{1}{4}$	30.00
700	14	4 $\frac{1}{4}$	33.00
800	14	4 $\frac{1}{4}$	38.00
1000	16	5 $\frac{1}{4}$	44.00
1200	16	5 $\frac{1}{4}$	53.00
1500	18	6 $\frac{1}{4}$	60.00
1800	18	6 $\frac{1}{4}$	69.00
2000	19	7 $\frac{1}{4}$	77.00
2500	19	7 $\frac{1}{4}$	95.00
3000	20	8 $\frac{1}{4}$	100.00

Hammers vary in weight 25 to 100 pounds more or less. Be sure to specify style of pin wanted. Larger sizes to order prices quoted upon request.



W. T. C. Patent Cap

In driving piles with a drop hammer the heads are frequently split or broomed by the concussion of the hammer—to overcome this difficulty, recourse is had to Pile caps.

The expense of taking off and replacing these bands, to say nothing of broken ones and consequent delays led to the adoption of this pile cap which is used by leading contractors and railroads all over the country.

It consists of a cast iron cap with tapered recesses above and below the pile fitting the head of the pile fitting the lower one.

Into the top recess is fitted a turned and painted oak cushion block with Norway iron band $1\frac{1}{2}$ inches at top.

Suitable jaws engage the leaders and form a movable toggle-iron, steadying the pile as it is being driven.

As the hammer descends, it strikes the wood cushion block and the pile is forced downward by the blow.

After the pile is driven, the cap is fastened to the hammer by means of pins on each side and both raised together.

These caps are made to suit dimensions of customer's leaders. We must know width of jaws and also distance between jaws of hammer.

Price, including block, band and pins for pile hammer.....\$60.00

Also furnished for steam hammers and for wooden sheet piling or for all popular makes of steel sheet piling, U. S., Lackawanna, J. & L., etc..... 65.00

No. 3 Follower Band

In some driving there is not room for a cap as described above, so we furnish a wrought iron band tapered single or double flare.

14 in. diameter, 8 in. face... \$22.75
12 in. diameter, 7 in. face... 20.00

State whether single or double flare is desired.



Follower Caps



No. 3

For driving piles below the surface. This cap is recessed at the bottom to fit over the pile. In the upper end a pile of required length is bolted with the upper end trimmed to fit into the regular pile cap.

The No. 4 is similar, but arranged for sheeting.

Price No. 3 A. 12 inch diameter.....\$20.00
Price No. 3 B. 14 inch diameter..... 26.00
Price No. 4. For 2x8 to 6x12 sheeting..... 15.00

State size of sheeting when ordering.



No. 4

Sheeting Caps for Maul Driving



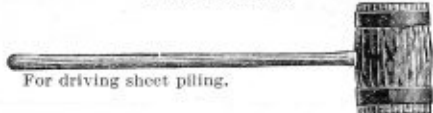
No. 5

Price each. 2x6 2x8 2x10 2x12 3x6 3x8
No. 5. Forged Steel... \$5.35 \$6.35 \$7.35 \$8.35 \$8.00 \$8.35
No. 5. Cast Steel 4.00 5.00 6.35
No. 6. Forged Steel... 6.35 7.35



No. 6

Sewer Mauls



For driving sheet piling.

Size 7x10. Weight about 19 pounds.....\$2.65
Size 8x10. Weight about 22 pounds..... 3.00

Norway Iron Pile Bands



Fitted to the tops of piles for hard driving. The popular size of iron is $\frac{3}{4}$ x3 inch iron, but we make them any size or diameter.

Diameter, inches. 11 12 13 14 15 16
Price each, $\frac{3}{4}$ x3... \$3.00 \$3.60 \$3.75 \$4.00 \$4.35 \$4.65
Other sizes average about 10 cts. per pound.

Pile Band Puller



No. 7. Forged steel. Adjustable for different sizes of bands. Price.....\$10.00

No. 8 Pile Puller



For Wood Sheeting Planks
Made for 3x10-inch plank, but can be used for other widths and also for 2-inch planks. Steel forging with $\frac{1}{2}$ -inch chain and ring.
Price each.....\$10.50

Pile Straighteners



Listed under Steamboat Ratchets or Pushing and Pulling jacks elsewhere in this catalog—see index.

Track Wheels

For Bridge Travelers, Excavators and Derricks—Made Single or Double Flanged
Cast Iron with Deeply Chilled Face, or of Cast Steel—
Any Style of Boxes Desired



Fig. 1121 Double Flanged

These track, or car, wheels are very heavy and substantial, with wide treads, and can be furnished with either single or double flanges as desired; the single flange wheel is preferred on account of taking a very deep chill, consequently lasting much longer as the rails are often covered with sand or other gritty material.

Can be furnished loose on shaft, but regular style is supplied with axles, 2 5/8" diameter pressed in, turning in bronze bushed boxes or boxes with oil cellars similar to railroad car axle boxes. State style of bearings desired and number wanted. We have patterns for 12 and 18-inch diameter.

Boom Fitting

Fig. 1122

With Shank to Fit a Drop Hammer



Fig. 1122

This is very convenient when it is desired to use the pile driver for light derrick work. The fitting is placed into the square hole of the drop hammer. It is made for a 10-inch boom and is of three tons nominal capacity.

List price \$30.00

Hanging Leaders

Fig. 1123

For suspension at end of boom of derrick; bottom braced from deck of driver, or guyed. Can, of course, be swung to drive batter, sideways and forward, or backward. Fitted with channel liners, back braces and hammer stop. Arranged at top to fit derrick.

State requirements as to length, size of hammer and width of derrick boom.

A swivelling hanger can be placed at the top of derrick to drive sheet planking.

Prices on application.

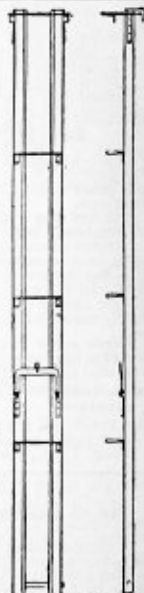


Fig. 1123

Hammer Stop

Fig. 1124

All forged—no castings used.

Dropped to form a stop, or rest, and pulled back to allow hammer to operate.

Made in the following sizes:

For 1000 to 1200-pound drop hammers..... \$23.00

For 1500 to 1800-pound drop hammers..... 25.00

For 2000 to 2500-pound drop hammers..... 30.00

For 3000-pound and upward drop hammers..... 40.00

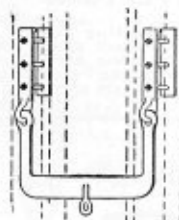
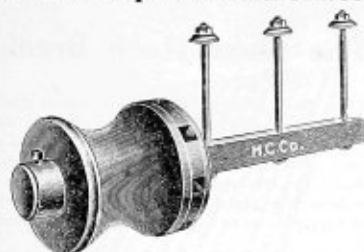


Fig. 1124

Roller Spools and Axles



No. 1. Square Shaft

Spool is machine finished, to run on 10-inch wooden or 10-inch iron pipe rollers. We can furnish also the 10-inch oak rollers, 26 feet and under, banded on ends and drilled for crowbar. Four roller spools and two oak rollers make one set.

No. 1. Square shaft. Price per set of four... **\$124.00**

No. 2. Round shaft, very heavy. Set of four. **280.00**

Two oak rollers, 10-inch by 26 feet, banded and drilled... **\$130.00**

Two oak rollers, 10-inch by 24 feet, banded and drilled... **124.00**

10-inch diameter pipe rollers quoted upon request. State length wanted.

Rigid Roller Bearings



These are plain castings to take the place of the spool rollers shown to the left. Instead of rolling they slide on the long rollers. With pipe rollers they are also satisfactory. Our pattern is for 10-inch pipe, about 10 $\frac{3}{4}$ -inch diameter, and also for 10-inch diameter oak rollers. Specify when ordering which is to be used.

Rigid Roller Bearings

Price per set of four... **\$46.00**

Price each... **11.50**

Rollers

Pile Saw Arbor

For Cutting Off Piles Under Water

As ordinarily used they are made to cut off piles 16 to 24 feet under water. We usually allow for 8 $\frac{1}{2}$ feet in length above water, to which we add the depth of cut required to get length of arbor.

The shaft is 3 $\frac{1}{8}$ inches in diameter, and counterbalanced. A 42-inch saw is usually sufficient, but for very large piles this size would have to be increased.

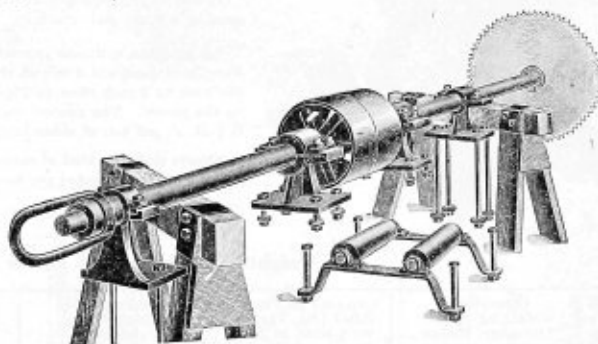
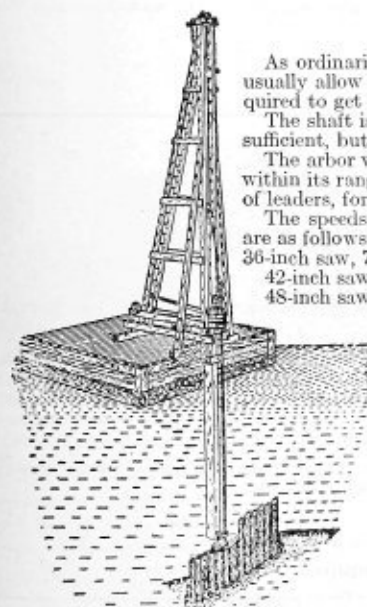
The arbor works on a spline its entire length, and is readily adjustable to any depth within its range. Side rollers and frames are furnished, to be fastened to the inner side of leaders, for the belt to run on.

The speeds and approximate horse powers required for different diameters of saws are as follows:

36-inch saw, 700 R. P. M., 8 H. P.

42-inch saw, 600 R. P. M., 10 H. P.

48-inch saw, 525 R. P. M., 12 H. P.

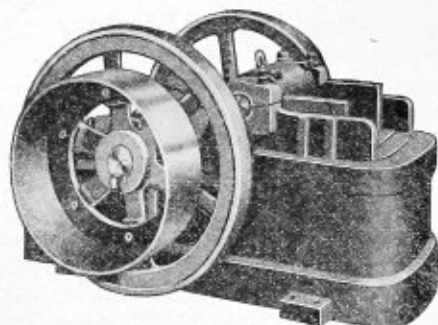


Our price includes the saw, arbor, pulley bearings, sheaves, swivel hook, counterbalanced sheave, side frames and rollers, with necessary bolts to fasten all to woodwork, together with a drawing for the woodwork and fastening in place.

Our regular pile driver engines can be fitted with an attachment for driving the saw. When this feature is desired we cast the frame with an extension on the front end to carry an extra shaft, driven by a pinion from the front drum shaft; this shaft carries a pulley in the center of the engine and from which the pile saw arbor may be driven direct.

Price of pile saw arbor, regular 28 $\frac{1}{2}$ feet... **\$380.00**

For increase or decrease in length, prices quoted upon application.



Dimensions, Weights, Etc., of Blake Rock Breakers

Prices on Request

Size of Receiving Opening	Capacity per Hour in Tons	Weight of Re'v't Piece	Total Weight						Extreme Dimensions Including Shafts						Driving Pulley	Proper Speed	Horse Power Required
			Lbs.	Lbs.	Ft.	In.	Ft.	In.	Ft.	In.	Ft.	In.	Inches	Rev.			
Inches																	
4 x 1 1/2	...	40	160	1	8	1	0	1	3	8 x 2	...	...	250	4	...	...	...
10 x 4	4	2,085	5,100	4	2	6	1 1/2	3	11	20 x 6 1/2	...	...	250	7	...	...	...
10 x 7	7	3,800	8,400	5	4	6	5	4	5	24 x 8 1/2	...	...	250	8	...	...	...
15 x 5	9	4,800	10,000	5	5	4	3	4	0	30 x 8 1/2	...	...	250	10	...	...	...
15 x 9	11	7,100	16,900	6	8	8	10	5	3	24 x 11	...	...	250	14	...	...	...
20 x 10	15	9,500	22,300	7	6	8	7	5	1	30 x 12 1/2	...	...	250	20	...	...	...
24 x 12	20	22,000	45,000	10	0	9	10 1/2	6	2	42 x 15	...	...	250	40	...	...	...
24 x 18	25	...	54,100	10	0	10	0	6	3	48 x 12	...	...	250	65	...	...	...
30 x 24	35	...	60,000	...	...	...	...	...	...	54 x 16	...	...	250	80	...	...	...
36 x 24	...	...	80,000	...	...	...	...	...	...	54 x 21	...	...	250	...	...	...	...

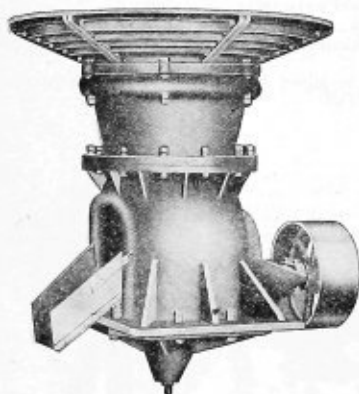
The Blake Rock Breaker

The Blake Rock Breaker has been a standard machine for so many years for preparing rock for finer crushing by stamps, rolls or Huntington mills, and is so well known that little description is necessary. Its wearing parts are few and the cost for repairs is very low. The crushing surfaces of the stationary and swing jaws are removable plates of white iron or cast steel. These plates are reversible, so as to give the maximum amount of wear.

In addition to the wedge adjustment for taking up the wear, toggle plates of different lengths are furnished which can be inserted on either side of the pitman to give the desired opening between the jaws and thus regulate the size product. We provide, with these Rock Breakers, tight and loose pulleys and a pillow block for an outboard bearing.

The capacity of a Rock Breaker depends on the distance between the jaws and the number of revolutions. The capacities, as specified in the table, are the average capacities when the machines are run at the speed stated, with the jaws 1 1/2 inches apart, and properly fed. The amount of product is also affected by the kind of rock; hard, brittle rock will go through faster than sandstone, or tough rock.

When estimating on the size of engine to drive one of these machines, it is wise to figure on using more power than that given in the table.



Gyratory Rock and Ore Crushers

In estimating power required for crushers, ample provision has been made for driving elevator and screen.

An accurate estimate cannot be made that will cover all classes of materials. Very hard rock will diminish the capacity. It takes more power per ton to break the rock to 1 inch than to 2 1/2 inches and larger. For fine crushing, add liberally to the power. The general rule for crushing the hardest stone to sizes mentioned is 1 H. P. per ton of stone broken per hour.

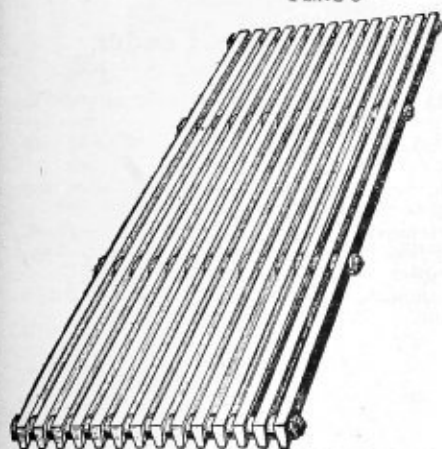
Always state the kind of stone or ore to be crushed, the grade of fineness required and the capacity wanted per hour in tons or yards.

Weights, Capacities and Power Required

No.	Dimensions Receiving Spider Openings, Inches		Capacity in Tons of 2,000 Lbs. Varying with Kind of Rock		Speed and Size Driving Pulley, Inches			H. P. for Crusher, Elevator and Screen	Approx. Weight of Crusher, Lbs.	List Price with Reg. R.H. or L.H. Drive	Add Extra for Back Gear
	Each About	Both About	Tons per Hour	To Pass Diam. Ring	Diam.	Face	R.P.M.				
2	8 x 22	8 x 44	5 to 10	2 1/4	24	8	450	12 to 15	10,000	\$ 1,000.00	\$ 50.00
3	8 1/2 x 24	8 1/2 x 48	10 to 20	2 1/2	28	10	425	20 to 25	15,500	1,500.00	65.00
4	9 x 27	9 x 54	15 to 30	2 1/2	32	12	400	25 to 30	23,500	2,000.00	81.00
5	12 x 35 1/2	12 x 71	25 to 50	2 1/2	36	14	375	30 to 50	32,000	2,700.00	88.00
6	12 1/2 x 37	12 1/2 x 74	45 to 90	3	40	16	350	40 to 60	44,000	3,500.00	95.00
7 1/2	14 x 44	14 x 88	90 to 150	3 1/2	44	18	350	75 to 125	67,500	5,000.00	105.00
8	19 x 50	19 x 100	130 to 225	4	48	20	350	100 to 150	100,000	7,000.00	...
10	25 1/2 x 72	25 1/2 x 144	400 to 600	5	54	24	350	175 to 250	180,000	11,000.00	...

The Grizzly

PLATE 5

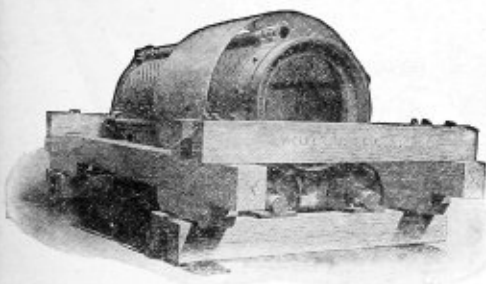


The Grizzly is made of special bar iron, of taper section, placed on edge and fastened together by rods and mesh thimbles of cast iron.

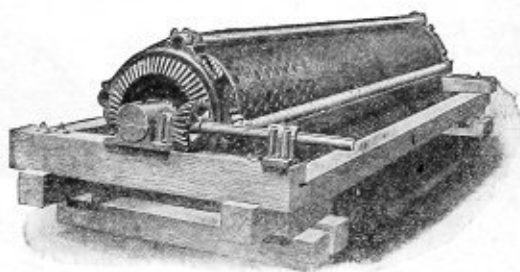
It is built into the woodwork above the ore bin, at an angle of about 40 degrees, its sides being formed of plank. It varies in width from 3 to 6 feet and in length from 8 to 12 feet. We make them of any size desired.

No.	Size of Grizzly, Feet	Size of Bar, Inches	Mesh, Inches	Weight, Pounds	Price
1	3½ x 8	¾ x 1¾	1	800	\$ 50.00
2	4 x 8	¾ x 2	1	900	60.00
3	4 x 10	¾ x 2	1	1200	80.00
4	4 x 10	¾ x 3	2	1400	90.00
5	5 x 10	¾ x 4	2¼	2400	150.00

Standard Rock Screens



Showing Receiving End and Dust Jacket



Showing Driving End and Gearing

No.	Diameter, inches	Length, feet	Weight, lbs.	List Price
36	32	8	3,800	Prices on request
37	32	10	4,300	
38	32	12	4,500	
39	40	8	5,100	
40	40	10	5,400	
41	40	12	5,600	
42	40	14	6,400	
43	40	16	6,600	
44	40	20	7,400	
45	48	12	9,300	
46	48	14	10,000	
47	48	16	11,000	
48	48	20	12,500	

Stone Elevators, Cars and Friction Hoists, listed elsewhere in Catalogue

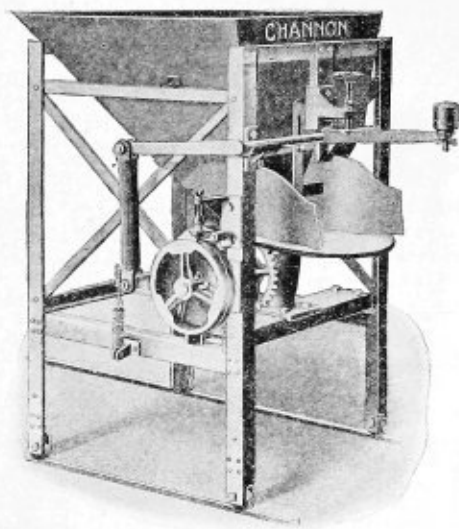


Fig. B1

Challenge Ore Feeder

Fig. B1 shows our Challenge ore feeder arranged to be tappet driven.

The frame is of steel throughout, making it very rigid and durable.

The legs are made extra long so that the track may be on a floor at the level of bottom of mortar.

Track is provided so that feeder may be moved back and away from the mortar to make the necessary clean-ups or repairs.

Full information furnished and prices quoted on application.

Channon Bin Gates Bottom Discharge

Fig. B2 shows the type of bin bottom gate most commonly used. It is very simple, strong and serviceable, and is operated by hand lever as shown.

We are prepared to furnish other gates of standard and special design to suit conditions without outlets proportioned to size of pumps and capacity required.

Prices on application.

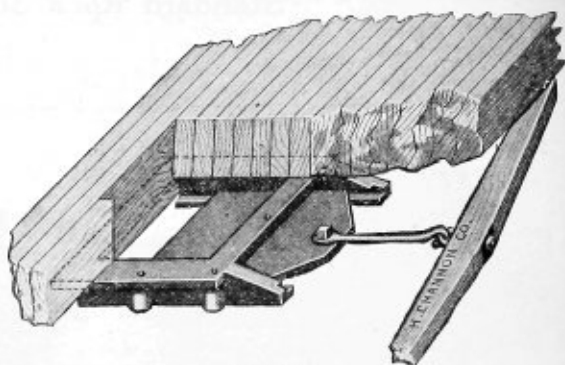


Fig. B2

Channon Side Discharge Bin Gates

Fig. B3 is the standard form of gate for discharging ore from side of bin. It is operated by a hand wheel in connection with a rack and pinion as shown.

By substituting a chain sheave for the hand wheel, gate may be operated by hand chain from the ground or other convenient point.

Made in a variety of sizes.

We can also furnish clam-shell under-cut and other gates of standard form for discharging ores, stones, coal, etc.

Full information and prices on request.

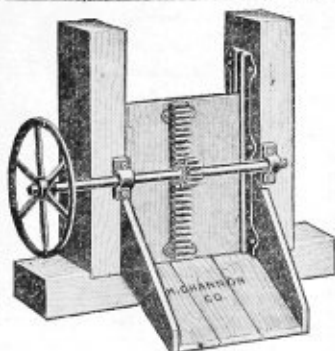
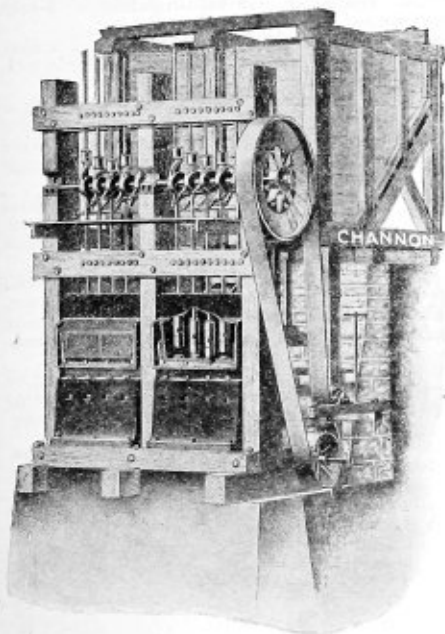


Fig. B3

Ten Stamp Batteries



The plate at left show our ten stamp battery placed on a heavy cast anvil block supported by concrete. We can also furnish mortar for bolting to a wooden mortar block usually 2-inch by 12-inch planks fastened together by 30-penny spikes.

Some users place the mortars on solid concrete mortar blocks and have reported increased capacity due to superiority of concrete over wood.

These batteries are built in either five or ten stamps on cam shaft with wood pulley on either side.

The battery may be started or stopped without interfering with the operation of any other part of the mill by means of a belt tightener as shown.

We are prepared to furnish complete iron work with stamps of any specified weight or drop, including a full set of hardwood guide blocks and wooden cam shaft pulley. Also bolts, rods, nuts, washers and piping for the battery. Also the necessary machinery for combination mills, including amalgamation pans, cleanup pans, retort and bullion furnaces, gold retorts, ingot molds, etc. Also cyanide mill equipments, including tanks, cyanide filters, zinc boxes, etc. Also re-grinding machinery, such as Huntington Mills, Chilean Mills, Ball Mills and Tube Mills.

A complete set of working drawings for the erection of the mill is included in our price, and furnished with order so that millwright will have no difficulty installing the plant.

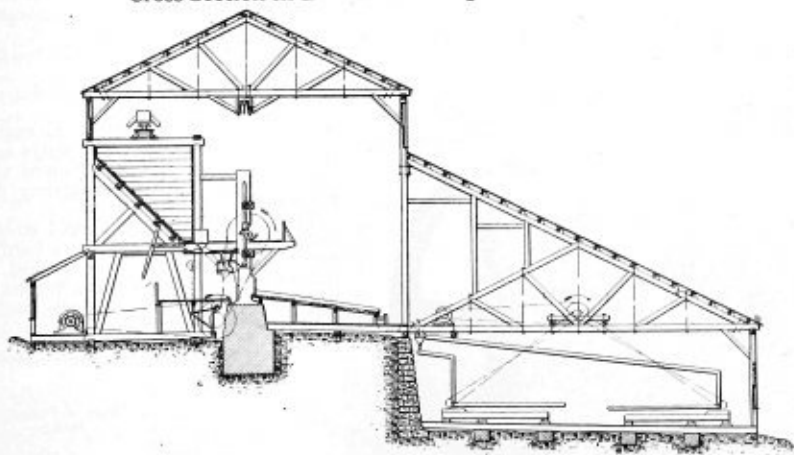
We are also in position to furnish three-stamp prospecting mills.

Let us figure on your work.

Gold Stamp Mill

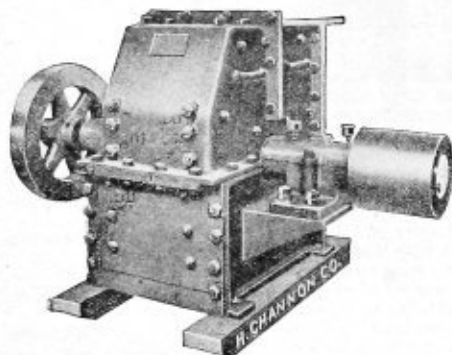
With Amalgamating Plates and Concentrating Tables

Cross Section in Elevation Through Center of Battery



The ore, as it comes from the mine, is reduced in the crusher house to the size required for the Stamp Mill. It is then carried by a belt conveyor, with an automatic tripper, to the bins behind the stamps. From these bins it is automatically fed into the stamp mortars which discharge onto the copper tables. The material from the tables is then treated on the concentrators.

The K-B Pulverizer



For reducing materials containing lumps 3-inch diameter and under to a fine product.

It will handle limestone for cement making and agricultural purposes, coal for coking, fluor spar, phosphate rock, gypsum, oyster shells, ores, etc.

The material is fed into the machine through the hopper as shown in cut below and is hurled by the hammers, revolving at the rate of 1000 r. p. m. against the breaking block. When sufficiently reduced the pulverized material is discharged through the screens in bottom of the machine.

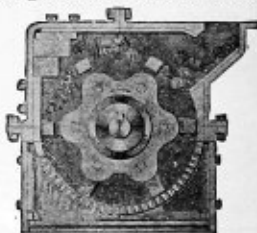
The K-B pulverizer is built entirely of steel and is lined throughout with heat-treated chrome steel plates, or manganese hardened steel castings, depending upon conditions of the work.

The hammers are made of manganese and by an ingenious method of mounting they can be readily adjusted to wear, thus **prolonging the life of the hammers, maintaining a uniform product and the high efficiency of the machine.**

The screens vary in design, depending upon the material to be crushed. They can be inserted or removed by sliding them through the lower casing. If the material should clog in the pulverizer because of its too rapid feeding, one man can easily and quickly remove the end plates from the lower casing and draw out the screen. Very little time is lost or effort required in the operation.

The No. 1 machine stands about 30 inches high and covers a floor space of 2x5 feet (from pulley to fly wheel). The No. 2 machine stands about 40 inches high and covers a floor space of 3x6½ feet. A No. 1 K-B pulverizer will reduce three to four tons of limestone per hour to 20 mesh, and four to five tons per hour to 10 mesh. A No. 2 K-B pulverizer will reduce eight to ten tons per hour to 20 mesh, and ten to twelve tons per hour to 10 mesh. The No. 1 machine requires about 15 H. P. and the No. 2 requires about 30 H. P. to operate.

No. 1 K-B pulverizer. Price.....\$ 783.50
No. 2 pulverizer. Price.....1,467.00



Crushing Rolls

Frame is of the box type, cast in one piece and heavily ribbed on the inside, having the fixed roll shaft bearing cast on. The inside is hopper shaped, with the discharge opening sufficiently large to allow the stream of crushed ore to pass through without coming in contact with the frame, thus avoiding wear. The removable bearings swivel in the pedestals, which glide on guides in the frame.

The bottom half of roll housing extends to the center of roll shaft and is cast integral with the roll frame. The upper half consists of two cast iron side plates and a feed hopper or distributor.

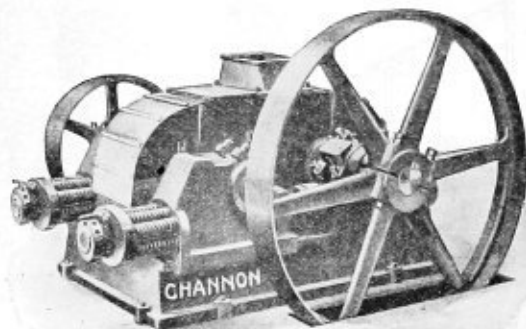
It is fitted with cover and inspection door in center of top. The joints of housing are all machined and shaft openings are covered with dust plates held in place by springs. It is dust proof.

The feed hopper has two hard iron, or manganese steel baffle plates, which spread the ore the entire width of rolls. The check plates are of hard iron and rest on the ledges cast inside the frame. The plates are bolted to the housing and can be removed through top opening without dismantling any part of the machine.

The roll shafts are of forged steel and extra heavy. The shells are of extra hard and tough rolled, or manganese, steel finished. The cast roll centers are in two parts, turned on outside to fit the double taper of shells, and drawn together by binding bolts.

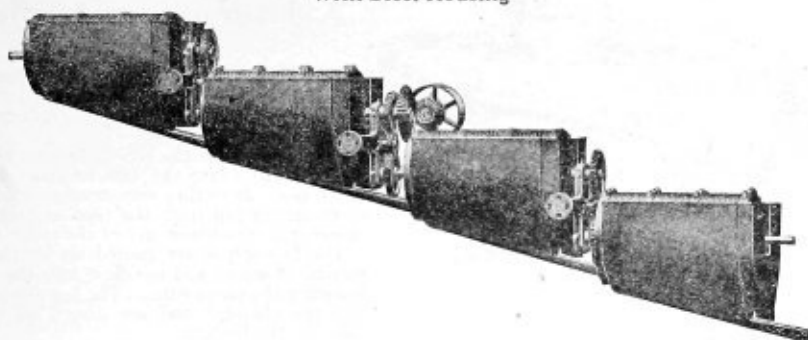
Prices on Application

Size, Ins.	Max. Feed When Crushing 4 to 1		Size of Pulley, Inches	Wt., Lbs.
	Smooth Shell Ins.	Cor'g'd Shell Ins.		
21x14	1	2	60x 8½ and 30x 6	11200
30x14	1½	2½	72x10½ and 36x10½	17500
36x16	1½	2½	84x10½ and 42x10½	24500
42x16	1½	3½	96x14½ and 48x10½	37000
48x18	2	3½	108x14½ and 54x10½	60000
54x24	2½	4½	108x17 and 54x13	105500



Revolving Sizing Screens

With Steel Housing



These revolving screens, or trommels, are designed to screen ores with little fall, and to avoid the vibrations incident to shaking screens. When the ore is once in motion very little slope in the direction of the screens length will cause it to move forward.

A "V" shaped steel housing is used to catch the undersize and convey it to the succeeding screen. Two or more screens are used, depending upon the number of sizes required. The different sizes of materials are conveyed through launders to the jigs.

Dimensions and Weights

Diameter of screen, inches	24	30	30	36	36	42	42	48	48
Length of screen, feet	6	6	9	6	9	6	9	6	9
Square feet of screen	38	47	71	57	85	66	99	76	113
Weight, pounds	900	1000	1300	1200	1500	1400	1800	1700	2000
Weight with housing, pounds	1100	1200	1600	1600	2200	2000	2600	2300	3000

Wood Frame Ore Jig

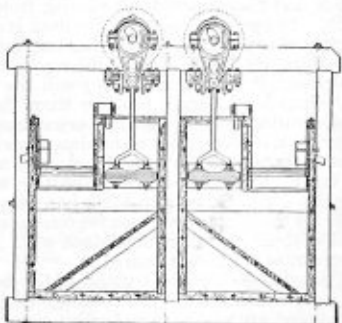
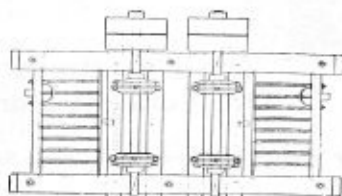
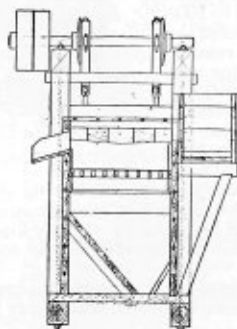
The Hartz type of jig here illustrated is the one most commonly used. It is employed successfully for treating coarse and fine ores and for recovering higher and lower specific gravity minerals. Two or three mineral separations can be made.

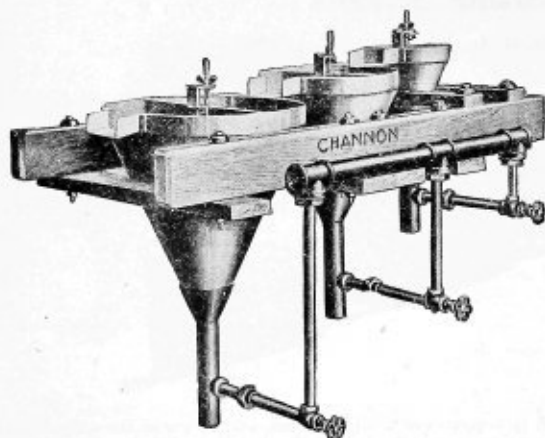
The jigs can be furnished with one or more jiggling compartments, each with its own sieve and plunger. Two, three and four compartments are the most common.

They are also made in the single and double types. The double jig is two singles placed back to back. Their tanks are supported and bound by timber frames, of which there are usually one to four compartments. We can also furnish them with iron frames.

The screen in the Hartz jig is stationary and the water is caused to rise and fall through it by the action of the plunger.

The jigs take the feed from the revolving screens, or trommels, and each jig is adjusted to handle fine, medium or coarse materials.





Hydraulic Classifiers

Each unit consists of two inverted cones, one inside the other. The inner cone is suspended from a cross bar and is adjustable in its relation to the outer cone.

The slimes run into the inner cone and pass out at the bottom into the annular space between the two cones. Here they encounter an upward current of water coming from the pipe at the side of the chamber at the lower end of the outer cone.

The fine slimes are carried up by the ascending current of water and overflow into the trough surrounding the outer cone. The heavier particles fall into the chamber and are drawn off through the valve in the bottom.

The regulation of quantity and size of material drawn off is effected by the adjustment of the inner cone and the quantity of water admitted to the chamber.

These sizes are generally used in series, increasing in size from No. 1 up. For example No. 1 size for two concentrating tables, No. 1 and 2 sizes for three concentrators, etc., depending, of course, upon the ores.

Weights and Dimensions

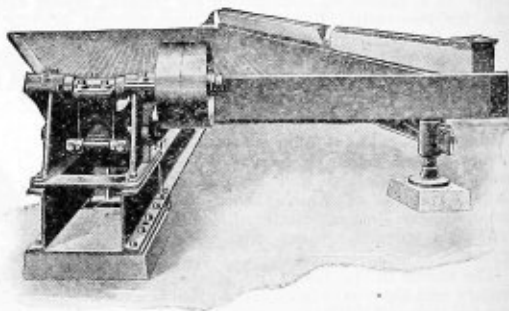
Diameter, Inches	Mesh	Weight, Pounds	Total Height, Inches
12	8 to 20	160	34
20	20 to 30	320	43
30	30 to 40	500	56
40	Finer than 40	850	71
60	Finer than 40	1100	86
72	Finer than 40	1500	105

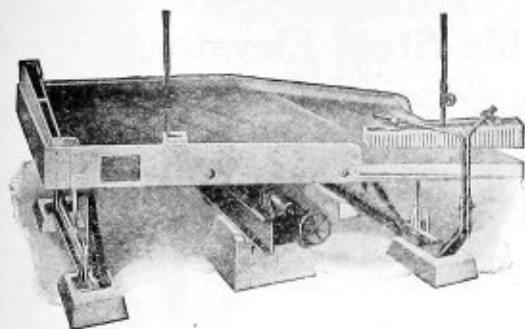
The Overstrom Ore Concentrator

For Treatment of Fine and Coarse Sand Feeds

The Overstrom table is adapted to the treatment of fine and coarse sand feeds ranging from 16 to 100 mesh. In operating position the deck is diagonal to the line of movement. This diagonal feature results in making the entire deck surface available for the settlement of mineral and as a result the Overstrom table handles a larger tonnage than the ordinary concentrating table of equal or even larger area. A very clean concentrate is produced owing to the greater transverse distance the cleaned mineral has to travel before discharging in the concentrate launder. The Overstrom table has proven its superiority for concentrating low grade iron ores. It is an ideal table for this class of work or for concentrating low grade ores of any kind, on account of its large capacity, general efficiency, and small maintenance cost. It has no superior for the concentration of ores where a two or more concentrate product is desired.

The table deck is constructed of the best grade of cypress rigidly braced and stayed, all fastenings being either screws, bolts or rods. The concentrating surface is covered with either the first quality linoleum or rubber. The riffles used are well seasoned sugar pine.





Deister Ore Concentrator

The Deister latest improved No. 3 slimer is furnished in either single or double deck type. It is essentially a slime machine designed for feeds of 80 mesh and finer. It embodies in its deck and mechanical construction all those features which continued use and experiment have demonstrated to be essential to its highest metallurgical and operating efficiency.

The feed crosses the table transversely. It flows in a thin film across the area adjacent to the feed box and is there stratified. It then encounters the relatively still water of a pool which serves as a baffle against the transverse progress of concentrates, resulting from the prior stratification. The differential motion imparted to the deck constantly advances the mineral to the concentrate edge, where it is discharged. The greater slope of the deck below the pool facilitates the sloughing to the tail of the gangue and the coarser sands which the feed may contain.

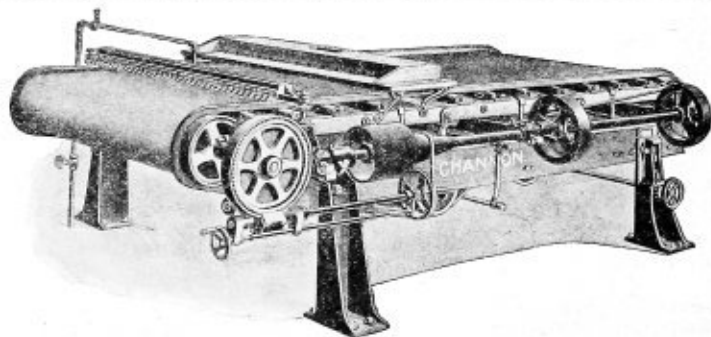
There is a decided advantage in the use of this table for the concentration of ores containing two or more valuable minerals where two or more products, each of a shipping grade, are desirable.

The table deck is shipped completely riffled ready for placing on table supports.

The wash water launder is supported over the table deck by a stand and adjustable extensions, and being independent of the table produces an even flow of water.

Frue Vanners

For Ore Concentration



The vanner is a fine sand and slime concentrator and does its work on the upper surface of an endless belt which is slightly inclined from the horizontal and receives a rapid shake in the plane of the belt, while at the same time it has a continuous slow motion up the incline. The agitation makes the ore bed so loose that minerals of higher specific gravity can settle to the lower layer, while those of lower specific gravity use this upper layer.

The travel of the belt carries the heavy mineral to the upper end and the surface water washes the light mineral down to lower or tail end. The heavy mineral adheres to the belt and is carried over the head end, washed off and deposited in a rectangular tank, under the machine, which is filled with water.

The concentrates may collect in the tank and be hoed out or may run out continuously through small spigots. In either case there is an overflow which goes to settling boxes to save the fines.

The belt generally has a smooth surface, but corrugated belts can also be furnished.

We can furnish these vanners in 4-foot or 6-foot widths. The capacity of a 4-foot Frue vanner on 50 mesh stamp mill pulp is 4 to 6 tons in 24 hours, and 6 to 8 tons if the pulp is a trifle coarser. 6-foot vanners have a capacity of from 8 to 16 tons in 24 hours. $\frac{1}{2}$ horse power is required to drive.

A standard 6-foot Frue vanner complete with plain belt, boxed ready for shipment weighs 3500 pounds. A standard 4-foot vanner weighs 3000 pounds.

"Channon" Portable Steel Elevator or "Stacking Machine"

For Stacking Boxes, Bales, Rolls, Etc.

Not only a labor saving machine, but one that will enable the warehouseman to utilize all of the space up to the ceiling—stacking or piling up the heavy packages in regular tiers, easily and quickly. Can be used advantageously in narrow aisles with but an inch or two of clearance, as the platform is open on three sides, cantilever type, to permit of loading in front and discharging at either side when unloading to top of pile.

This "elevator on wheels" can be moved to any part of the warehouse—the uprights are usually hinged at a point that will permit passing through doors or other obstructions. Wheels are roller bearings and while this machine was not designed for a truck, can be moved with great facility on any ordinary level floor that will carry a platform or warehouse truck.

Can be used in basements or other places with low headroom as it requires no overhead support, it is self-contained, consequently material can be piled closer to the ceiling than with other forms of hoisting devices—there is no waste space such as would be taken up by tackle blocks and slings or the beams of a traveling crane.

Advantages.—Bulky, heavy cases may be handled by one man, the package is lifted to the level of the first tier—then slid over on the rollers—unloading from stock piles is accomplished in the same manner. Piling and shipping may be handled with one-half to one-fourth the number of men. The storage capacity is greatly increased. Stock may be piled or stacked in an orderly manner, thereby facilitating easy removal.

The design is amply strong, with rigid construction between base and uprights which carry the platform and its load.

Has positive floor lock which operates automatically and prevents movement of machine while the load is being lifted.

The machine is safe and simple, all hand machines are equipped with a positive acting ratchet and pawl device, which must be properly set before the crank can be applied to the hoisting mechanism and the pawl cannot be released until the brake has been set and the crank removed. This prevents operator from being struck by the crank, if, through carelessness, he neglects to remove same.

500-pound size is a useful size and strong enough to handle a good proportion of warehouse packages and light enough to be moved around handily.

This size is single geared and has $\frac{1}{2}$ -inch steel hoisting cable. Has friction brake, crank guard and ratchet and pawl.

1000-pound size is the standard machine for most lines of work. It is compound geared, with two crankshafts and two speeds—the second shaft gives twice the speed in lifting one-third of maximum load. This feature is useful in lifting a light load or raising the platform when empty, preparatory to lowering packages from the pile.

The hoisting cable is $\frac{1}{2}$ -inch Reliance Swedes Iron. Has friction brake, ratchet and pawl of releasing type and crank guard.

Information Required

State total height of machine desired; height of lowest opening machine is to pass through; maximum load; kind of material to be handled, and the kind of floor in warehouse.

Standard Sizes and Prices of Hand Power Machines

Any Height Up to Ft. In.	500-Pounds Capacity					1,000-Pounds Capacity				
	Lift Ft. In.	Price	Base Frame, Inches	Platform, Inches	Base Wheels, Inches	Lift Ft. In.	Price	Base Frame, Inches	Platform, Inches	Base Wheels, Inches
9 6	7 11	\$148.50	30 x 47	26 x 29	5	7 5	\$166.50	36 x 54	30 x 34	5
10 6	9 2	153.00	30 x 47	26 x 29	5	8 8	171.00	36 x 54	30 x 34	5
12 9	10 5	157.50	40 x 47	26 x 39	5	9 11	175.50	42 x 54	30 x 40	5
13 0	11 5	162.00	40 x 47	26 x 39	5	10 11	180.00	42 x 54	30 x 40	5
14 0	12 5	166.50	40 x 47	26 x 39	5	11 11	184.50	42 x 54	30 x 40	5
15 0	13 5	171.00	40 x 47	26 x 39	5	12 11	189.00	42 x 54	30 x 40	5
16 0	14 5	175.50	40 x 47	26 x 39	5	13 11	193.50	42 x 54	30 x 40	5

Prices on 1,500 and 2,000-pound hand machines also power machines in heights up to 30 feet, capacities up to 4,000 pounds and platform speeds up to 50 feet per minute, quoted upon request.

Platform lift on 500 pounds is 21 inches, on 1,000 pounds 25 inches less than total height of machine.

The above machines have hinged uprights for folding down when passing through doors, etc.; usual clearance height is 6 feet 2 inches on 500 pounds and 6 feet 10 inches on 1,000 pounds—if hinged upright is not desired, deduct \$9.00.

Prices include full case handling equipment, consisting of platform rollers, two pipe rollers and crow bar—if these are not wanted, deduct \$4.50.



1,000-Pound Capacity, Hinged Upright, Compound Geared

Union One-Man Inspection Elevator

A Simple, Safe and Convenient Machine for Grain Elevators, Flour and Cement Mills, Ore Crushing Plants, Factories, Etc.

For the safe and efficient operation of any grain elevator or mill, the cupola should be inspected at least three times a week and sometimes oftener.

Usually this is a tedious and tiresome trip and is avoided as much as possible by the average employe and most owners.

By means of the One-Man Elevator, all of the unpleasant features of this inspection trip are eliminated and it is possible to quickly and easily travel up or down from one floor to another without mechanical power of any kind.

The elevator is provided with a counterweight of sufficient size to not only take care of the weight of the platform complete, but also to counterbalance the weight of any average size man. In addition, there are sufficient equalizing weights on the platform so that it is possible to get almost a perfect balance.

All that is then necessary is to press down on the foot treadle and a slight pull on the hand rope will move the platform either up or down at almost any desired speed, according to the pull applied.

To stop the lift, simply removing the foot from the pedal will stop the elevator at any desired point.

The elevator can be operated only when the man is on the platform, eliminating danger of accident due to someone else moving elevator from some other floor.

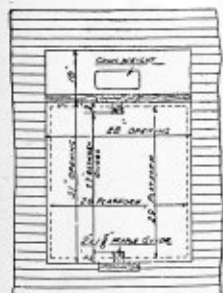
A safety clutch of special design is also provided, so arranged that if lifting rope should break, dogs or grips will clamp the guide and prevent platform from falling.

Suitable hand railings together with a simple type of gate that cannot be left open should be provided at each floor to prevent accidents.

The installation of one of these elevators allows quick and easy access to any part of plant regardless of the height, thus reducing danger of fire from lack of attention. Coupled with this, the installation of one or more fire extinguishers on the frame ready for instant use at any point, should mean a material reduction in insurance rate.

The Standard Elevator is fitted with wooden platform, hard wood guides, and manila rope. The lifting rope is frequently made of flexible wire cable. The guide and tail ropes can also be furnished of wire cable at a small extra charge.

The All-Steel Elevator is constructed entirely of steel bars, angles and plates, except the hard wood guide rails which are always required for smooth operation and the safe action of the locking device.



Floor Plan

Floor Space

The floor space required for the standard equipment is comparatively small, being only 28x41 inches over all (see floor plan at left) and the installation of one of these outfits in either new or old building is a very simple matter.

Standard Elevator

Standard Elevator with oak frame, 26 by 29-inch platform, complete, one head frame with sheave and bearings, one counterbalance weight, three equalizing weights, one each lift, guide and tail ropes and one set of hard wood guides for 35-foot travel.

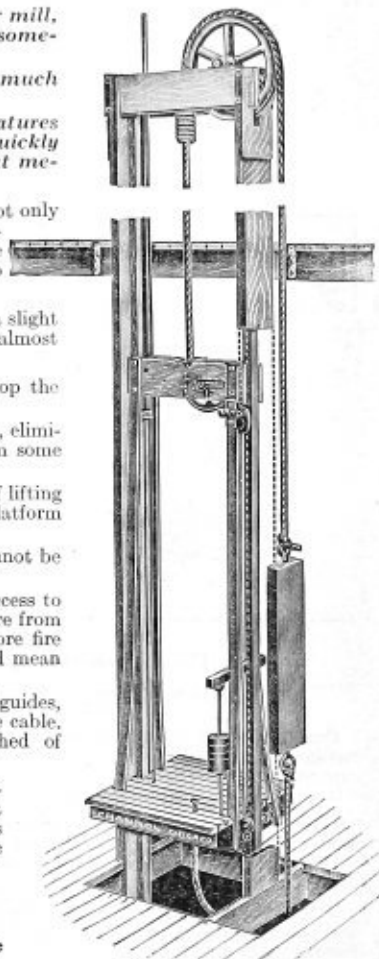
Price.....\$90.00

For additional travel up to 100 feet, add 90 cents per foot.

All-Steel Elevator

All-Steel Elevator with steel frame, 26 by 29-inch platform, complete, one steel Head frame with sheave and bearings, one counter balance weight, three equalizing weights, one each flexible wire lift, guide and tail ropes and one set of hard wood guides for 35-foot trail.

Price.....\$180.00



Channon Elevators

Manufactured in our own shops in Chicago since 1894—in all styles of hand, belt, steam, electric, air and hydraulic power—also dumb waiters, basement hoists, contractors' material elevators, also automatic safety gates, doors, etc. Ask for special catalog.

No. 10—Little Dandy Dumb Waiter

Capacity 25 to 100 Lbs.—Hand Power

This is the simplest kind of a dummy elevator, one especially adapted for hotels, stores, restaurants, offices, etc., to carry light loads quickly from floor to floor.

Elevator is easy to operate and can be readily set up.

The sheaves, all of proper diameter, are lathe bored and fitted with our self-lubricating bronze bushings, which reduce friction and require no oil. Sheaves are fitted to turned steel shafts and upright stands are furnished.

Car is of whitewood, neatly finished in oil, usually made 24 inches wide, 20 inches deep, 28 inches high, with or without movable shelves. We can supply any other size cars to order.

The operating rope is of $\frac{5}{8}$ -inch diameter, best cotton.

All dumb waiters furnished with automatic, for each floor, holding car until released.

With complete outfit is furnished; car, upper and lower sheaves with shafts and stands, counterweight, necessary rope, rope connections and guide strips.

Travel	Size of Standard Car, Inches	Approximate Shipping Weight, Pounds	Net Price Complete Without Enclosure
1 Story	24 inches wide	150	\$ 90.00
2 Story	20 inches deep	175	100.00
3 Story	28 inches high	200	120.00
4 Story		225	135.00

No. 11—Geared Dumb Waiter

Capacity 50 to 300 Lbs.—Hand Power

Our "Geared" Dumb Waiter is built on the principle of our regular hand power elevators; it is a well made machine for capacities up to 300 pounds.

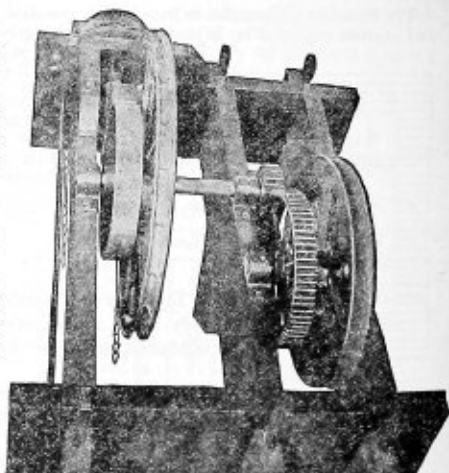
The machine is fitted on a hard pine frame, which is easily set in place; the parts consist of a pair of cut gears, a hoisting sheave of V-groove for cable, a hand or pulling rope wheel with brake rim attached, all keyed to steel shafts turning on babbitted journal bearings.

The Brake is our latest design, always positive and secure, and can be operated from any floor, being applied and released by Manila brake lines.

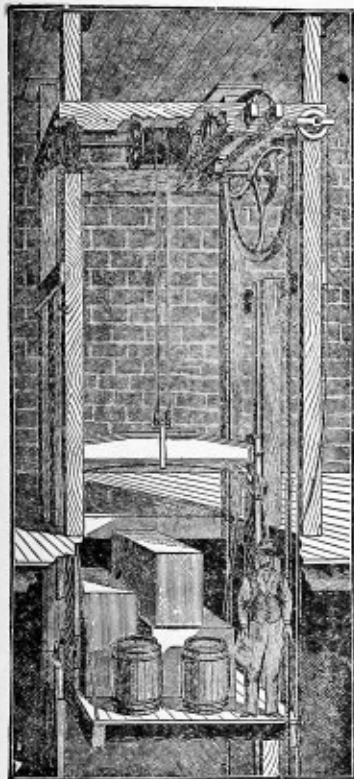
The car is made of ash, well mortised, is fitted with shoes to travel on hardwood guide strips. The standard size is 24 inches wide, 20 inches deep, 28 inches high, but other sizes can be supplied to order. Furnished with or without movable shelves.

Car is lifted by one $\frac{1}{2}$ -inch diameter hoisting cable connecting to weight; hand or pulling rope is $\frac{3}{4}$ -inch diameter best Manila.

Travel	Size of Standard Car, Inches	Approximate Shipping Weight, Pounds	Net Price Complete with Car
1 Story	24 inches wide	300	\$135.00
2 Story	20 inches deep	325	153.00
3 Story	28 inches high	350	180.00
4 Story		375	200.00



Geared Type



Channon Hand Power Elevators

The difference between the No. 3 and No. 1 is in the platform, the former being suspended by a cable at each corner, affording plenty of head-room for vehicles.

The equipment furnished includes:

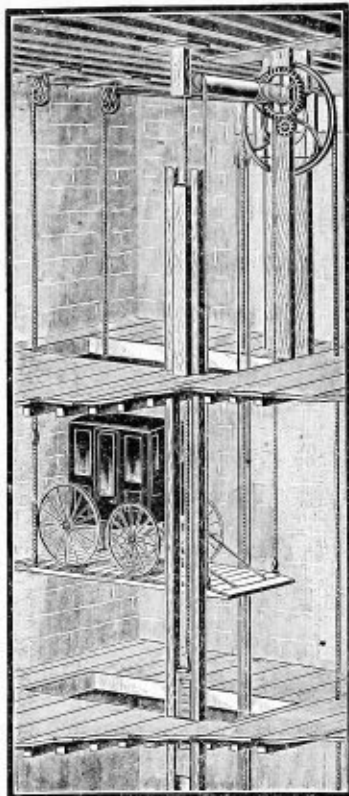
One cast iron hand wheel with brake pulley attached; one cast iron gear and pinion, all accurately lathe bored and securely keyed to shafts; shafts are cold rolled steel, operating on anti-friction roller bearings.

The drums, usually two in number, are made up of cast iron, grooved for perfect travel of cables.

The brake is positive in action and can be noiselessly operated from the platform, or any floor.

The No. 1 elevator is equipped with the "Union" Safety System, which throws the dogs in contact with guide strips in case of breakage of cables, thus preventing the fall of the car.

Cars have hard pine bottoms bolted to angle iron at the sides and covered with maple flooring.



No. 1 Center Lift

For Use in Warehouses, Stores, Factories, etc.

Furnished with three cables (two for hoisting and one for counter-balance) Reliance Brand Swedes Iron, annealed. The hand or pulling rope is pure manila of large diameter.

No. 1—Prices for Travel Up to 20 Feet

Capacity, Pounds	Size of Car in Feet	Approximate Weight Lbs.	Price Complete without Timber Travel up to 20 ft.
1000	4 x 4	1200	\$216.00
1500	4 x 5	1300	228.00
1500	5 x 5	1500	252.00
1500	4 1/2 x 6 1/2	1800	252.00
1500	3 1/2 x 8	1500	252.00
2000	5 x 6	2000	260.00
2000	6 x 6	2500	271.00
2000	6 x 7	2600	276.00
2000	6 x 8	2700	280.00
2500	6 x 6	2600	300.00
2500	6 x 7	2700	307.00
2500	6 x 8	2800	312.00

No. 3 Carriage Lift

For Lifting Buggies, Carriages, Wagons, Automobiles, Machinery, Farm Implements, etc.

Furnished with five cables (four for hoisting and one for counter-balance), Reliance Brand best Swedes Iron, annealed; the hand or pulling rope is pure manila of large diameter.

No. 3—Prices for Travel Up to 20 Feet

Capacity, Pounds	Size of Car in Feet	Approximate Weight, Lbs.	Price Complete without Timber Travel up to 20 ft.
2000	6 x 8	2800	\$280.00
2000	6 x 10	3000	312.00
2000	7 x 10	3000	324.00
2500	6 x 8	3000	300.00
2500	7 x 9	3500	324.00
2500	6 x 10	3200	324.00
2500	7 x 10	3500	336.00
2500	6 x 12	4000	336.00
2500	7 x 12	4000	348.00
2500	8 1/2 x 12 1/2	4500	360.00
4000	8 x 16	5000	456.00
4000	8 x 18	5500	496.00

Prices for travel over 20 feet quoted upon application.

Above prices include counter-weight of 100 pounds in excess of weight of car and are for complete outfits, excepting timbers. Blue prints showing full details of erection furnished with each elevator.

Directions for Measurement. Send sketch showing height of each story from floor to floor travel of elevator and in top story, the height from floor to ceiling, where overhead machinery is located. The floor opening must be 12 inches wider, postway, than you want the car in the clear and 2 inches larger front to back. The minimum head room required for overhead machinery is 11 feet.

ELECTRIC FREIGHT ELEVATORS

Fig. C1

Our most popular direct connected, electrically operated elevator. Especially adapted for handling automobiles in garages and for general freight elevator service in warehouses, manufacturing plants, etc. Capacity, 1000 to 5000 pounds.

It can be installed directly over the platform. It requires little head room and the cables wind directly onto the drum.

When requesting prices state capacity, size of platform required and electric current available.

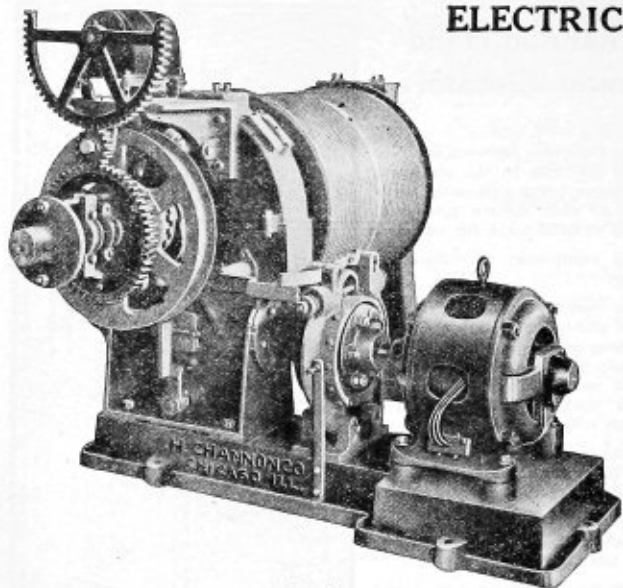


Fig. C1

Direct Connected—Floor Type

Fig. C2

Our standard heavy floor type elevator. It is usually set in the basement, the cables being carried to the top of the elevator shaft by guide sheaves. Capacity, 6000 to 12,000 pounds.

Requests for prices should contain full information as to current available, capacity, etc.

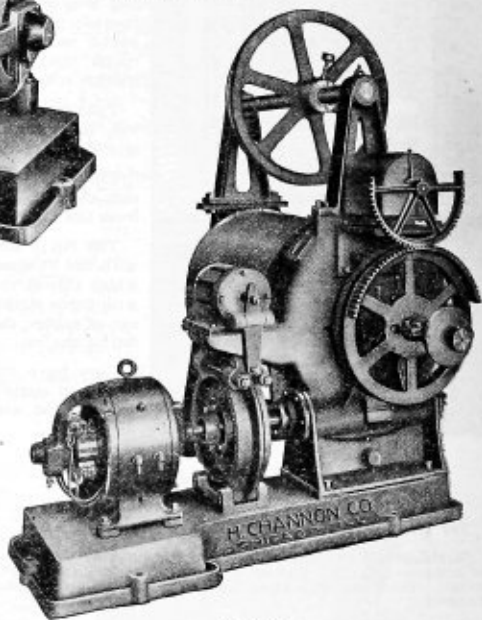


Fig. C2

Belt Driven Type

Fig. C3

This is our standard and most popular type of elevator for operating with detached reversing motor. We also furnish this elevator with tight and loose pulleys for belt drive from line shaft or other power.

An inexpensive and highly satisfactory machine. Easy to install and simple to operate.

Inquiries should specify capacity and character of drive. If motor is required, character of current available should be stated.

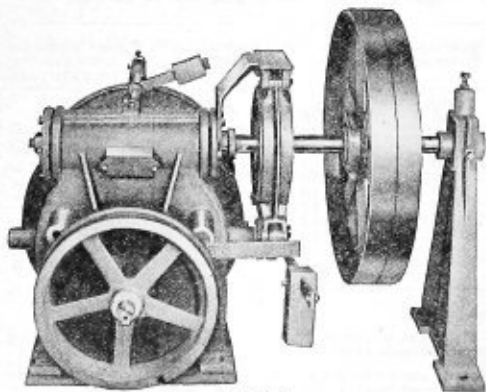


Fig. C3

Platforms

Used with Freight and Automobile Elevators

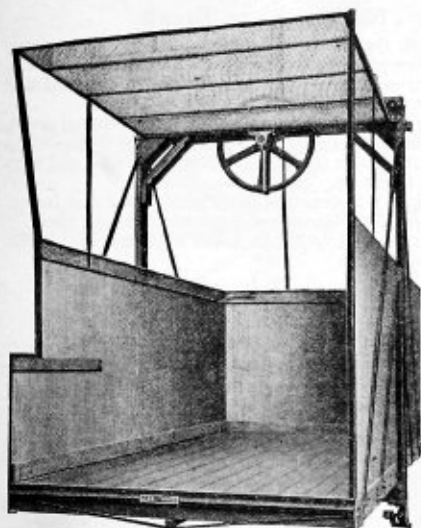


Fig. C4

Fig. C4

Our special heavy duty elevator cage for use with double cable lift.

Designed especially for handling heavy automobiles and motor trucks.

When requesting price state size and capacity required.

Fig. C5

Showing our standard freight platform with sides and cover.

Built in any size required.

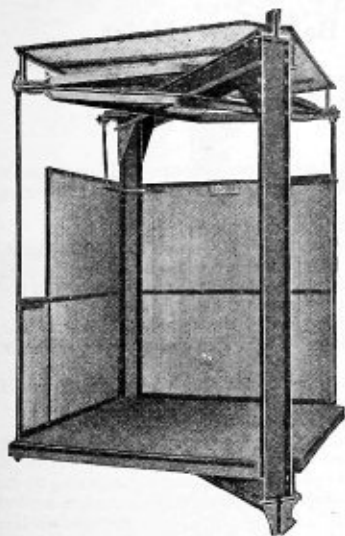


Fig. C6



Fig. C5

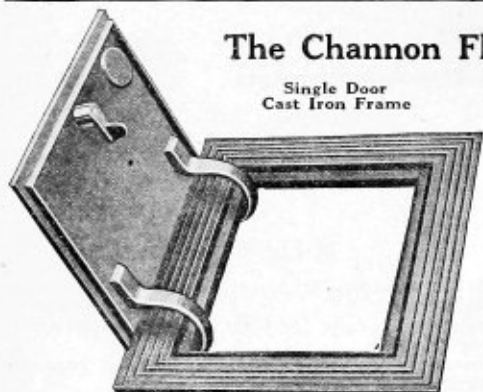
Fig. C6

Illustrating our standard freight platform with posts at corners. This construction permits opening one side and end or all four sides if desired.

We shall be pleased to submit estimate covering any size and type of elevator required.

For power units see preceding page.

The Channon Flush Sidewalk Doors

Single Door
Cast Iron Frame

No Hinges to Break

These doors are absolutely flush and operate on powerful steel levers which are concealed when closed.

When door is raised the lever throws it outward and dirt falls outside, not inward.

It overcomes the great trouble common to hinged doors, due to dirt accumulating between door and frame. The leverage resulting is a severe strain on the hinges and soon causes them to break.

The standard construction is all steel, door and frame. You may drop these doors but you cannot break them.

Can be furnished any size or make with cast iron frame or prismatic lights.

Standard Construction

The Covers are checkered steel plate.

The Levers are crucible steel with bronze pins.

Panel Frame, steel angles or tees.

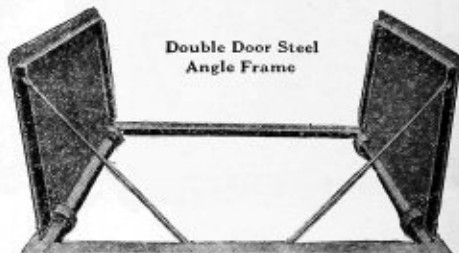
Door Frame, heavy steel angle.

All complete with lifting ring, hold open rods and backing device, and painted with best quality graphite.

Price List Double Doors

Size of door, 3x4 feet.	Price.....	\$72.00
Size of door, 4x4 feet.	Price.....	76.00
Size of door, 4x5 feet.	Price.....	82.00
Size of door, 5x5 feet.	Price.....	90.00
Size of door, 5x6 feet.	Price.....	96.00

Single Doors Quoted on Application.

Double Door Steel
Angle Frame

The Channon Basement Hoist

For Removing Ashes, Barrels, Boxes, Etc.

A simple device consisting of two steel channels connected by a couple of cast iron spreaders which also serve as guides for raising and lowering the telescopic mast.

The frame is secured to the floor and wall by anchor bolts.

It is very easy to operate and takes up very little room in the basement. When not in use the entire machine is below the basement ceiling.

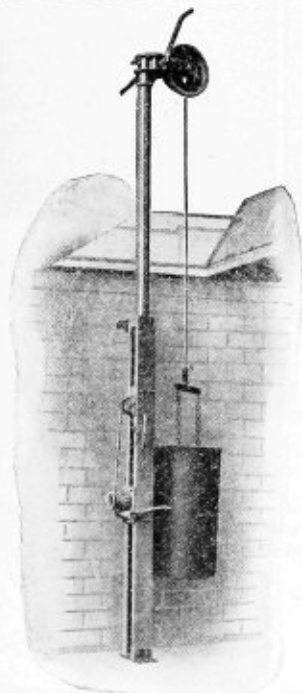
To operate the hoist the mast is raised by the lower crank shown in the illustrations and held in the elevated position by a steel pin.

The hoisting mechanism is operated from the sidewalk level. The hoisting head revolves so that the material may be swung to the sidewalk without lifting.

The capacity of the mechanism is sufficient for any load which it would be advisable to handle with a machine of this type.

When ordering state the height of the basement ceiling.

Price.....\$170.00



Portable House Movers Capstans

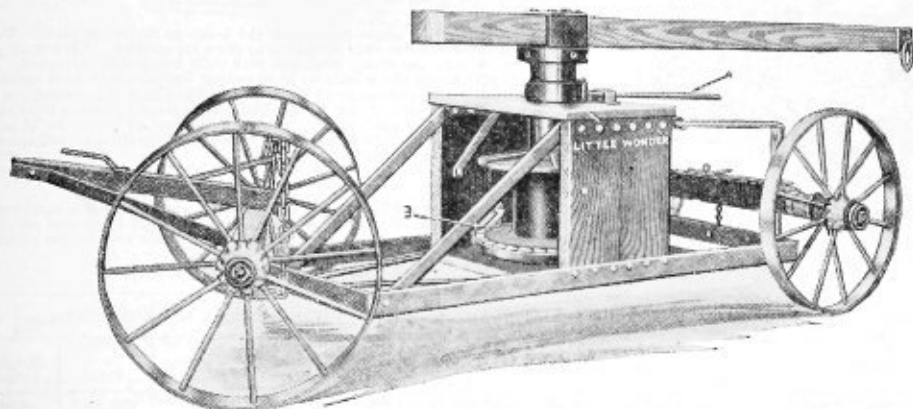


Fig. G. 2271

With this style of capstan the wire cable is wound up on the drum until the object to be moved is close up to the capstan; the stakes are then pulled, the capstan raised in the truck, the horses hitched to the front and the entire outfit transported to about 700 or 800 feet further and again staked down—altogether very much quicker than the old style method. The front wheels and tongue are used as a stake puller.

The two upright ratchet bars, passing through the rear axle, support the rear end of capstan bed. The hand lever, when pulled out, release the ratchet bars and the capstan is deposited on the ground, ready to stake. Bed is raised again by crowbar. The front part of the bed is supported by chains passing through angle plate on the front axle.

The drum is 12 inches in diameter and will hold about 800 feet of $\frac{5}{8}$ inch diameter wire cable. The drum is all steel construction, which is strong and light. The only wearing part is the pin at the bottom of the spool. This pin is replaceable when worn.

Price with 32x3-inch steel truck wheels, including capstan sweep.....\$150.00

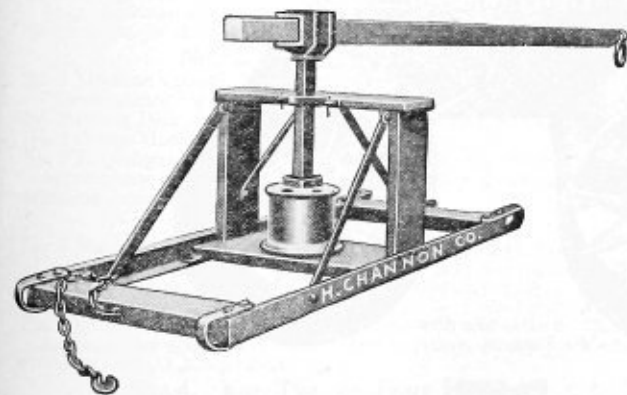


Fig. G. 2273

Standard Steel House Movers Rope Capstan

This Capstan is not the usual home made affair as made by a country blacksmith—it is strictly up-to-date in every respect.

The frame is made up of steel angles and well braced. Shoes and chain are placed at each end so you can pull from either direction with horse in resetting. All bottom bolts are countersunk. The housing is fitted with a hasp so you can release spool to place cable on the drum. Spool has heavy cast head for the sweep. Pole of spool is a $2\frac{1}{2}$ -inch square steel bar; drum is cast iron 10 inches diameter. The lower bearing is 3 inches in diameter and 2 inches long.

Price each.....\$65.00

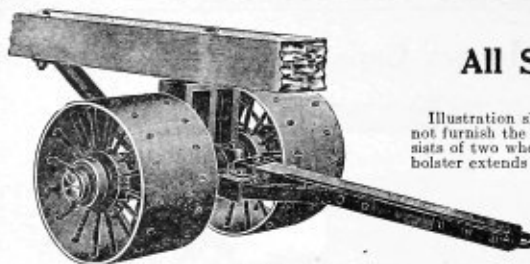


Fig. C2270

An outfit generally consists of four trucks which are capable of moving a large size building. Each rear truck has a short tongue five feet long which is lashed or fastened to the beam. The front trucks have a 12-foot tongue. Capacity is 20 to 40 tons per truck. These prices are for one two-wheel truck only; each truck consisting of two wheels, one round solid steel axle with bolster attached, complete with heavy tongue, braces, and king bolt.

All Steel House-Moving Trucks

Illustration shows a single truck with the beam or timber in place. We do not furnish the beam but only include it to show its position. Each truck consists of two wheels, one round steel axle with solid iron bolster attached. The bolster extends above the wheels so as to permit the wheels to turn under the beam and is 18 to 22 inches wide at top, according to the width of tire used. The wheels track 30 inches from center to center of tire, making axle from 42 inches to 45 inches long over all. Tongue is oak, heavily ironed, complete with braces and heavy king bolt.

Height of Wheels, Inches	Size of Axle, Inches	With 10x $\frac{3}{4}$ -inch Tire		With 10x $\frac{1}{2}$ -inch or 12x $\frac{1}{2}$ -inch Tire		With 12x $\frac{3}{4}$ -inch Tire		With 14x $\frac{1}{2}$ -inch Tire		With 16x $\frac{1}{2}$ -inch Tire	
		Price	Weight, Pounds	Price	Weight, Pounds	Price	Weight, Pounds	Price	Weight, Pounds	Price	Weight, Pounds
24	3 $\frac{1}{2}$	\$45.75	950	\$48.00	1040	\$49.50	1075	\$54.00	1100	\$56.75	1160
24	4	50.00	990	52.25	1060	53.75	1120	58.25	1170	61.00	1220
26	3 $\frac{1}{2}$	46.75	980	49.00	1040	50.50	1110	55.00	1150	58.25	1250
26	4	51.25	1020	53.25	1090	55.50	1150	59.25	1200	62.50	1275
30	3 $\frac{1}{2}$	49.00	1050	51.25	1120	52.75	1190	57.50	1225	60.75	1280
30	4	53.25	1100	55.50	1170	57.00	1240	61.75	1250	65.00	1340

An outfit usually consists of four of the above trucks, with two 5-foot and two 12-foot tongues. For general moving, we recommend four trucks with wheels 24 inches high, 12x $\frac{3}{4}$ -inch tire, 3 $\frac{1}{2}$ -inch steel axles.

Four Wheel House-Movers' Truck

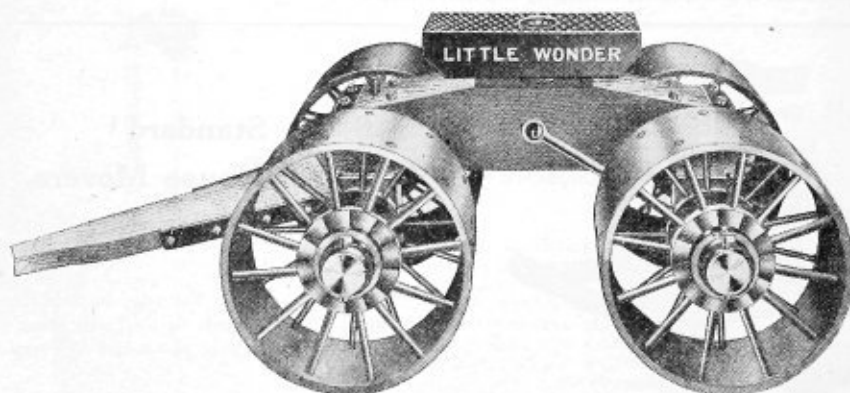


Fig. C2272

This four wheel truck is strong and substantial. The capacity of one of these trucks is about 40 tons and the weight of one truck about 1200 pounds.

Fitted with staggered spokes wheels which are as near perfect for strength and durability as can be made. Note the well braced rear axle. All wooden parts are well protected from the weather by the best of paint. These trucks have 3-inch carbon steel axles.

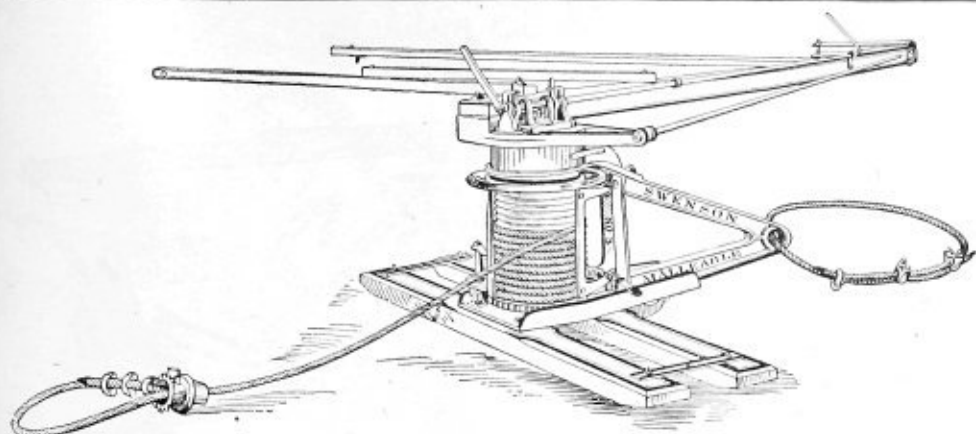
Price of one truck as shown with 24-inch diameter spoke wheels with 12x $\frac{1}{2}$ -inch steel tires with either iron or wood bolster as desired. Each.....

Price of one long tongue and truss header, each.....

An outfit usually consists of three trucks as per illustration and one long tongue and truss header for front truck.

We can also furnish 8-wheel trucks and trucks with web wheels and steel bolster,

\$125.00
40.00



The Swenson Stump Pulling and Grubbing Machines

Especially Adapted to Contractors' Use in Clearing Right-of-Way

Can Also be Used for House Moving

These machines have more up-to-date improvements than any other that we know of—equipped with large diameter grooved drum; rope won't slip, crowd or chafe; malleable frame; can be thrown in and out of gear at the machine as well as at the end of the sweep and without lifting the sweep—has hand-wheel for quickly taking up slack cable, back ratchet at bottom of drum as well as at top—heavy anchor frame holds machine rigidly whether rope is high or low on drum—has rope guides, hinged and adjustable, held by springs, prevents cable from over-lapping, crossing or shearing. Machines are all furnished complete with sweep and bed-timbers, has truss-rod full length of the sweep.

No. 1. For One Horse

No. 1 Machine with 80 feet $\frac{5}{8}$ -inch drum cable and 8 feet $\frac{5}{8}$ -inch anchor rope.....	\$94.00
No. 1 Power Pulley with 10 feet $\frac{7}{8}$ -inch cable.....	8.00
No. 1 Stump Hook.....	8.00
No. 1 Extension Cable, $\frac{5}{8}$ -inch, 50 feet long with connections.....	14.20
Approximate weight of machine, power pulley, stump hook and extension cable, 760 pounds.	

No. 2. For Two Horses

No. 2 Machine with 80 feet $\frac{3}{4}$ -inch drum cable and 10 feet $\frac{3}{4}$ -inch anchor rope.....	\$110.00
No. 2 Power Pulley with 12 feet 1-inch pulley rope.....	10.00
No. 2 Stump Hook.....	10.00
No. 2 Extension Cable $\frac{3}{4}$ -inch, 50 feet long with connections.....	18.15
Approximate weight of machine, power pulley, stump hook and extension cable, 1,100 pounds.	

No. 3. For Two Horses

No. 3 Machine with 75 feet $\frac{7}{8}$ -inch drum cable and 12 feet $\frac{7}{8}$ -inch anchor rope.....	\$132.00
No. 3 Power Pulley with 15 feet $1\frac{1}{8}$ -inch cable.....	12.00
No. 3 Stump Hook.....	11.00
No. 3 Extension Cable, $\frac{7}{8}$ -inch, 50 feet long with connections.....	22.85
Approximate weight of machine, power pulley, stump hook and extension cable, 1,325 pounds.	

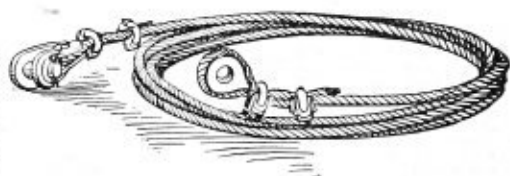
No. 4. For Two or Four Horses

No. 4 Machine with 75 feet 1-inch drum rope and 20 feet 1-inch anchor rope.....	\$161.00
No. 4 Power Pulley with 20 feet $1\frac{1}{4}$ -inch pulley rope.....	20.00
No. 4 Stump Hook.....	14.00
No. 4 Extension Rope, 1-inch, 50 feet long with connections.....	27.55
Approximate weight of machine, power pulley, stump hook and extension cable, 1,650 pounds.	

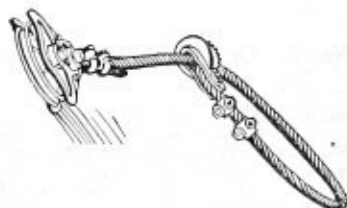
Grooved Drums.—If not wanted on Nos. 2, 3, 4 and 5, deduct \$5.00.

Extra Length Ropes

No. of machine.....	1	2	3	4	5
Anchor rope, per foot.....	\$0.22	\$0.30	\$0.39	\$0.48	\$0.48
Pulley rope, per foot.....	.39	.48	.57	.71	.71



Extension Cable Showing Connections

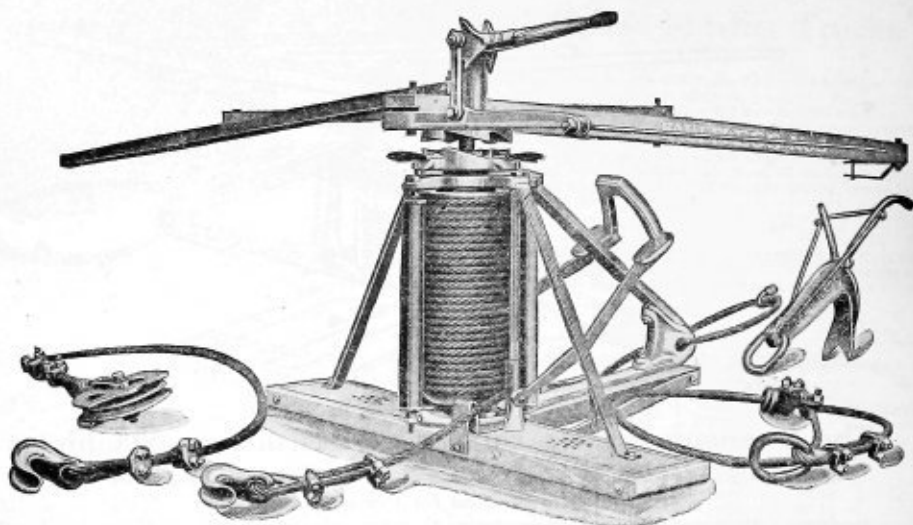


Double Power Pulley



Stump Hook

Our "Bullock" Special Stump Rope will outpull and outlast any other.



Faultless Stump Puller

There's Money Under Every Stump

The Faultless Stump Puller is powerful, durable and safe. It is used by many of the largest contractors in the country as the best equipment for clearing land. How much time are you losing by plowing or harvesting around stumps on your land? How often does your harrow or drill catch in the roots and cause breakage and loss of time? How much valuable space are you losing by allowing these stumps to occupy room in your fields? Can you afford to leave them there, when you could clear from one to five acres of land a day with the Faultless Stump Puller? This machine is so constructed that the pulling coil is always the bottom coil. This great advantage gives uniform power from the beginning to the end of the pull. It relieves the machine of the strain produced by a hard pull when the tension is not direct, as well as preventing the cable from grinding itself to pieces. It prevents the machine from tipping over and injuring the operator. The main shaft is composed of cold rolled steel shafting; the main brace, side braces and tail brace of bar steel; the bottom box of malleable iron; sweep, bed plank and tail piece of selected, straight grained hardwood. It is a "built to last a lifetime" machine.

Specifications

No. 2. Develops 85 H. P. and is Recommended for Stumps Running 14 to 16 Inches in Diameter at Base

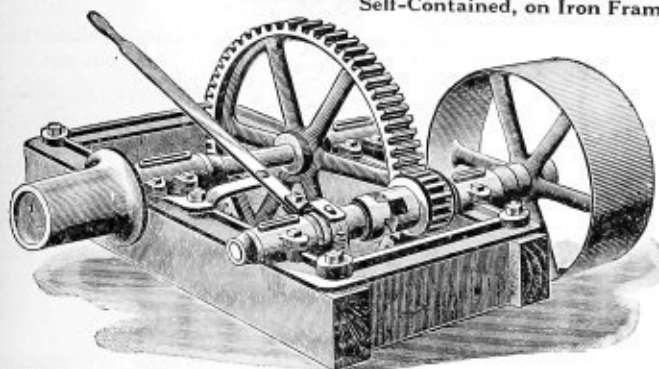
No. 2. Two-horse power Faultless Capstan, complete, including the 100 feet $\frac{3}{4}$ -inch Faultless Steel Main Cable, the 10-foot anchor cable of the same material, the sweep, lead pole, truss rod, brace, steel hook, clamps, etc.; all ready for use.....	\$104.75
No. 2. Stump Snare, complete with 10 feet $\frac{3}{4}$ -inch Faultless Steel Cable, link, snare ball, clamps, etc.; all ready for use....	6.25
No. 2. Power Pulley of malleable iron, complete with 10 feet 1-inch Faultless Steel Cable, steel hooks, clamps, etc. (this cable has a guaranteed breaking strain of 96,000 pounds); all ready for use.....	14.00
No. 2. Stump Hook (or root plow) of solid cast steel with tubular handles; all ready for use.....	10.00
No. 2. Faultless Stump Puller, with complete outfit including the capstan, snare, power pulley and stump hook, as mentioned above; all ready for use.....	135.00

No. 4. Develops 150 H. P. and is Recommended for Stumps Running up to 36 Inches in Diameter at Base

No. 4. Two-horse Faultless Capstan, complete, including the 83 feet of 1-inch Faultless Steel Main Cable, the 32-foot anchor cable of the same material, sweep, lead pole, truss rod, brace, steel hooks, clamps, etc.; all ready for use.....	\$146.00
No. 4. Stump Snare, complete with 20 feet of 1-inch Faultless Steel Cable, link, snare ball, clamps; all ready for use.....	17.50
No. 4. Power Pulley of malleable iron, complete, with 20 feet of $1\frac{1}{2}$ -inch Faultless Steel Cable, steel hook, clamps, etc. (this cable has a guaranteed breaking strain of 152,000 pounds); all ready for use.....	24.50
No. 4. Stump Hook (or root plow) of solid cast steel with tubular handles and braces; all ready for use.....	12.00
No. 4. Faultless Stump Puller, with complete outfit, including the capstan, snare, power pulley and stump hook, as mentioned above; all ready for use.....	200.00

Standard Car Puller

Self-Contained, on Iron Frame



Complete with full cast iron frame.

Capacities are based on straight and level track, in good condition.

Size number...	41	42	43	44
Capacity cars...	3	8	12	18
Pull. Sp. in Ft. per Min.	83	83	83	80
Dia. rope, ins.	1 1/2	1 1/2	1 1/2	2
Size of pulley...	20x7	24x11	30x13	36x15
Sp. of pulley, rev. per min.	225	225	200	200
Price each	\$96.00	\$162.00	\$240.00	\$342.00

Price includes pulley, but not any lead sheaves or rope.

Belt Driven Car Pullers

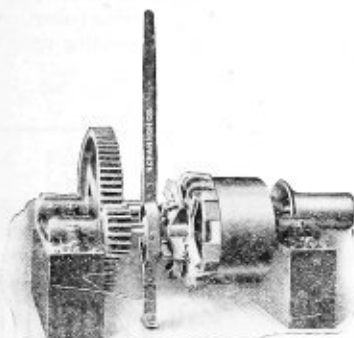


Fig. 168 with friction clutch.

Fig. 169 (not shown) is the same, except that it has a jaw clutch.

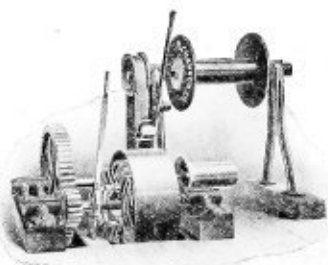


Fig. 170 with friction clutch and drum for hauling in slack rope.

Safety drum can be suspended from ceiling if so desired.

Size, No.	Pulling Capacity, Loaded Cars	Size of Pulley on Pinion Shaft, Inches	Speed Pinion Shaft, R. P. M.	Fig. 169 with Jaw Clutch	Fig. 169 with Safety Device	Fig. 168 with Friction Clutch	Fig. 170 with Safety Drum
1	3	16 x 6	225	\$100.00	\$170.00	\$120.00	\$190.00
2	8	20 x 10	225	160.00	240.00	190.00	270.00
3	12	24 x 12	200	240.00	330.00	300.00	390.00
4	18	30 x 14	200	340.00	440.00	400.00	500.00

Capacities Given Are Based on Straight and Level Track in Good Condition

Car Puller Sheaves in Frames



Fig. 510. Double.



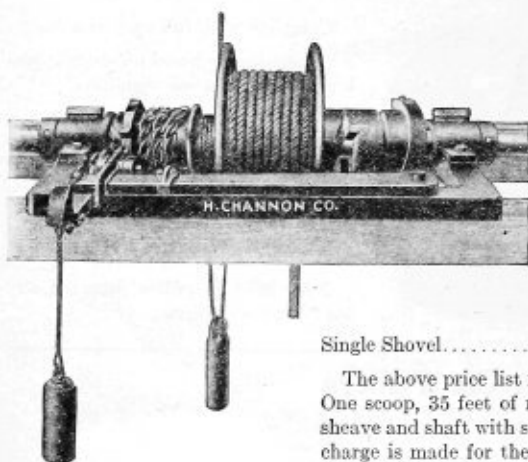
Fig. 511. Single.

Groove in Sheaves Made for Manila or Wire Rope

12-inch diameter sheaves.	List each	Single \$15.00	Double \$30.00
18-inch diameter sheaves.	List each	25.00	50.00

"Ajax," Manila and other car puller ropes quoted upon application.

The Clark Automatic Power Shovel



The quickest and most economical appliance for unloading small coal, grain, etc., from box cars.

Illustration shows a Single Clark Automatic Power Shovel. They are generally used in pairs, both being placed on the same shaft, side by side. They are perfectly automatic in action and may be adjusted to throw in or out of gear at any desired point. A double shovel operated by two men will unload a car in about five minutes and a single machine with one man in about fifteen minutes.

Price List

Single Shovel.....	\$100.00	Double Shovel.....	\$200.00
--------------------	----------	--------------------	----------

The above price list includes the following fixtures with each single shovel: One scoop, 35 feet of rope, scoop chain, two horizontal sheaves, one swivel sheave and shaft with sufficient projection to receive driving pulley. An extra charge is made for the driving pulley, the amount depending upon the size required.

For repair parts see next page



Standard Wood Scoop

Scoops for Clark Shovels

Standard Wood Scoop

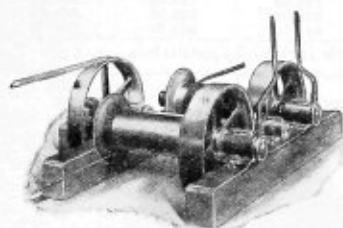
Price each, complete.....	\$3.50
Extra handles, per pair.....	.75

For Ear Corn

Price each, complete.....	\$15.00
Extra handles, per pair.....	1.00



Ear Corn Scoop



Power Drum Yard Scraper

Power Drums and Yard Scrapers

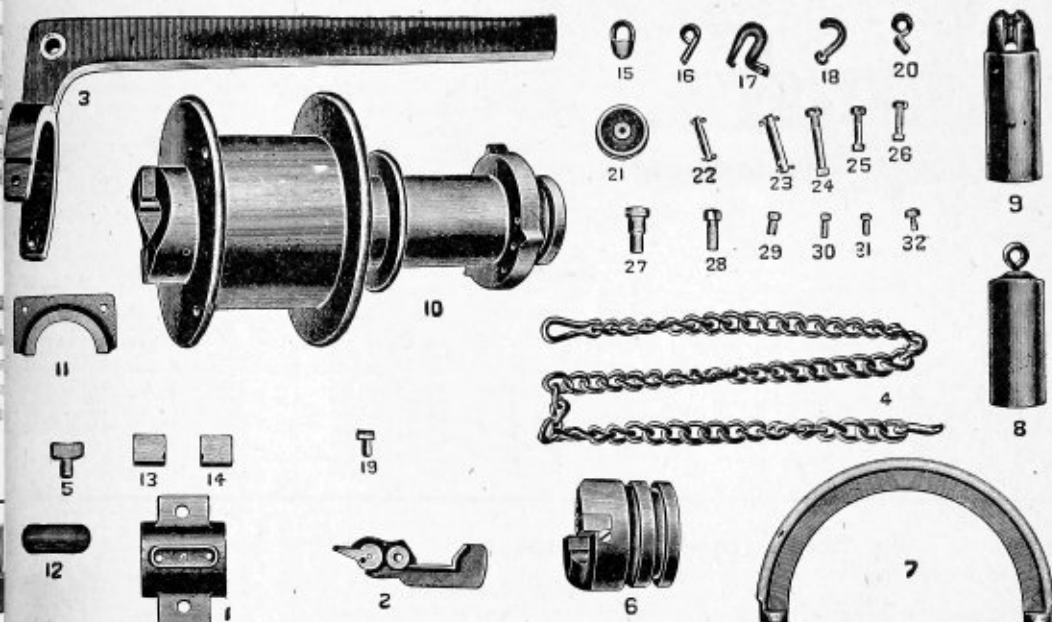
For scraping coal in yards to conveyors and elevators. A rapid and economical method of re-handling coal stored on the ground.

We are prepared to furnish yard scrapers in a variety of forms for operation with these drums.

Prices and specifications submitted upon receipt of full information concerning the work contemplated.



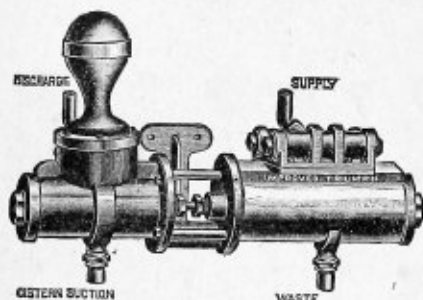
Parts for Clark Automatic Power Shovel



Price List

No. of Part	Name of Part	Material	Price Each	No. of Part	Name of Part	Material	Price Each
1	Frame Bearing Cap	C. I.	\$ 2.50	18	J-Bolt and Nut	Steel	\$ 0.30
2	Dog Lever	C. I.	3.50	19	Trip Lug	Steel	1.00
3	Main Lever	Steel	19.00	20	Rope Hook for Lever	Steel	.80
4	3/8-in. Coil Drum Chain	Steel	3.50	21	Rope Wheel for Frame	C. I.	.40
5	Stub Clutch Band	Mall.	.80	22	3/8x3 in. Pin, with Cotters		.20
6	Slide Hub with Jaws	C. I.	18.00	23	5/8x4 in. Pin, with Cotters		.20
7	Guard	C. I.	1.50	24	3/4x4 in. Bolt		.10
8	Weight, with Eye	C. I.	2.00	25	1/2x2 1/2 in. Bolt		.10
9	Weight, with Wheel	C. I.	2.30	26	1/2x2 in. Screw and Nut		.20
10	Drum	C. I.	34.00	27	Lever Pin		.80
11	Thrust Plate	C. I.	1.50	28	3/4x1 3/4 in. Screw		.10
12	Grease Pot Cover	C. I.	.20	29	1/2x1 in. Screw		.10
13	Left Hand Jaw	T. Steel	1.60	30	1/2x1 1/4 in. Screw		.10
14	Right Hand Jaw	T. Steel	1.60	31	3/8x1 in. Screw		.10
15	Rope Swivel	Mall.	.40	32	3/8x3/4 in. Screw		.10
16	Rope Hook	Steel	1.00	33L	Frame, Left Hand	C. I.	30.00
17	Chain Hook	Steel	1.00	33R	Frame, Right Hand	C. I.	30.00

The Triumph Automatic Water Lift



Designed to pump filtered or rain water from a cistern direct into the house pipes and plumbing fixtures or into an attic storage tank.

Operated by hydraulic pressure, that is by the pressure or force of the city water.

Made of bronze, is simple and noiseless in operation. It needs no oil, the wearing parts being leather against metal. Its working parts are few and easy of access. It can be used for direct pumping, or for pumping to a tank.

Specifications

No.	Price	Cylinders		Stroke, Inches	Weight, Pounds	Adapted for City Pressures	Extreme Capacities			
		Power	Suction				Pressure, Pounds	Gallons per Hour	City Water Used per Hr., Gallons	Extreme Lift With 15 Ft. Suction Lift, Feet
1	\$55.00	2 1/2	2	5	37	25 to 40	40	160	240	120
2	\$5.00	2 1/2	2	5	38	40 to 60	60	200	300	120
3	\$5.00	3	2 1/2	5	38	20 to 35	35	200	280	100
4	\$5.00	3	2 1/2	5	38	15 to 25	25	130	275	100
5	\$60.00	2 1/2	3	5	40	60 or more	60	275	185	80
6	\$60.00	3	3	5	41	40 to 60	60	275	275	120
8	\$90.00	4 1/2	3	5	55	15 to 25	25	220	460	100

Steam Syphon Pumps

The simplest apparatus made for raising fluids by steam. Has no piston, no valves, no moving parts. Operated entirely by direct action of steam. To set, it is necessary only to attach steam suction and discharge pipes; to start it, means only the opening of the steam valve.

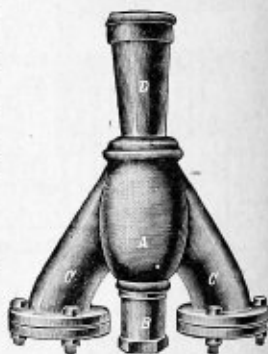
Height.—The syphon will raise water about one foot for each pound pressure of steam at the pump. If the fluid is heavier than water, this estimate must be reduced.

Capacity.—As given, is based upon 60 pounds steam pressure at the pump and 15 feet lift. With a greater lift or less steam, these capacities will be reduced.

Temperature.—The syphon can be used for pumping warm liquors, but not too hot. About 140 degrees Fahrenheit is the limit. It will not pump boiling water, nor will it force water into a boiler like an injector.

No.	Capacity, Gallons per Minute	Diameter Discharge	Diameter Steam Pipe	Price of High Pressure Pump Only, for Steam Pressure of 30 Pounds or Over
3	30	3/4	1 1/2	\$16.00
4	50	1	1 3/4	20.00
5	120	1 1/2	2	35.00
6	200	2	2 1/2	45.00
7	320	2 1/2	3	70.00
8	450	3	3 1/2	90.00

Sizes 7 and 8 have flanged suctions, balance screw connections.



Galvanized, Spiral Riveted Bilge Pumps

Soldered Joints—Spiral Riveted or Lock Seam Pipe



Length of bilge pumps is measured over all.

Diameter, Inches	Length, Feet	Price per Foot
2 1/2	6 and 8	\$1.25
3	6, 8, 10 and 12	1.50
4	8	1.75

"Cameron" Regular Pattern Steam Pumps

Mine and General Service Type—Single—Direct—Acting



The Cameron pump is of simple, yet superior design of best material and exact and thorough construction, few working parts, no outside valve-gear. There is nothing to get out of order and it can be run continuously at highest possible speed without damage to its parts. Suction pipe may be lifted out of the water and then allowed to race without danger of piston striking the heads or otherwise injuring the pump.

Pump can be completely taken apart without disconnecting any of the piping.

The first seven sizes may be furnished with hand lever attachment when so desired and ordered.

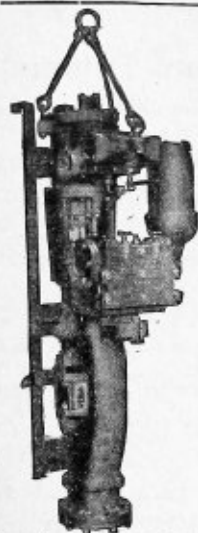
Prices include necessary tools, wrenches and sight-feed lubricator.

Prices

Size No.	Iron Water Cylinder, Steel Piston Rod		Iron Water Cylinder, with Lining, Water Pistons and Fittings of Composition, Tobin Bronze Rod.		Iron Water Cylinder, with Lining, Water Pistons and Fittings of Acid Metal, Phosphor Bronze Rod.		Acid Metal Water Cylinder, with Lining, Water Pistons and Fittings of Acid Metal, Phosphor Bronze Rod.	
	Rubber Valves	Metal Valves	Rubber Valves	Metal Valves	Rubber Valves	Metal Valves	Rubber Valves	Metal Valves
0	\$ 100.00	\$ 111.00	\$ 105.00	\$ 116.00	\$ 121.00	\$ 132.00	\$ 232.00	\$ 242.00
1	116.00	126.00	121.00	132.00	132.00	142.00	274.00	284.00
2	126.00	137.00	137.00	147.00	147.00	158.00	337.00	347.00
3	163.00	179.00	179.00	195.00	195.00	211.00	489.00	505.00
3A	168.00	184.00	184.00	200.00	205.00	221.00	495.00	511.00
4	179.00	195.00	195.00	211.00	216.00	232.00	500.00	515.00
4A	184.00	200.00	200.00	216.00	221.00	237.00	505.00	521.00
5	263.00	279.00	295.00	311.00	316.00	333.00	905.00	921.00
5B	332.00	353.00	374.00	395.00	400.00	421.00	1174.00	1189.00
6	300.00	316.00	332.00	347.00	353.00	368.00	932.00	947.00
6A	342.00	363.00	384.00	405.00	411.00	426.00	1184.00	1200.00
7	379.00	400.00	432.00	453.00	463.00	484.00	1242.00	1263.00
8	389.00	411.00	447.00	468.00	484.00	505.00	1347.00	1368.00
9	500.00	521.00	579.00	600.00	621.00	642.00	1916.00	1937.00
10A	658.00	679.00	763.00	774.00	821.00	842.00	2174.00	2195.00
10	775.00	826.00	979.00	1011.00	1021.00	1053.00	2495.00	2521.00
10C	984.00	1033.00	1195.00	1263.00	1216.00	1284.00		
11	1232.00	1337.00	1437.00	1542.00	1516.00	1621.00	4279.00	4384.00
12	1432.00	1537.00	1758.00	1863.00	1853.00	1958.00	5200.00	5305.00

Specifications

Size No.	Diameter of Steam Cylinder Inches	Diameter of Water Cylinder Inches	Stroke of Piston Inches	Displacement Gallons per Min.		Steam Pipe	Exhaust Pipe	Suction Pipe	Discharge Pipe	Floor Space Inches	Weight, Pounds
				Normal	Maximum						
0	3½	2	4	8	10	¾	¾	1¼	1	32x9	136
1	4	2	6	10	12½	¾	¾	1¼	1	40x10	210
2	5	2½	6	16	20	¾	¾	1½	1¼	40x11	254
3	6	3	7	28	35	¾	1	2	1½	47x13	418
3A	6	3½	7	38	47	¾	1	2½	2	47x15	455
4	7	3½	7	38	47	¾	1	2½	2	47x15	459
4A	7	4	7	50	63	¾	1	2½	2	51x16	457
5	7	3½	12	50	63	1	1½	3	2½	58x17	820
5B	7	5	13	100	125	1	1½	4	3	63x20	1120
6	8	4	12	65	80	1	1½	3	2½	58x18	865
6A	8	5	13	100	125	1	1½	4	3	63x20	1160
7	10	5	13	100	125	1¼	2	4	3	64x21	1345
8	10	6	13	125	155	1¼	2	4	3½	64x21	1411
9	12	7	13	200	250	1½	2½	5	4	66x24	1930
10A	14	8	13	200	250	2	3	5	5	73x26	2550
10	14	9	18	250	310	2	3	6	5	81x30	3300
10A	14	9	18	330	410	2	3	6	6	90x30	4250
11	16	10½	18	425	525	2½	4	8	6	90x37	5150
12	18	12	20	500	625	3	4	10	8	103x41	6120



"Cameron" Mine Sinking Pumps

Standard Vertical Plunger Type

This is the most successful sinking pump that has ever been placed on the market. Any steam pump that is to be used in sinking a mine shaft must be strong, certain in operation, capable of handling gritty water, require little attention, and above all, be able to stand the roughest kind of usage without sustaining injury.

The Cameron sinking pump has no outside valve gear, arms or levers to be bent or broken off. It cannot suffer from violent collision with the walls of the mine shaft, and is not likely to receive injury from the explosion of blasts.

Being fitted with our exhaust cut-off, it will run along as fast as steam will drive it with an irregular or intermittent supply of water, or when the water fails entirely, not only without danger of the piston striking the heads, but without injury to the valves.

Prices and Specifications

Size No.	Prices			Diam. of Steam Cyl., Ins.	Diam. of Plunger, Ins.	Stroke of Piston, Ins.	Displacement Gallons per Minute		Steam Pipe	Exhaust Pipe	Suction Pipe	Discharge Pipe	Space Occupied in Shaft, Ins.	Wght., Lbs.
	Iron Plunger and Steel Piston Rod	Composite Water Plunger Tobin Bronze Rod	Acid Water Metal Plunger Phosphor Bronze Rod				Normal	Maximum						
5	\$ 411.00	\$ 468.00	\$ 505.00	7	3 1/2	12	50	63	1	1 1/2	2 1/2	2	24x24	1441
6	421.00	479.00	516.00	8	4	12	65	81	1	1 1/2	3	2 1/2	25x25	1526
7	574.00	634.00	737.00	10	5	13	100	125	1 1/2	2	4	3	31x30	2308
70	647.00	763.00	821.00	12	5	13	100	125	1 1/2	2 1/2	4	3	32x33	2670
8	600.00	650.00	795.00	10	6	13	125	155	1 1/2	2 1/2	4	3 1/2	31x31	2455
9a	647.00	779.92	842.00	12	6	13	125	155	1 1/2	2 1/2	4	3 1/2	32x33	2688
90	842.00	1000.00	1084.00	14	6	13	125	155	2	3	4	3 1/2	40x35	3490
9	774.00	943.00	1021.00	12	7	13	200	250	1 1/2	2 1/2	5	4	34x33	3424
9b	927.00	1116.00	1221.00	14	7	13	200	250	2	3	5	4	40x35	4023
91	1247.00	1484.00	1605.00	16	7	16	200	250	2 1/2	4	5	4	42x40	5220
92	1368.00	1621.00	1753.00	18	7	16	200	250	3	4	5	4	42x45	5798
10	974.66	1184.00	1289.00	14	8	13	200	250	2	3	5	5	40x38	4214
11	1153.60	1405.00	1542.00	16	8	16	200	250	2 1/2	4	5	5	42x40	4875
110	1284.00	1579.00	1716.00	16	9	16	250	310	2 1/2	4	6	5	42x45	5270
12	1368.00	1668.00	1822.00	18	9	16	250	310	3	4	6	5	42x45	6070

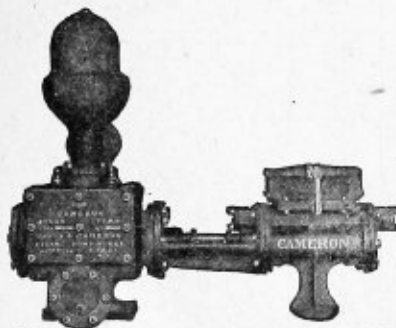
"Cameron" Prospector's Sinking Pump

\$273.68	\$305.25	\$315.78	6	3	7	28	35	3 1/2	1	2	1 1/2	27x21	804
----------	----------	----------	---	---	---	----	----	-------	---	---	-------	-------	-----

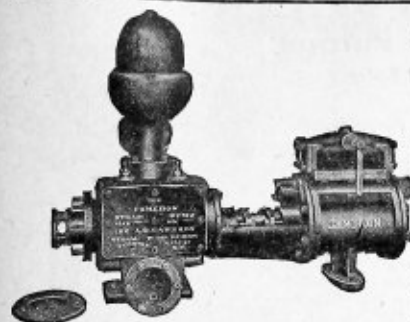
"Cameron" Steam Pumps Regular Boiler Feed Pattern

Give quantity of feed water required; a pump which will supply this quantity at about one-half its rated capacity at ordinary speed will be right for cold water, and say one-third speed for hot water.

In feeding hot water the pump should be placed below the source of supply. The first six sizes furnished with hand-lever attachment when so desired.



Size Number	Prices				Diameter of Steam Cylinder, Inches	Diameter of Water Cylinder, Inches	Stroke of Piston, Inches	Boiler and P. there will supply at mod. speed based on 30 lbs. of water per H. P. per hour	Steam Pipe	Exhaust Pipe	Suction Pipe	Discharge Pipe
	Jenkins Valves	Metal Valves	Jenkins Valves	Metal Valves								
0	\$105.00	\$111.00	\$111.00	\$116.00	3 1/2	2	4	60	3 1/2	1 1/2	1 1/2	1
1	121.00	126.00	126.00	132.00	4	2 1/2	6	80	4	1 1/2	1 1/2	1 1/2
2	132.00	137.00	142.00	147.00	4 1/2	3	6	125	4 1/2	2	2	2 1/2
2a	158.00	163.00	168.00	174.00	5	3 1/2	7	200	5 1/2	2 1/2	2 1/2	2 1/2
2b	163.00	168.00	174.00	179.00	5 1/2	3 1/2	7	300	5 1/2	2 1/2	2 1/2	2 1/2
3a	184.00	189.00	194.00	200.00	6	4	7	375	6 1/2	3 1/2	3 1/2	3 1/2
3b	242.00	247.00	252.00	258.00	6 1/2	4 1/2	12	375	6 1/2	3 1/2	3 1/2	3 1/2
3d	253.00	258.00	263.00	269.00	6 1/2	4 1/2	12	500	6 1/2	3 1/2	3 1/2	3 1/2
5a	274.00	284.00	289.00	295.00	7	5	12	650	7 1/2	4 1/2	4 1/2	4 1/2
5b	347.00	358.00	369.00	395.00	7 1/2	5	13	800	7 1/2	4 1/2	4 1/2	4 1/2



The Cameron Steam Pump—Removable Bushing Pattern

Where mine water is very gritty and the use of a plunger pump is prohibited on account of limited space or other circumstances, to secure the greatest durability possible with a piston pump, we supply a removable bushing of iron or composition. This bushing can be turned in the pump so that the wear, which is usually greatest on the bottom, can be gradually distributed over every portion of its surface. Furthermore, if, from the deepening of the mine, it becomes necessary for the pump to be placed lower, the removable bushing can be replaced by one of smaller diameter, thus changing the proportions of the pump, and enabling it, within certain limits, to work against a greater head.

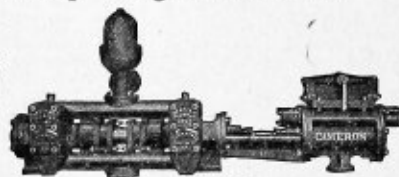
Prices

Size No.	Iron Water Cylinder, Iron Bushing, Steel Piston Rod, Composition Fittings		Iron Water Cylinder, Composition Bushing and Fittings, Tobin Bronze Rod		Iron Water Cylinder, Acid Metal Bushing and Fittings, Tobin Bronze Rod		Diameter of Steam Cylinder, Ins.	Diameter of Water Cylinder, Ins.	Stroke of Piston, Ins.	Displacement Gallons per Minute		S't'm Pipe	Exhaust Pipe	Suction Pipe	Discharge Pipe	Wght., Lbs.
	Rubber Valves	Metal Valves	Rubber Valves	Metal Valves	Rubber Valves	Metal Valves				Normal	Maximum					
0	\$121.00	\$132.00	\$126.00	\$137.00	\$122.00	\$142.00	3 1/2	2	4	8	10	3/4	1 1/2	1 1/2	1	150
1	126.00	137.00	137.00	147.00	142.00	153.00	4	2 1/2	6	10	12.5	3/4	1 1/2	1 1/2	1	217
2	142.00	153.00	153.00	163.00	158.00	168.00	5	2 1/2	6	16	20	3/4	1 1/2	1 1/2	1 1/4	270
3	179.00	195.00	205.00	221.00	211.00	226.00	6	3	7	28	35	1	2	2	1 1/2	455
3a	184.00	200.00	211.00	226.00	216.00	232.00	6	3 1/2	7	38	47	1 1/4	2 1/2	2 1/2	2	475
4	189.00	205.00	216.00	232.00	221.00	237.00	7	3 1/2	7	38	47	1 1/4	2 1/2	2 1/2	2	505
4a	195.00	211.00	221.00	237.00	227.00	242.00	7	4	7	50	63	1 1/4	2 1/2	2 1/2	2	510
5	289.00	305.00	342.00	363.00	358.00	379.00	7	3 1/2	12	50	63	1 1/4	2 1/2	3	2 1/2	890
5b	358.00	379.00	437.00	463.00	458.00	484.00	7	5	13	100	125	1 1/2	3	4	3	1210
6	311.00	332.00	363.00	384.00	374.00	395.00	8	4	12	65	80	1 1/2	3	3	2 1/2	1002
6a	368.00	389.00	447.00	474.00	463.00	489.00	8	5	13	100	125	1 1/2	3	3	3	1225
7	411.00	432.00	495.00	516.00	521.00	542.00	10	5	13	100	125	1 1/2	4	4	3	1445
8	432.00	453.00	516.00	537.00	537.00	558.00	10	6	13	125	155	1 1/2	4	4	3 1/2	1475
9	542.00	563.00	658.00	684.00	689.00	715.00	12	7	13	200	250	1 1/2	5	5	4	2050
10a	705.00	732.00	874.00	900.00	921.00	942.00	14	8	13	250	250	2	5	5	5	2635

The Cameron Outside Packed Plunger Pump—Regular Pattern

This pump is especially adapted for station duty in mines, and is far more durable than a piston pump for handling gritty water.

There are no wearing parts in the water and except the packing in the stuffing boxes, which can be instantly tightened up from the outside. Since the plunger works in loose sleeves, the pump barrel cannot be cut or worn by grit or sand, and the stuffing boxes are placed in the center, so that there is no tendency for the plunger to sag. It is more compact than any other make of plunger pump, and has no outside rods or crossheads. It is also adapted for feeding boilers under heavy pressure.

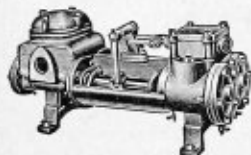


Prices

Size	Iron Water Plunger, Composition Fittings, Steel Piston Rod		Composition Water Plunger, Composition Fittings, Tobin Bronze Rod		Acid Metal Water Plunger, Acid Metal Fittings, Phosphor Bronze Rod		Diameter of Steam Cylinder, Ins.	Diameter of Plunger, Ins.	Stroke of Piston, Ins.	Boilers in H. P. They Will Supply at Moderate Speed Based on 30 Lbs. of Water per H. P. per Hour	S't'm Pipe	Exhaust Pipe	Suction Pipe	Discharge Pipe	Floor Space, Ins.	Wght., Lbs.
	Rubber Valves	Metal Valves	Rubber Valves	Metal Valves	Rubber Valves	Metal Valves										
A	\$137.00	\$147.00	\$158.00	\$168.00	\$174.00	\$184.00	4	2	6	80	3/4	1 1/2	1 1/2	1	53x10	288
B	200.00	215.00	225.00	242.00	242.00	258.00	6	3	7	200	1	2	2	1 1/2	59x13	575
B-B	211.00	227.00	247.00	263.00	263.00	279.00	7	3 1/2	7	300	1 1/4	2	2	1 1/2	60x15	590
C	337.00	353.00	400.00	416.00	437.00	453.00	7	3 1/2	12	375	1 1/4	2 1/2	3	2 1/2	82x18	1260
D	353.00	368.00	405.00	421.00	442.00	458.00	8	4	12	500	1 1/2	2 1/2	4	3 1/2	82x18	1240
C	463.00	484.00	568.00	589.00	621.00	642.00	10	5	13	800	1 1/2	2 1/2	4	3	91x23	1880
D	547.00	563.00	658.00	674.00	721.00	737.00	12	5	13	800	1 1/2	2 1/2	4	3	91x25	2335
E	463.00	484.00	579.00	600.00	621.00	642.00	8	6	13	1150	1 1/2	2 1/2	4	3 1/2	94x23	2460
E	505.00	526.00	632.00	653.00	695.00	716.00	10	6	13	1150	1 1/2	2 1/2	4	3 1/2	94x24	2170
E	668.00	689.00	821.00	842.00	905.00	926.00	12	6	18	1250	1 1/2	2 1/2	5	4	114x25	3125
E	837.00	858.00	1011.00	1032.00	1105.00	1127.00	14	6	18	1250	2	3	5	4	126x27	3580
E	989.00	1011.00	1179.00	1200.00	1295.00	1316.00	16	6	18	1250	2 1/2	4	5	4	130x28	4330
E	632.00	653.00	789.00	811.00	863.00	884.00	10	7	13	1500	1 1/2	2 1/2	5	4	99x26	2800
EE	653.00	674.00	821.00	842.00	900.00	921.00	12	7	13	1500	1 1/2	2 1/2	5	4	99x27	2940
EE	700.00	721.00	874.00	895.00	959.00	1011.00	12	7	18	1500	1 1/2	2 1/2	5	4	114x27	3270

Duplex Piston Steam Pumps

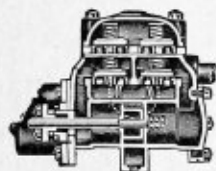
For Boiler Feeding and General Service
Packed Water Pistons



Nos. 2, 3, and 4 pumps



Nos. 6 and 8



Sectional View of Water End



Valve Seats and Springs

Valve seats, springs and bolts of composition metal. Seats are screwed into the decks on a taper. Springs are cylindrical and the valve bolts have shoulders for guiding the springs. All rubber valves have plate washers.



Style No. 8 and Larger Showing Bed Plate and Air Chamber

Regular Fitted Pumps have Brass water cylinder linings, iron fibrous packed pistons, iron stuffing boxes and steel piston rods. **Brass Fitted Pumps** have brass linings, also bronze rods.

Lever Pumps Nos. 1½ and larger have forked levers, giving double the wearing surface in the cross-heads, and are so arranged that the piston rods cannot turn—a decided improvement over the single arm type.

No. 6 and larger pumps have roller bearings in the cross-heads and divided or two-piece rods, permitting removal of rod on either end without disturbing other end. Rubber or brass valves furnished as desired.

Boiler Feed Sizes—Pressures up to 175 Pounds

Size No.	Diam. Steam Cyls.	Diam. Water Cyls.	Stroke, Inches	H. P. Boiler Will Feed at 6 Gallons Water per Hour No. Strokes Stated	Capacity per Min., Gallons	Pipe Sizes, Inches				Apprx Weight Pounds	Price Regular Fitted	Price Brass Fitted
						Steam	Exhaust	Suction	Discharge			
0	2½	1½	3	70 strokes 30 H.P.	4 to 8	¾	1½	1	¾	130	\$ 50.00	
00	3	2	3	60 strokes 50 H.P.	8 to 16	¾	1½	1½	1	180	55.00	\$ 61.00
1½	4	2½	4	50 strokes 80 H.P.	16 to 32	1	1½	1½	1½	270	85.00	95.00
2	4½	3	4	50 strokes 120 H.P.	24 to 48	1½	2	2	1½	330	92.50	103.50
3	5½	3½	5	50 strokes 210 H.P.	38 to 75	1½	2½	2½	2	470	120.00	134.00
4	6	4	6	50 strokes 330 H.P.	60 to 120	1	1½	3	2	630	140.00	157.00
4A	7	4½	6	50 strokes 420 H.P.	75 to 150	1½	1½	4	3	850	195.00	217.00
5	7	4½	10	40 strokes 550 H.P.	83 to 165	1½	2	4	3	1100	260.00	284.00
6A	8	5	10	40 strokes 680 H.P.	100 to 200	1½	2	5	4	1700	325.00	359.00
7	10	6	10	40 strokes 975 H.P.	145 to 290	2	2½	5	4	1800	400.00	434.00
7A	10	6	12	40 strokes 1175 H.P.	147 to 295	2	2½	5	4	2650	440.00	520.00
8	12	7	12	40 strokes 1600 H.P.	200 to 400	2½	3	6	5	3500	575.00	610.00

General Service Sizes—Pressures up to 150 Pounds

Size No.	Diam. Steam Cyls.	Diam. Water Cyls.	Stroke, Inches	Capacity per Minute		Pipe Sizes, Inches				Apprx Weight Pounds	Price Regular Fitted	Price Brass Fitted
				Strokes	Gallons	Steam	Exhaust	Suction	Discharge			
9	12	8	12	50 to 100	260 to 520	2½	3	7	6	4120	\$650.00	\$685.00
11	14	8	12	50 to 100	260 to 520	2½	3	7	6	4370	750.00	840.00
12	14	10	12	50 to 100	408 to 816	2½	3	8	7	5220	850.00	990.00
13A	16	9	12	50 to 100	330 to 660	2½	4	8	6	5730	975.00	985.00
14	16	10	12	50 to 100	408 to 816	2½	4	8	7	5770	900.00	1060.00
15	16	12	12	50 to 100	585 to 1170	2½	4	10	8	6840	1000.00	1210.00
17	18	10	12	50 to 100	408 to 816	3	4	8	7	6650	1000.00	1650.00
18	18	12	12	50 to 100	585 to 1170	3	4	10	8	7800	1150.00	1360.00
19	18	14	12	50 to 100	800 to 1600	3	4	12	10	9600	1350.00	1590.00

Birch Pump Valves

Pressures up to 150 Pounds



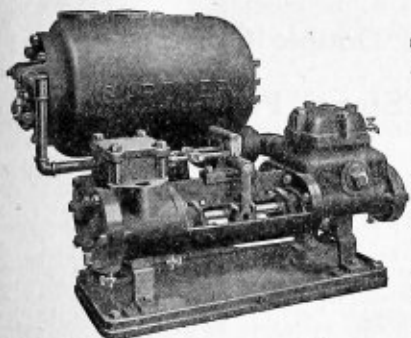
5 to 1. The top of the valve is level, requiring no special springs. leakage, increasing capacity of pump. When ordering, give dimensions of pump seat, temperature of water, water pressure, name, size and shop number of pump.

Size, inches	2	2½	3	3½	4	4½	5	6	7	8						
Valve only	\$0.55	\$0.60	\$0.68	\$0.75	\$0.88	\$1.05	\$1.25	\$1.35	\$1.65	\$1.80	\$2.05	\$2.30	\$3.25	\$4.35	\$5.80	\$8.90
Valve, Seat, Stem and Spring Complete	1.88	1.98	2.26	2.38	2.66	3.10	3.50	3.94	4.54	4.94	5.59	6.09	7.73	10.35	13.30	18.80
Seat only	.80	.85	.95	1.00	1.15	1.30	1.50	1.70	2.00	2.25	2.40	2.65	3.08	4.30	6.30	7.70

Prices on intermediate sizes and high pressure valves on request.

Low Service, Plunger, Compounded and Large Size Steam Pumps upon Request.

Automatic Feed Pump and Receiver



For draining steam coils, radiators, heaters, drying cylinders, steam jackets, etc., and feeding condensation into the boiler.

The pump is automatic in its action, returning the water into the boiler in a steady and continuous flow as fast as it accumulates. Its action is automatically controlled by a seamless copper float (tested at 300 pounds) within the receiver.

When water is out of the receiver the pump is brought to a stop.

The regulating valve is equipped with a removable metal disc which can be replaced at small expense.

The receiving tank is heavy guaranteed and tested for 200 pounds, has a compartment to catch sediment and chips from return pipes, radiators, etc.

The governing arrangement is attached to receiver head so that when repairs are necessary, removal of head permits easy access to all parts.

Each size has three openings in top for returns. When more are required they can be connected in end of receiving tank.

Number	Size			Square feet of Radiating Surface* Drained per Minute	Gallons Delivered per Minute	Inside Dimensions of Receiver	Shipping Weight, Pounds	Price Each
	Diameter of Steel Cylinder	Diameter of Water Cylinder	Length of Stroke					
0	2½	1½	3	2500	6	12½ x 18½	390	\$125.00
1	3	2	3	5000	12	12½ x 18½	440	135.00
1½	4	2½	4	7000	15	14½ x 21	660	175.00
2	4½	3	4	10000	20	14½ x 21	760	190.00
3	5½	3½	5	20000	35	16½ x 24½	1050	230.00
4	6	4	6	40000	60	16½ x 24½	1315	260.00
5	7	4½	6	50000	75	20 x 34	1680	365.00
6	7	4½	10	80000	100	20 x 34	2050	415.00

*1,000 square feet of radiating surface equal about 3,000 linear feet of one-inch pipe.

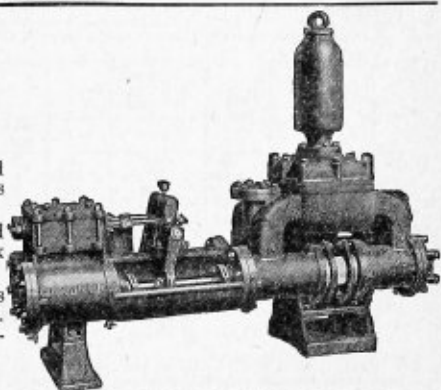
Outside Center Packed Plunger Pumps

300 Pounds Pressure

These pumps are suitable for all conditions of service and especially recommended for pressures in excess of 150 pounds and for pumping water containing grit, sand, gravel, etc.

The plungers being exposed are easily kept lubricated, and all leakage is prevented by an adjustment of the stuffing box glands, and proper maintenance of the packing.

Sizes 10x6x12 and larger have water cylinder cast in sections securely bolted together, with copper gaskets between joints. If a rupture should occur in any part of the water cylinders renewal of that section only is necessary.



Diameter Steam Cylinder	Diameter Water Plunger	Length of Stroke	Strokes per Min. of one Plunger	Gals. Del'd. per Min. by Both Plungers at Stated No. of Strokes	Sizes of Pipe for Short Length				Price Each	
					Steam Pipe	Exhaust Pipe	Suction Pipe	Discharge Pipe	Regular Fitted	Brass Fitted
6	2½	6	90 to 180	23 to 46	1	1½	3	2	\$ 200.00	\$ 234.00
6	3	6	90 to 180	33 to 66	1	1½	3	2	210.00	246.00
6	4	6	90 to 180	59 to 118	1	1½	3	2	215.00	253.00
7	3½	10	60 to 120	50 to 100	1½	2	4	3	300.00	360.00
7	4	10	60 to 120	65 to 130	1½	2	4	3	315.00	377.50
7	4½	10	60 to 120	83 to 166	1½	2	4	3	330.00	395.00
8	4	10	60 to 120	65 to 130	1½	2	5	4	400.00	485.00
8	5	10	60 to 120	100 to 200	1½	2	5	4	425.00	515.00
10	5	10	60 to 120	100 to 200	2	2½	5	4	475.00	565.00
10	6	10	60 to 120	145 to 290	2	2½	5	4	500.00	590.00
10	6	12	50 to 100	147 to 294	2	2½	6	5	650.00	755.00
10	7	12	50 to 100	200 to 400	2	2½	6	5	700.00	825.00
12	6	12	50 to 100	147 to 294	2½	3	6	5	700.00	805.00
12	7	12	50 to 100	200 to 400	2½	3	6	5	750.00	875.00
12	8	12	50 to 100	260 to 520	2½	3	7	6	860.00	1020.00
14	7	12	50 to 100	200 to 400	2½	3	6	5	800.00	930.00
16	8	12	50 to 100	260 to 520	2½	4	7	6	1000.00	1175.00
16	9	12	50 to 100	330 to 660	2½	4	8	6	1150.00	1350.00
16	10	12	50 to 100	408 to 816	2½	4	8	7	1200.00	1385.00
18	9	12	50 to 100	330 to 660	3	4	8	6	1300.00	1485.00
18	10	12	50 to 100	408 to 816	3	4	8	7	1350.00	1560.00
20	10	12	50 to 100	408 to 816	4	5	8	7	1400.00	1610.00

"Nye" New Model Double Cylinder High Pressure Steam Pump



Front View
Showing Hooks for
Suspension

The all-around contractors' pump—elevations up to 125 feet. Has no engine, pistons or plungers. Works suspended or stationary. Pumps muddy or sandy water. No exhaust. Steam is used twice. For cofferdam and caisson work, quarries, mines, well-point systems, paper mills, tanneries, gas and chemical works, refineries, etc.

Features. This pump creates a high vacuum and therefore has greater suction lift and will discharge to a greater height with greater rapidity and with less steam than other pumps of similar type. It has no pistons or plungers, no engine with gears or other parts to cause trouble. It is impossible for sand, grit or mud to affect its operation. Will suck air and water without losing its priming. Discharges a full, continuous, steady stream. Cylinders are air cushioned. Has no exhaust. Steam is used twice. Automatically takes care of variation in boiler pressure. Has mushroom type spray basket jets. Patent priming device. High discharge velocity. No reciprocating parts. Simple and compact, takes up least space. Handles liquids at higher temperatures. Operates at 40 degrees below zero. Shock is eliminated. It will operate equally well suspended or stationary.

Consists of two connected hollow cylinders with discharge chamber at one side, all cast in one piece forming main body of the pump; bottom of these three chambers contains suction and discharge parts. At the top the two cylinders are sealed by steam yoke connection embodying the Nye special spray basket jets. The steam yoke carries two original Nye features, a pair of air valves and a hollow steam valve that floats in its chamber. This valve is extremely simple and sensitive to pressure, vacuum and its own gravity—the operating medium—and is responsible in a high degree for the steam economy of the Nye pump. Its function is admission of steam to the filling cylinder in time to aid the air cushion, overcoming shock from ram action of the rising column of water. Following the cushioning function the steam valve admits steam for the discharge. Filling of the alternate cylinder cuts off the supply of steam, permitting expansion of the residual charge, thereby causing discharge from both cylinders simultaneously. The result of this lap of discharge is a sustained momentum. An almost imperceptible increment is the only evidence of the junction of the discharge cycles.

Priming is not required for short suction, but if it is desired to pump air and water at bottom of suction, keeping the water down so that the men can work to good advantage, a small amount of water can be run through the pump continuously through angle valve at the back of the pump.

No.	Price Each	Wght., Lbs.	Capacity, Gals. per Min. Elevations of		Size of Pipes, Inches			Approx. Boiler H. P. at Elevations of, Feet			
			50 Ft.	100 Ft.	Suction	Discharge	Stm.	25	50	75	100
2	\$225.00	550	200	100	3	2	3/4	10	15	20	25
3	300.00	900	300	200	4	3	1	15	20	25	30
4	400.00	1600	500	400	5	4	1 1/4	20	25	30	35
5	500.00	2300	800	600	6	5	1 1/2	25	30	35	40
6	600.00	2800	1000	800	7	6	2	30	40	45	50

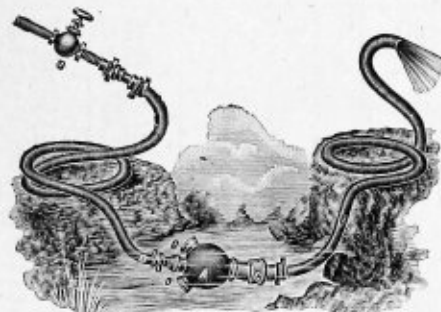
Prices include ring and hooks for suspension or stand for stationary work, lubricator, air cocks and check valves.

Nye Special Sand Pumps

For handling silica sand, fine coal, etc., up to 50 per cent of solids. Prices quoted upon request. Specify conditions and describe carefully quantity and nature of materials to be handled.



Rear View Showing
Pump on Stand



Steam Syphon Pumps

Raises liquids by direct action of steam and will raise water about one foot for each pound pressure of steam at the pump. Not economical, but for emergency purposes are useful and investment is small.

Size No.	4	5	6	7	8
Gallons per minute.....	50	120	200	320	450
Steam Pipe, inches.....	3/4	1	1 1/4	1 1/2	1 3/4
Discharge, inches.....	1	1 1/2	2	2 1/2	3
Price, pump only, each....	\$20.00	\$35.00	\$45.00	\$70.00	\$80.00

Portable Railway Outfits (Shown at Left)

Complete with hose and fittings for supplying engines with water from any body of water within reach. No. 1 has 1 1/4 steam and 1 1/4 discharge hose, capacity 120 gallons. No. 2 has 1 1/2 steam and 2 1/4 discharge hose, capacity 200 gallons per minute with 60 pounds steam pressure and 15-foot vertical lift.

No. 1 Outfit with 25 feet of steam and discharge hose.....	\$110.00
No. 2 Outfit with 25 feet of steam and discharge hose.....	145.00

Other types of Steam Syphons listed under Ejectors.

New Style Emerson Steam Pumps

These pumps have capacities between the Junior pumps and the No. 1 Standard. They are of the Standard type, but have three very essential features which are different.

1. The body is made of steel pipe instead of iron casting, which reduces the weight more than one-half.
2. The pipe is screwed into the head and flanged to the base, and so the pump can be easily taken apart; this means that it can be shipped in a box, carried in several sections by hand, or transported on mule back into places inaccessible by other means of conveyance.
3. The price is lower than it has been possible heretofore to offer the Emerson Standard pump.

No.	Price Each	Weight, Pounds	Capacity, Gallons per Minute	Cylinders		Steam Pipe	Suction, Inches	Discharge, Inches
				Diam., Inches	Length, Inches			
E1	\$175.00	425	140	4	6	$1\frac{1}{2}$	$2\frac{1}{2}$	$2\frac{1}{2}$
EE1	\$225.00	550	190	5	6	$1\frac{3}{4}$	3	3



Front View



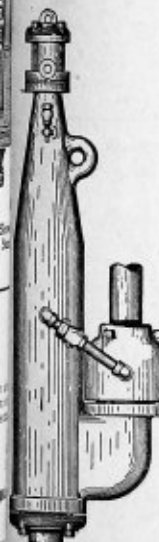
Side View

Emerson Single Cylinder Junior Pump

The Emerson Junior steam pump is especially adapted to pumping operations where the head or lift does not exceed 100 feet and the quantity of water to be handled ranges from 75 to 100 gallons per minute. For any service within the scope of its work, it is by far the most reliable and durable pump on the market.

One of the salient features of the Emerson Junior is the simplicity of its design and construction. This pump has fewer parts than any other and lacks all the delicate and intricate mechanisms common to other types. Although it is built extra strong and of the best material obtainable, it is lighter in weight and cheaper in price than any other pump of the same capacity. It takes up less room, requires less attention, and causes less expense for installation, operation and maintenance than any other steam pump. It requires no adjustments whatever to be made and has no packing glands, stuffing boxes, belts, pulleys, pistons, rocker arms or numerous other devices, which, in other types of pumps, cause the user endless trouble and expense. Its action is automatic. It requires no lubrication and works perfectly when taking large quantities of air in the suction. Gritty or muddy water does not damage it or interfere with its operation, and exposure to all kinds of weather does not affect it in the least. This pump midget requires less skill to operate it than any other type of pump and is capable of making long and continuous runs with scarcely any attention. The economy in its steam consumption is marked and in point of durability it has no equal in the pump world.

No.	Price Each	Weight, Pounds	Capacity in Gallons per Minute	Cylinders		Steam Pipe, Inches	Suction, Inches	Discharge, Inches
				Diameter, Inches	Length, Inches			
A	\$100.00	220	75	6	$3\frac{1}{2}$	$1\frac{1}{2}$	3	$2\frac{1}{2}$
B	125.00	295	100	8	$3\frac{1}{2}$	$1\frac{3}{4}$	4	3



Emerson Junior

“Emerson” Steam Pumps



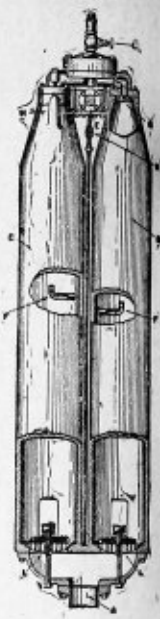
Front View

This pump consists of two chambers or cylinders with inlet and outlet valves for water; a circular slide valve for admitting steam alternately to each chamber; a small three cylinder engine for actuating slide valve; a condenser nozzle at the middle of each chamber, connected by pipes to the bottom of the opposite chamber and two air check valves at the top of each cylinder.

The water is forced from the chamber to a height corresponding with the boiler pressure available, by the direct pressure of steam, then the steam is condensed to form a vacuum and cause the chamber to fill again. One chamber fills while the other is discharging. The work is done solely by direct pressure of steam and by the vacuum produced by the condensation of the steam after it has been used once for expelling the water.

The rotary slide valve is driven by a small three-cylinder engine which is attached to the under side of the steam chest. The engine crank shaft extends into the steam chest in the center of the bearing around which the slide valve rotates and a positive geared connection is made by cut gears of steel and bronze.

Capacity given in table below is for 20-ft. head. For each additional 10 feet of head deduct 5 per cent.



Sectional View

No.	List Price	Weight, Pounds	Capacity, Gals. per Min., 20-ft. Head	Cylinders		Steam Pipe	Suction, Inches	Discharge, Inches
				Diameter, Inches	Length, Inches			
1	\$ 275.00	950	245	6	6	$\frac{3}{4}$	3	2 $\frac{1}{2}$
2	350.00	1375	430	8	6 $\frac{1}{2}$	1	4	3
3	500.00	2075	700	10	7	1 $\frac{1}{4}$	5	4
4	700.00	3150	1100	12	8	1 $\frac{1}{2}$	6	5
5	1150.00	5000	2000	16	8	2	8	6
6	1700.00	5400	3000	20	8	2 $\frac{1}{2}$	10	8

“Pulsometer” Steam Pumps

A simple and durable pump for general service. Has no mechanically operated parts. The only parts in motion are a few check valves which are enclosed and operate automatically.

Action consists in alternately emptying and filling the two pumping chambers or cylinders by means of steam which first forces out the water in the cylinder by pressure after which the condensing of the steam produces a vacuum which draws in a new supply of water.

Price includes strainer, either basket or mushroom type, steam and relief valve, connections and pump hook for suspension.

No.	Price Standard Flat Valve	Weight, Pounds	Pipe Sizes			Capacity in Gallons			Boiler Horse Power Required
			Steam	Suction	Discharge	25-ft. Head	50-ft. Head	75-ft. Head	
2	\$100.00	95	$\frac{3}{4}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	20	17	13	4
3	140.00	140	$\frac{3}{8}$	2	2	60	50	38	5
4	200.00	295	$\frac{1}{2}$	2 $\frac{1}{2}$	2 $\frac{1}{2}$	100	80	65	6
5	240.00	430	$\frac{1}{2}$	3	3	180	160	115	10
6	300.00	570	$\frac{3}{4}$	3 $\frac{1}{2}$	3 $\frac{1}{2}$	300	265	200	12
7	375.00	745	$\frac{3}{4}$	4	4	425	375	275	15
8	540.00	1375	1	5	5	700	625	450	25
9	700.00	2100	1 $\frac{1}{2}$	7	6	1000	900	650	35
10	1400.00	3800	2	8	8	2000	1800	1400	70



Discharge Side

Ball Valve Pumps to order only—Prices upon request.

Duplex Power Pumps

Horizontal—Packed Piston Pattern

Geared 5 to 1

For Water Pressures 100 to 175 Pounds

A rugged, simple and high grade double cylinder power pump for boiler feeding or general service. The feature that stands out most prominently in this pump is the accessibility of all the working parts.

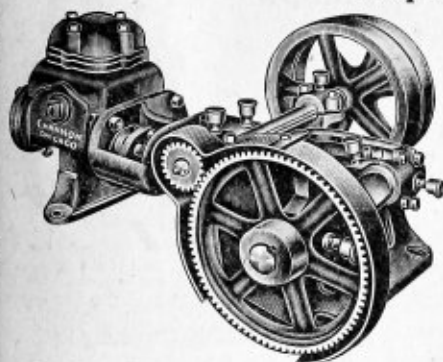
Grease lubrication is employed exclusively, compression cups being provided for all bearings.

Regular Fitted pumps have brass lined water cylinders, iron pistons and steel rods.

Brass Fitted pumps have in addition to the brass lined cylinders, brass or brass lined stuffing-box glands and bronze rods. Valve seats, springs and bolts of both styles are always of brass and valves of rubber or metal as preferred.

Motor driven pumps upon request. Specify voltage, phases and cycles.

Can also be furnished in the outside center-packed plunger type. Prices upon request.



T. & L. Pulleys and Single Reduction Gears

Diameter Cylinder and Length of Stroke	Maximum Pressure, Pounds Sq. In.	Capacity, Gallons per Minute	Suction, Inches	Discharge, Inches	Maximum Speed, R. P. M.	Size Belt Pulley, Inches	H. P. at Maximum Speed and Pressure	Approx. Weight Std. Pump, Pounds	Price with Pulley Regular Fitted	Price Extra for T. and L. Pulleys
3 x 4	150	36	2	1 1/2	75	16x3	5	500	\$ 200.00	\$10.00
3 1/2 x 4	100	60	2 1/2	2	75	16x3	5	600	225.00	30.00
3 1/2 x 5	150	50	2 1/2	2	60	20x4	7	680	240.00	11.00
4 x 5	80	90	3	2 1/2	60	20x4	6	800	300.00	11.00
4 x 6	150	80	3	2	60	24x4	10	1000	325.00	16.90
5 x 6	75	160	4	3	60	24x4	10	1250	400.00	16.90
4 1/2 x 10	175	137	4	3	50	30x6	20	2000	600.00	31.00
5 x 10	150	170	5	4	50	30x6	20	2100	675.00	31.00
6 x 10	100	245	5	4	50	30x6	20	2250	700.00	34.00
6 x 10	175	245	5	4	50	30x6	35	2250	950.00	52.50
7 x 10	150	334	6	5	50	40x8	40	3500	1050.00	52.50
8 x 10	115	436	6	5	50	40x8	40	4000	1200.00	52.50
8 1/2 x 10									1350.00	52.50

The 8 1/2 x 10-inch has removable cast iron liners in water cylinder. Can also equip the 7 x 10-inch and 8 x 10-inch in same way at extra charge.

"Bulldozer" Power Pumps

Double-Acting—Double Geared

Driven by two pinions placed on same shaft. These pinions drive two gear wheels conveying power to the piston by means of a cross-head. Drive from both sides insures alignment.

Piston rods on all pumps are covered by heavy brass tubing and are outside packed.

Gearing on all pumps are machine cut from the solid.

Cylinders are all fitted with removable brass liners.

Wrist pins are brass bushed and fitted with oil cups. Suction may be taken from either side of the pump and air chamber can be set to discharge from any quarter.

Valves in the No. 500 are hard brass, of the poppet pattern with concave ground brass seats; in the balance of the sizes valves are hard rubber, with brass grid seats of the quick closing pattern with coiled spring.

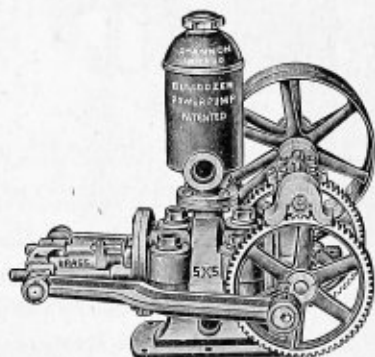
Plungers are hump packed in Nos. 500-352 and 363; in the other sizes plungers are fitted with double cup leathers with a turned washer between them.

Nos. 362, 352 and 363 have guide for piston mounted on the head of the pump. No. 352 is considerably heavier than the others, being designed for very heavy work.

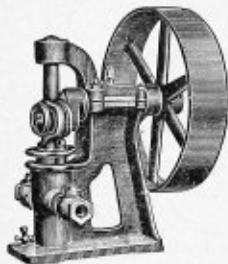
Nos. 352 and 363 are tested to 140 pounds, balance to 200 pounds pressure, at the factory.

The speed at which these pumps can be operated varies in accordance with the size of the pump and the elevation under which they are being operated.

All equipped with air chambers, T. & L. pulleys and pinion gear guards.



No.	Price	Wgt., Lbs.	Size Cyl., Inches		Maximum Capacity, Gallons per Hour	Suction and Discharge	Speed, R. P. M.	T. & L. Pulleys, Inches	Geared	Horse Power Required					
			Diam.	Stroke Ad- justable to						Elevation in Feet					
										25	50	75	100	150	200
500	\$55.00	95	2	5	350	1 1/2	1 1/2	25 to 40	14x2 1/2	5 to 1	1 1/2	1 1/2	2 1/2	1 1/2	1 1/2
501	60.00	210	2 1/2	5	650	1 1/2	1 1/2	25 to 40	14x2 1/2	5 to 1	1 1/2	2 1/2	1 1/2	1 1/2	1 1/2
502	65.00	205	3	5	900	1 1/2	1 1/2	25 to 40	14x2 1/2	5 to 1	1 1/2	2 1/2	1 1/2	1 1/2	1 1/2
503	75.00	300	4	5	1300	2	2	25 to 40	16x3	5 to 1	3 1/2	1 1/2	1 1/2	1 1/2	1 1/2
505	80.00	485	5	5	2000	2	2	25 to 40	16x4	5 to 1	3 1/2	1 1/2	1 1/2	1 1/2	1 1/2
353	75.00	360	5	5	2000	2	2	25 to 40	16x4	5 to 1	3 1/2	1 1/2	1 1/2	1 1/2	1 1/2
362	75.00	400	3	5-7 1/2-10	1400	2	2	40	16x4	5 to 1	3 1/2	1 1/2	1 1/2	1 1/2	1 1/2
352	150.00	730	6	10	5800	3	3	40	24x4	6 to 1	1 1/2	3 1/2	4 1/2	5 1/2	...
363	275.00	1600	6	20	7200	4	4	25	30x6	8 to 1	4	5	6	7	9



Simplex Plunger Power Pumps

Scotch Yoke Type—Single Acting
For Pressures up to 125 Pounds

Suitable for boiler feeding, pumping juices, molasses, paint and other thick liquids.

A simple and reliable pump, easily set up and kept up. Furnished with brass check valves, passing liquid through cylinder in either direction.

Crank pin has a steel roller and runs within the link shown. Valves are rubber and have brass seats.

Capacities rated at 50 strokes per minute. Nos. 2A and 3A geared 5 to 1; Nos. 8 and 9 geared 4 to 1.

Nos. 8 and 9 are single acting, Nos. 11 and 12 are double acting.

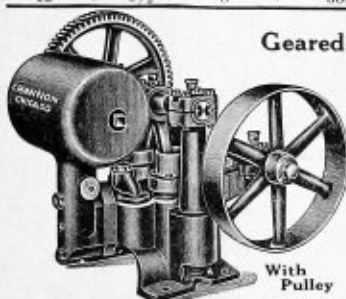


Style Nos. 1 to 7

When used for spraying we furnish outfit consisting of pump with pulley or gear, relief valve, pressure gauge, double shut-off, suction strainer, 10 feet of suction hose, coupled, two 10-foot bamboo extensions, two couplings, and two Misty Junior spray nozzles for \$143.75. Belt tightener at extra price.

Style Nos. 2A, 3A, 8 and 9

No.	Size of Plunger, Inches		H. P. of Boilers Will Feed	Capacity, Gallons per Hour	Suction and Discharge, Inches	Size of Std. Pulley, Inches	Approximate Weight, Pounds	Price
	Diameter	Stroke						
1	1	2	3	18	3/4	12x2	35	\$19.80
2	1 1/4	2 1/2	5	30	3/4	14x2	45	22.00
2A	1 1/4	2 1/2	5	30	3/4	14x2	55	35.20
3	1 1/4	3	10	60	3/4	16x3	65	26.40
3A	1 1/4	3	10	60	3/4	16x2	80	41.80
4	1 1/2	3	15	90	3/4	16x3	75	30.80
5	2	3	30	180	1	18x4	130	35.20
6	2 1/2	3	45	270	1	18x4	170	41.80
7	2 1/2	6	60	360	1 1/4	22x4	200	55.00
8	2 1/2	6	80	408	1 1/4	14x4	300	77.00
9	3	6	100	600	1 1/4	14x4	400	93.50
11	4	6	300	1800	2 1/2	18x4	700	165.00
12	5 1/2	8	500	3500	3	20x4	900	220.00



With Pulley

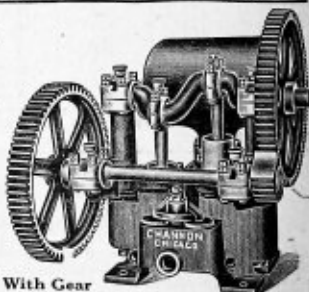
Geared Duplex Plunger Power Pump

Outside Packed Bronze Plungers
For High Pressures, 200 to 250 Pounds

For general water supply, operating large orchard sprayers. Geared 5 to 1.

The plungers, glands, followers, valves, valve seats and other working parts coming in contact with the liquid are of bronze.

Connecting rods are cast steel; crank and pinion shafts forged steel. Gears are machine cut, keyed and pressed onto the shafts.



With Gear

The crank shaft is extended beyond the main gear to provide for sprocket or pulley to operate agitator. Bearings are exceptionally large—the caps being held by four bolts; bearings are babbitted and are provided with grease cups. Air chamber is large for maintaining uniform high pressure.

No. 1603. Plungers 3x3 inches. Capacity per minute, 50 R. P. M., 9 gallons; 65 R. P. M., 12 gallons. Suction, 1 1/4 inches. Discharge, 1 inch. Pulley, 15x3. Size base, 10 1/4 x 14 inches. Weight, 310 pounds.

Price with pulley or gear.....\$112.50

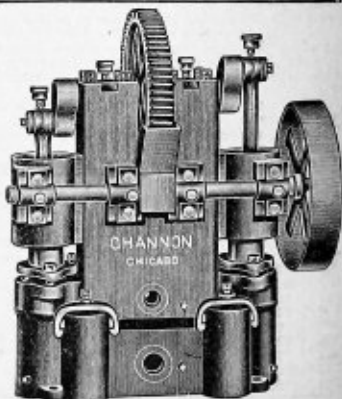
Price with tight and loose pulley.....117.50

No. 500 Geared Vertical Duplex Plunger Power Pump

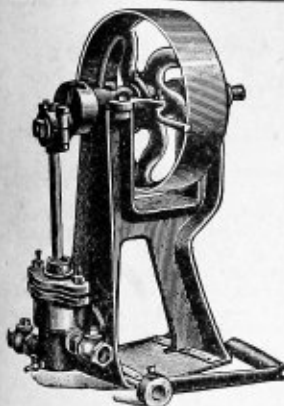
For Pressures up to 250 Pounds. Geared 5 to 1
For Spraying, General Water Supply, Etc.

This pump is outside packed. Air chamber inside of pump. It is compact, taking up but little floor space on account of arrangement of cylinders. All gears are machine cut from the solid iron. Bearings are accessible and lubricated by compression grease cups.

Pump has bronze covered plungers, bronze valve seats and valves with renewable rubber discs.



Size of Plungers, Inches	Capacity per Minute	Size of Pipes		Standard Pulley, Inches	Weight, Pounds	Price with Pulley
		Suction, Inches	Discharge, Inches			
2 1/2 x 4	10 Gals.	1 1/4	1	12x3	220	\$75.00



Channon Power Pumps

For Light Service

For pressures
up to 50 pounds.
Speeds 10 to 70
strokes per minute.

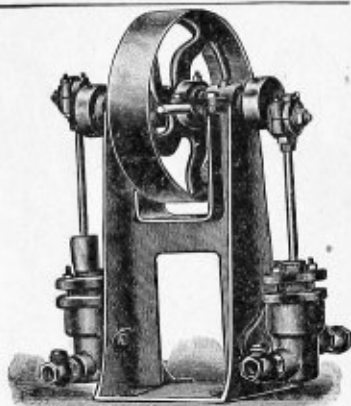
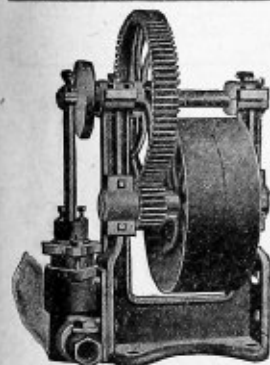


Fig. 81. Single Plunger

Fig. 82. Double Plunger

The above pumps are designed for any light service, such as filling tanks or any place where pressure does not exceed 50 pounds per square inch. Plungers are cast iron, valves of bronze. Pumps can be run either way and valves can be changed to make either side suction or discharge side.

No.	Diameter Plunger, Inches	Length Stroke, Inches	Suction and Discharge, Inches	Size Pulley	Price Single Plunger	Price Double Plunger	Capacity at 40 Strokes per Minute			
							Single Plunger		Double Plunger	
							Gallons per Hour	Boiler H. P.	Gallons per Hour	Boiler H. P.
1	2	4	1	16x3 1/4	\$40.00	\$45.00	124	31	248	42
2	2 1/2	4	1 1/4	16x3 3/4	45.00	60.00	204	51	408	102
3	3	4	1 1/2	16x4 1/4	55.00	60.00	293	73	587	147



Channon No. 4 Geared Power Pump

For pressures
up to 170 pounds.
Speeds 10 to 60 strokes
per minute.

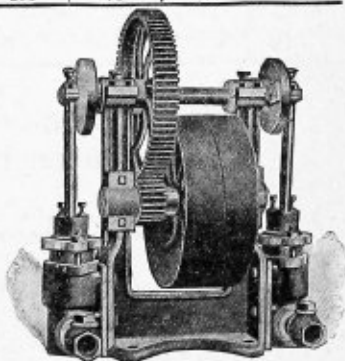


Fig. 91. Single Plunger

Fig. 92. Double Plunger

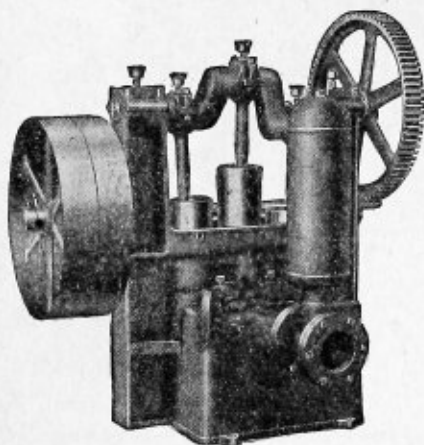
Designed for continuous hard work, such as feeding boilers or in paper mills, tanneries or any place where a good, reliable pump is required.

The valves can be changed to suit the relative position of pipes or boiler, and pump can be run in either direction. Can be run as a double pump or two distinct and separate single pumps. Have brass plungers and valve seats and bronze or hard rubber valves. In boiler feeding will save about 50 per cent over an injector and 25 per cent over a steam pump.

No.	Diameter Plunger, Inches	Length Stroke, Inches	Geared	T. & L. Pulleys	Suction, Inches	Discharge, Inches	Price Single	Price Double
4	3	4	4 to 1	16x3 1/4	1 1/2	1 1/2	\$80.00	\$100.00

Capacity, Allowing 4 Gallons per H. P. per Hour

Strokes per minute	10	20	25	30	35	40	45	50	55	60
Single plunger, gallons per hour	73	147	183	220	257	294	330	367	403	450
Single plunger, boiler H. P.	18	37	46	55	64	74	83	92	101	112
Double plunger, gallons per hour	146	293	366	440	513	587	660	733	806	880
Double plunger, boiler H. P.	36	73	91	110	128	147	165	183	201	220



Size 7x8 and Smaller

Style 957 Single-Acting Triplex Plunger Pumps

For 50 Pounds Working Pressure or 115 Feet Elevation

For tank pumping in mills, bleacheries, dye houses, tanneries, refineries, railway stations, etc.

Frame cast in one piece with cylinders, forming exceptionally rigid construction and accurate alignment of all working parts. Crank and pinion shaft bearings are babbitted.

Grade 5 to 1. Machine cut iron gears with gear guard. Connecting rods 7x8 and smaller have adjustable bronze boxes at crank end and bronze bushings at plunger end. Other sizes have strap head and wedge adjustment with bronze boxes at crank end and bronze bushings at plunger end.

Plungers are hard cast iron and inside guided.

Glands are iron and of easy access for adjustment.

Base and valve boxes in one casting affording large valve area, direct waterways and easy access.

Valves are rubber discs on bronze grid seats.

Air chamber supplied with pump.

Special construction to order—bronze plungers, lined cylinders and glands, rawhide pinion, etc.

Size, Inches		Gallons Displaced per Minute	Speed R. P. M.	H. P. 50 Lbs. Pressure	Displacement one Rev. of Crank Shaft, Gallons	Size Pipe, Ins.		T & L Pulleys, Ins.	Wght., Lbs.	Price
Diam.	Stroke					Suction	Discharge			
4	6	50-60	52-62	2.2-2.5	.978	2	2	20x3	1050	\$200.00
5	8	80-100-125	40-49-62	3-3.5-4.6	2.041	3	3	26x4	2200	325.00
7	8	150-175-200-250	38-44-50-63	6-6.8-7.8-9.6	4.00	5	5	30x3	2900	450.00
8	10	250-300	39-46	9.6-11	6.52	6	5	36x6	5950	700.00
8	12	300-350-400	39-45-51	11-12.6-14.4	7.83	6	5	36x6	6050	725.00

Read gallons, speed and H. P. in order given, i. e., size 5x8 rating is 100 gals. at 49 R. P. M. takes 3.8 H. P.

Style 924 Single-Acting Triplex Plunger Pumps

For 130-pound working pressure or 300-foot elevation. For general water supply, municipal water works, pulp grinders, railway water stations, etc.

Same general description as Style 957 above.

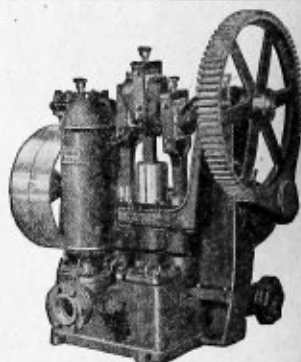
Gear ratio is 5 to 1 except 9x10, which is 6 to 1.

Connecting rods are extra long with strap head and wedge adjustment with bronze boxes at crank end and bronze bushings at plunger end.

Valves are rubber disc on bronze grid seats, cylindrically wound springs. Metal valves as ordered.

Air chamber supplied with pump; vacuum chamber to order.

Special construction to order: Phosphor bronze plungers, lined cylinders and glands, rawhide pinion, etc.



Type 8½x10 and Smaller

Size, Inches		Gallons Displaced per Minute	Speed R. P. M.	H. P. 100 Lbs. Pressure	Displacement one Rev. of Crank Shaft, Gallons	Size Pipe, Ins.		T & L Pulleys, Ins.	Wght., Lbs.	Price
Diam.	Stroke					Suction	Discharge			
4	4	30-40	46-62	2.6-3.5	.653	2	2	20x3	1000	\$195.00
4	6	40-50-60	41-52-62	3.5-4.3-5	.978	2	2	20x3	1100	210.00
5	6	80	53	6	1.531	3	3	26x4	2125	325.00
5	8	100-125	49-62	7.5-9.1	2.041	3	3	30x5	2260	350.00
5½	8	125-150	51-61	9.4-11	2.465	4	3	30x5	2525	385.00
6½	8	150-175-200	44-51-59	11.5-13.3-14.4	3.440	4	4	36x6	4200	550.00
8	8	200-250	39-48	15.5-18.5	5.22	6	5	36x6	6000	765.00
8½	8	250	45	18	5.56	6	5	36x6	6100	775.00
8	10	300-350	46-54	21-24	6.52	6	5	36x6	6950	800.00
8½	10	300-350	44-51	21-24	6.94	6	5	36x6	6975	825.00
9	10	400	49	30	8.26	6	5	42x8	12000	1275.00

For high suction lifts select pumps to run at slow speed. To determine H. P. for increase or decrease in pressure multiply H. P. in tables by operating pressure divided by 50 for No. 957 and 100 for No. 924.

Style 1140 Single-Acting Triplex Plunger Pumps

For 130 Pounds Working Pressure or 300 Feet Elevation

For general water supply, municipal water works, boiler feeding, hydraulic elevators, mines, pulp grinders, etc.

Frame is cast in one piece with crosshead guides and cylinders, forming exceptionally rigid construction and accurate alignment of all working parts.

Crank and pinion shaft bearings are babbitted.

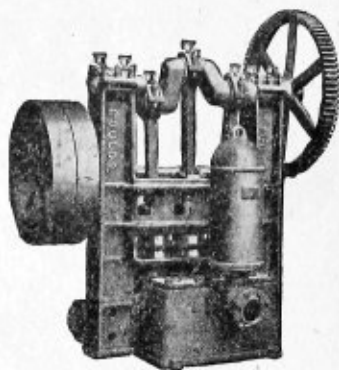
Geared 5 to 1—gears are machine cut from the solid iron.

Crossheads are babbitted and run in bored guides.

Connecting rods have adjustable bronze boxes at crank end, except $3\frac{1}{2} \times 4$ and smaller, which have babbitted boxes and bronze bushings at crosshead end. Plungers are hard cast iron and ground true.

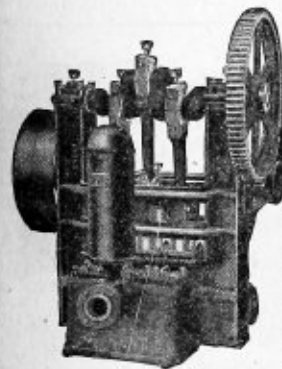
Valves for cold water, rubber on bronze grid seats; for hot water we furnish special disc. Air chamber supplied with pump.

Special construction to order: Phosphor bronze plungers, lined cylinders and glands, rawhide pinion, etc.



Size 8x10

Size, Inches		Gallons Displaced per Minute	Speed R. P. M.	H. P. 100 Lbs. Pressure	Displacement one Rev. of Crank Shaft, Gallons	Size Pipe, Ins.		T & L Pulleys, Ins.	Wght., Lbs.	Price
Diam.	Stroke					Suction	Discharge			
$2\frac{1}{2}$	4	12-15-18	48-59-71	1.1-1.25-1.6	.255	$1\frac{1}{2}$	$1\frac{1}{2}$	15x3	400	\$115.00
3	4	15-18-35	41-50-69	1.25-1.6-2	.367	$1\frac{1}{2}$	$1\frac{1}{2}$	15x3	450	125.00
$3\frac{1}{2}$	4	25-30-40	50-60-80	2.2-2.6-3.5	.501	2	2	15x3	725	165.00
4	6	40-50-60	41-52-62	3.3-4.3-5	.978	2	2	20x3	1240	240.00
5	8	80-100-125	40-49-62	6-7.5-9.1	2.041	3	3	30x5	2655	355.00
6	8	125-150-175	43-52-60	9.4-11-13	2.938	4	4	30x6	4250	475.00
7	8	175-200-250	44-50-63	13.6-15.5-19	4.00	4	4	30x6	5065	625.00
7	10	250-300	50-60	18.5-21	5.00	5	5	36x6	6700	740.00
8	10	300-350	46-54	21-24	6.52	5	5	36x6	8225	900.00



Size $2\frac{1}{2} \times 4$

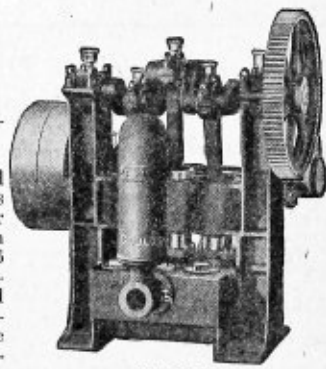
Style 1009 Single-Acting Triplex Plunger Pumps

150 Pounds Working Pressure or 350 Feet Elevation

For boiler feeding, mine pumping, municipal waterworks, general water supply, etc.

Same general specification as Style 1140.

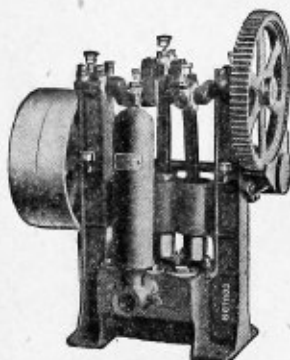
Gear ratio, 5 to 1. Crossheads on 4×6 and larger fitted with adjustable bronze shoes which run in bored guides. $3\frac{1}{2} \times 4$ and smaller crossheads are cylindrical of bronze and run in bored guides. Connecting rods, sizes 4×6 and larger, have strap head and wedge adjustment with bronze boxes at crank end and adjustable marine type bronze boxes at crosshead; $3\frac{1}{2} \times 4$ and smaller have adjustable babbitted boxes at crank and bronze bushings at crosshead.



Size 7x8

Size, Inches		Gallons Displaced per Minute	Speed R. P. M.	H. P. 100 Lbs. Pressure	Displacement one Rev. of Crank Shaft, Gallons	Size Pipe, Ins.		T & L Pulleys, Ins.	Wght., Lbs.	Price
Diam.	Stroke					Suction	Discharge			
$1\frac{1}{4}$	2	2	67	.30	.031	$\frac{3}{4}$	$\frac{3}{4}$	12x1 $\frac{1}{2}$	115	\$ 50.00
$1\frac{3}{4}$	$2\frac{1}{2}$	4-6	52-77	.32-.53	.078	1	1	12x2 $\frac{1}{2}$	200	70.00
2	3	6-9	50-75	.7-9	.122	$1\frac{1}{4}$	$1\frac{1}{4}$	12x2 $\frac{1}{2}$	235	80.00
$2\frac{1}{2}$	4	12-18	48-71	1.1-1.6	.255	$1\frac{1}{2}$	$1\frac{1}{2}$	15x3	400	120.00
3	4	18-25	50-70	1.6-2	.367	$1\frac{1}{2}$	$1\frac{1}{2}$	15x3	450	140.00
$3\frac{1}{2}$	4	25-40	50-80	2.2-3.5	.501	2	2	15x3	725	160.00
4	6	40-50-60	42-52-62	3.3-4.3-5	.978	2	2	20x3	1250	260.00
5	6	80-100	53-66	6-7.5	1.531	3	3	26x4	2600	400.00
6	8	100-125	50-62	7.5-9.1	2.041	3	3	30x5	2700	425.00
6	8	125-150-175	43-52-60	9.4-11-13	2.938	4	4	30x6	4350	500.00
7	8	175-200-250	44-50-63	13.6-15.5-19	4.00	4	4	36x6	5100	640.00
7	10	250-300	50-60	18.5-21	5.00	5	5	36x6	6750	785.00
8	10	300-350	46-54	21-24	6.52	5	5	42x6	8400	1000.00

To determine H. P. for increase or decrease in pressure multiply H. P. in table by operating pressure divided by 100.



Size 7x10

Style 1157 Single-Acting Triplex Plunger Pumps

200 Pounds Working Pressure or 460 Feet Elevation

For mine pumping, general water supply, waterworks, etc.
Frame is cast in one piece with crosshead guides and cylinders, forming an exceptionally rigid construction and accurate alignment of all working parts. Crank shaft and pinion shaft bearings are babbitted. Gear ratio is 5 to 1. Gears are machine cut from the solid. A gear cover or guard covers the pinion and adjacent teeth of the gear.

Crossheads 3½x6 and larger fitted with adjustable bronze shoes which run in bored guides, 3x4 have cylindrical crossheads of bronze.

Connecting rods 3½x8 and larger have strap head and wedge adjustment at crank end and adjustable marine type bronze boxes at crosshead. 3x4 and smaller have adjustable babbitted boxes at crank end and bronze bushings at crosshead. Plungers are hard cast iron, except size 1½x3, which has bronze plungers. Glands are cast iron, except size 1½x3, which are bronze.

Base and valve boxes are in one casting, affording large valve area, direct water ways and easy access. Valves for cold water are rubber discs on bronze grid seats; for hot water a special disc is supplied.

Special construction to order: Bronze plungers, lined cylinders and glands, rawhide pinion, etc.

Size, Inches		Gallons Displaced per Minute	Speed R. P. M.	H. P. 100 Lbs. Pressure	Displacement one Rev. of Crank Shaft, Gallons	Size Pipe, Ins.		T & L Pulleys, Ins.	Wght., Lbs.	Price
Diam.	Stroke					Suction	Discharge			
1½	3	3.5-5	51-73	.35-.5	.069	1½	1½	12x2½	235	\$ 85.00
2	4	12	74	1.2	.163	1½	1½	15x3	400	120.00
3	4	18-25	50-69	1.6-2	.367	2	2	15x3	750	180.00
3½	6	40-50-60	54-67-80	3.3-4.1-4.9	.75	2	2	20x3	1300	280.00
4	8	60-80	46-62	5-6	1.305	3	3	30x5	2775	430.00
5	8	80-100-125	40-50-62	6-7.5-9.5	2.041	4	4	30x6	4460	560.00
6	8	125-150-175	43-52-60	9.5-11-13	2.938	4	4	36x6	5150	660.00
7	10	150-175	41-48	11-13.3	3.67	5	5	36x6	6800	800.00
8	10	200-250-300	40-50-60	14.5-18.5-21	5.00	5	5	42x6	8600	1000.00

To determine H. P. for increase or decrease in pressure multiply H. P. in table by operating pressure divided by 100.

Style 966 Portable Electric Triplex Mine Pumps

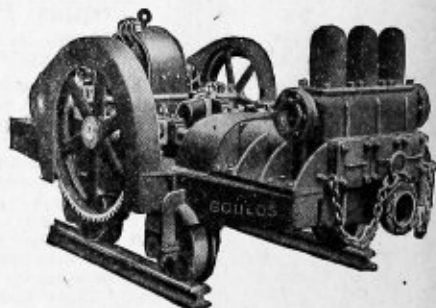
130 Pounds Working Pressure or 300 Feet Elevation
With Outside Packed Plungers

These pumps are of the horizontal triplex type designed for slopes, incline shafts or inside dips.

Made for any gauge of track—strong and compact. Three air chambers are used instead of one to reduce height. Any make of moisture-proof motor can be fitted. All working parts are provided with guards. Suction is taken from one end, but discharge can be taken from either side.

Crank shaft, pinion shaft and axle bearings babbitted. Pump and motor gears are iron—motor pinion bronze—all cut.

Connecting rods have strap and wedge adjustment with bronze boxes at crank end and bronze bushings at plunger end. Cylinders and valve boxes are in one casting; cylinders are bronze lined. Plungers phosphor bronze or hard iron as ordered. Glands, bronze lined or iron, as ordered—easy of access for adjustment and packing. Valves, rubber discs on bronze grid seats. Prices given include pump complete on truck, gearing necessary to connect to motor—but no motor. State gauge of track, height and current available.



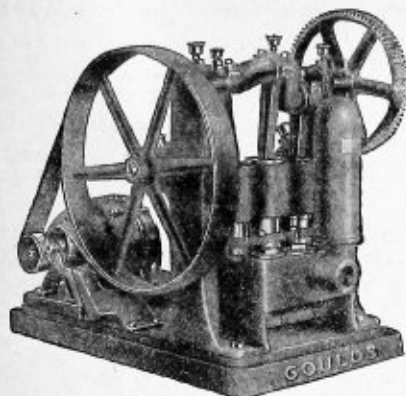
Size 6½x8

Size, Inches		Gallons Displaced per Minute	Speed R. P. M.	H. P. 100 Lbs. Pressure	Displacement one Rev. of Crank Shaft, Gallons	Geared	Weight, Pounds	Price Without Motor	
Diam.	Stroke							Iron	Bronze Fitted
4	6	50	52	4.12	.978	5 to 1	2100	\$ 473.00	\$ 635.00
4	6	65	67	5.35	.978	5 to 1	2100	473.00	635.00
5	8	100	49	8.25	2.041	5 to 1	4100	921.00	1126.00
5	8	125	62	10.3	2.041	5 to 1	4100	921.00	1126.00
6½	8	150	44	12.35	3.44	5 to 1	6500	1135.00	1521.00
6½	8	200	59	16.5	3.44	5 to 1	6500	1135.00	1521.00
8	8	250	48	20.7	5.22	5 to 1	7900	1353.00	1956.00
8	8	300	58	24.8	5.22	5 to 1	7900	1353.00	1956.00

To determine H. P. for increase or decrease in pressure multiply H. P. in table by operating pressure divided by 100.

Onoko Babbitt in your journals will show a profit on your ledger.

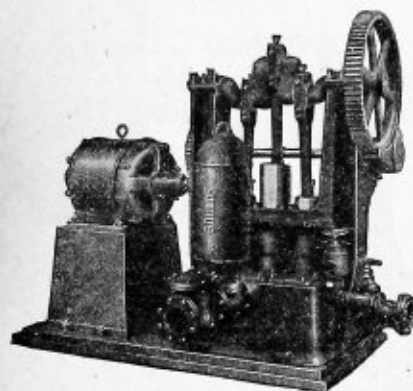
Forms of Triplex Pump Drives and Controls



Form "A" Drive, No. 1009 Pump

Form "A" Drive

An efficient form of short belt drive, consisting of bed-plate, idler, belt and driving pulley for belted connection to electric motor. Sizes $3\frac{1}{2} \times 4$ and smaller are regularly fitted with rawhide pump pinion; larger sizes to order.



Form "C" Drive and Control "K"
No. 924 Pump

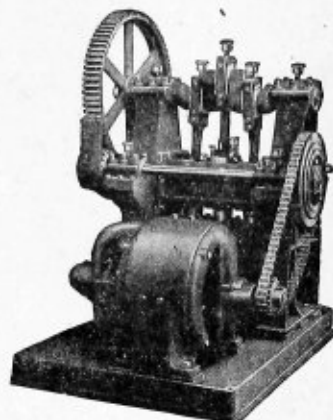
Form "C" Drive

Consists of intermediate gearing, rawhide pinion and bed-plate for geared connection to motor.

Control "K"

Consists of by-pass with gate-valve, discharge check valve and relief valve. In boiler feeding pump is usually run at a constant speed, delivering enough water to supply the maximum demand, though the actual quantity required may vary.

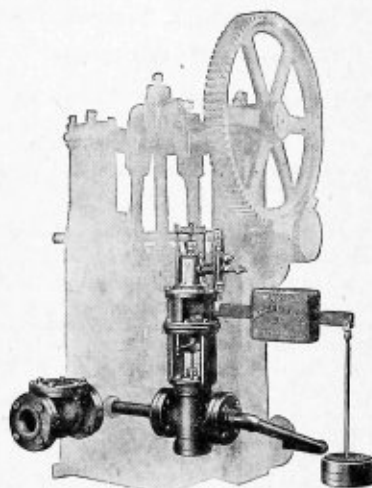
By means of a gate valve in the by-pass the feed may be regulated, the surplus water returning to the source of supply.



Form "N" Drive, Silent Chain

Form "N" Drive

Consists of silent chain with sprockets and cast iron bed-plate to order for connection to electric motor.



Showing Control "L"

Control "L"

Consists of an automatic pressure regulator and by-pass which may be used when the demand on the pump is practically constant.

The pressure on the pump is controlled by the pressure in a compression tank. The regulator is adjusted to open the by-pass valve when the limit pressure is reached. When the pressure begins to drop, the by-pass closes and the pump discharges into the tank.

Other Drives

These pumps can also be furnished with other styles of drive—such as standard long belt drive; by means of friction cut-off coupling to gas engine or by flexible coupling to steam engine.

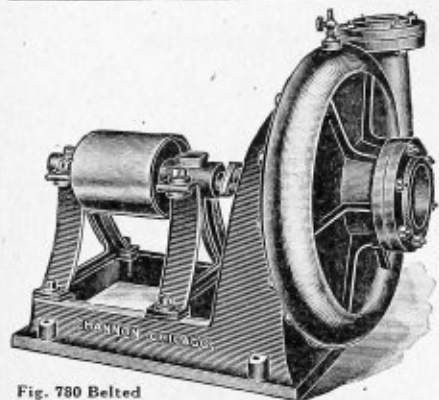


Fig. 780 Belted

Channon Centrifugal Pumps

Contractors' Type—Side-Suction—Heads up to 50 Feet

This is a very popular pump for contract and other work, as it is extremely simple, will handle large quantities of water, is not affected by mud or grit and will pump a fair percentage of sand and other foreign matter without appreciable wear. There are no valves of any kind to get out of order.

Pump consists of the case or shell with one moving part—the runner or impeller—revolving inside of it.

The inside of the shell is machine finished and the runner is also machined and accurately fitted to it, giving a close running fit and greater efficiency than with the old style split case pumps.

Discharge may be adjusted at any angle.

Pumps hot or cold liquids equally well.

No expensive foundations are required, as the pump receives the liquid without shock or jar and delivers it in a continuous steady stream.

Hand Suction Primer, shown at left, can be furnished if desired at extra price, though an ordinary hand pitcher pump may be used for the purpose.



Hand Primer

Size No.	Disch. Pipe, Ins.	Suct. Pipe, Ins.	Capacity, Gals. per Minute	Belt Pulley, Inches	Std. Speeds		Approx. Wt., Lbs. Fig. 780	Extra for Hand Primer	Price Std. Pump Fig. 780
					10-foot Head	20-foot Head			
1½	1½	2	75	4x4	785	1000	100	\$15.00	\$ 45.00
2	2	3	125	6x6	445	575	240	20.00	75.00
3	3	4	265	7x8	350	475	385	25.00	110.00
4	4	5	475	10x8	390	495	475	30.00	130.00
6	6	8	1060	14x12	300	385	1150	45.00	225.00

Class A and E Single Stage Centrifugal Pumps

Horizontal—Belt Driven

Class "A"—

Low pressure—single stage. For total heads up to 65 feet.

Class "E"—

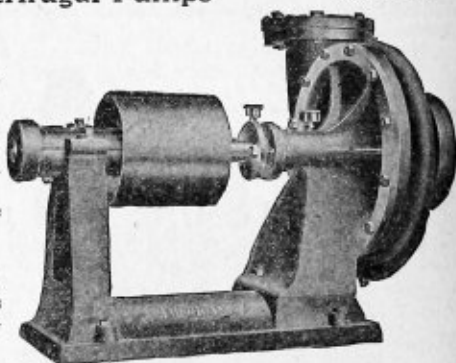
High pressure—single stage. For total heads up to 125 feet.

These pumps are of the volute type and highly efficient. Flow lines are reduced to the easiest possible curves, with least cavitation.

The Class E pumps have ball-bearing end-thrust, while the Class A has plain collar.

Brass fitted or all brass pumps quoted on request.

Below we are giving partial horse power table for reference, but the horse power depends upon the quantity of water as well as the head and care should be exercised on all installations. We supply full data upon receipt of information.



Horse Power Table

Pump No.	1½	2	2½	3	3½	4	5	6	7	8	10	12
10-ft. head, B. H. P.	.39	.61	.79	1.08	1.30	1.89	2.99	3.65	4.52	7.5	10.9	14.28
15-ft. head, B. H. P.	.62	.92	1.27	1.84	2.31	3.04	4.88	5.98	7.38	11.5	16.8	22.1
20-ft. head, B. H. P.	.87	1.25	1.77	2.60	3.49	4.37	6.82	8.22	10.52	15.9	23.7	30.7
30-ft. head, B. H. P.	1.31	1.87	2.57	3.68	4.87	6.31	9.54	13.1	17.2	25.0	36.9	49.4
40-ft. head, B. H. P.	1.74	2.50	3.42	4.91	6.5	8.28	12.1	17.2	23.5	33.9	50.0	67.2

Hand Primers can be furnished at same prices as quoted for pumps shown above.

Diameter Discharge, Inches	Diameter Suction, Inches	Capacity per Minute, U. S. Gals.	Standard Pulley, Inches	Std. Speeds		Approx. Weight, Pounds	Class "A"		Class "E"	
				10-ft. Head	20-ft. Head		No.	Price Each	No.	Price Each
1	1½	10 to 35	3½x8 2½	1050	1400	45	1 A	\$ 30.00	1 E	\$ 36.00
1½	1½	30 to 80	4 x 3	840	1155	100	1½ A	42.50	1½ E	49.50
1½	2	40 to 150	4 x 4	560	770	140	1½ A	50.50	1½ E	57.50
2	2½	60 to 195	4 x 4	575	780	160	2 A	75.00	2 E	82.00
2½	3	110 to 385	6 x 6	430	600	230	2½ A	90.00	2½ E	100.00
3	4	135 to 470	7 x 8	485	660	260	3 A	110.00	3 E	120.00
3½	5	225 to 720	7 x 8	440	570	360	3½ A	120.00	3½ E	130.00
4	6	250 to 845	8 x 8	445	595	420	4 A	130.00	4 E	140.00
5	7	350 to 1200	9 x 10	400	540	680	5 A	165.00	5 E	180.00
6	8	400 to 1350	10 x 10	410	540	725	6 A	200.00	6 E	220.00
7	8	600 to 2200	12 x 12	395	535	1150	7 A	260.00	7 E	290.00
8	10	800 to 2600	14 x 12	345	435	1280	8 A	310.00	8 E	340.00
10	12	1100 to 3950	16 x 16	275	355	2200	10 A	444.00	10 E	484.00
12	15	1500 to 5800	20 x 16	275	360	2420	12 A	560.00	12 E	600.00
15	15	2900 to 8800	24 x 16	275	358	3040	15 A	956.00	15 E	1000.00

Sizes smaller than 2-inch have screwed connections. Larger sizes upon request.

When asking for information be sure to give all conditions.

Centrifugal Sand and Gravel Dredging Pumps

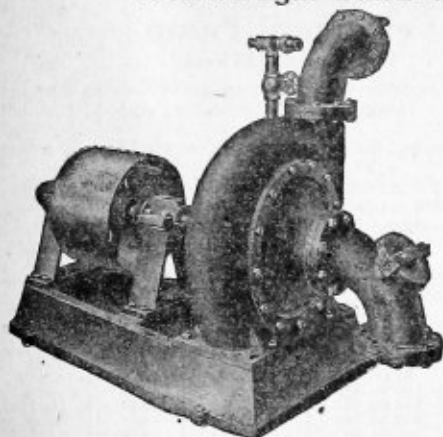


Fig. 1005—Standard Belted Pump

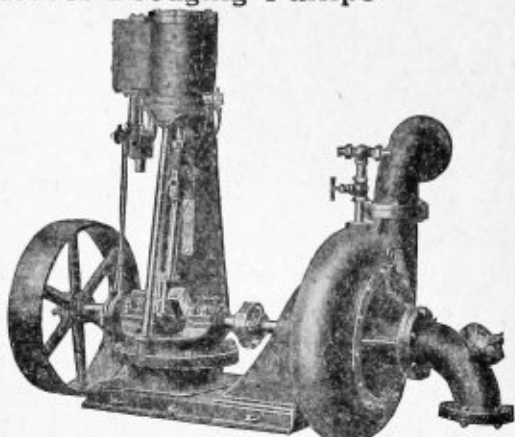


Fig. 1010G—Direct Connected to Steam Engine

Dredging by means of the centrifugal pump is a well established successful method—the high velocity of the sand and gravel passing through the pump disintegrates all earth and decayed stone which passes off with the water. This style of pump is largely used by bridge and railroad contractors for pumping out caissons where the water contains sand, coal, decayed vegetation, etc., which would make the ordinary plunger pump or even a centrifugal water pump unsuitable. All stuffing boxes are tapped for water connection and have water sealing ring fitted with grease connection.

Standard Belt Driven Pumps

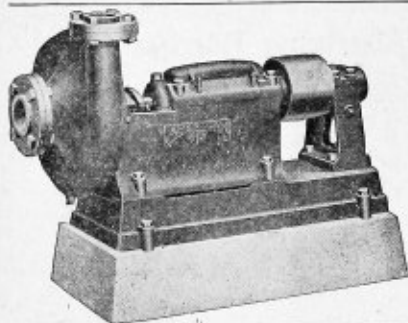
No.	Diameter Suction and Discharge, Inches	Capacity Cu. Yds. per Hour When Material Is Free and Easily Handled			Brake H. P. for Each 10 Feet of Head	Diam. of Largest Solids Will Pass, Inches	Size of Pulley, Ins.	Approx. Floor Space, Inches	Approx. Weight, Pounds	Prices with Suction and Discharge Elbows, Flap Valve and Steam Primer	
		10% Solids	15% Solids	20% Solids						Std. Iron Pump	Pump with Cast Steel Shell Runner and Suction Head
304	4	15	22	30	4	2 1/2	10x10	42x18	850	\$ 140.00	\$ 190.00
305	5	20	30	40	6	2 1/2	12x12	48x25	1250	180.00	270.00
306	6	30	45	60	8	4	18x12	54x30	1650	280.00	380.00
307	8	62	94	125	15	6	20x12	66x44	2900	380.00	600.00
308	8	62	94	125	15	6	24x12	70x48	3800	440.00	680.00
309	10	100	150	200	25	8	30x14	75x46	5000	540.00	800.00
310	12	150	225	300	30	10	40x16	95x50	7500	830.00	1300.00
311	12	150	225	300	30	10	40x16	108x58	11000	1300.00	1700.00
312	15	225	337	450	50	10	44x24	108x60	15000	1850.00	2400.00
313	18	300	450	600	70	10	50x30	160x96	18000	2200.00	3000.00

Direct Connected Steam Driven Outfits

No.	Diameter Suction and Discharge, Inches	Maximum Total Head, Feet	Size of Steam Engine	Capacity Cubic Yards per Hour When Material Is Free and Easily Handled			Diam. of Largest Solids Will Pass, Inches	Approx. Weight, Pounds	Price of Standard Iron Pump	Price of Pump with Shell, Runner and Suct. Head of Cast Steel
				10% Solids	15% Solids	20% Solids				
314	4	12	5x 5 Single	15	22	30	2 1/2	1700	\$ 375.00	\$ 460.00
315	4	20	6x 6 Single	15	22	30	2 1/2	2000	440.00	570.00
316	4	25	5x 5 Double	15	22	30	2 1/2	2700	600.00	700.00
317	5	10	6x 6 Single	20	30	40	2 1/2	1850	400.00	490.00
318	6	12	6x 6 Single	30	45	60	4	2250	490.00	625.00
319	6	18	7x 7 Single	30	45	60	4	3100	550.00	700.00
320	6	25	6x 6 Double	30	45	60	4	3500	860.00	1000.00
321	8	12	9x 9 Single	62	94	125	6	5000	870.00	1125.00
322	8	20	7x 7 Double	62	94	125	6	6100	1100.00	1350.00
323	8	25	10x 9 Single	62	94	125	6	9000	1350.00	1650.00
324	8	35	9x 8 Double	62	94	125	6	14000	2000.00	2300.00
325	10	15	10x 9 Single	100	150	200	8	7000	1020.00	1250.00
326	10	22	9x 8 Double	100	150	200	8	9500	1500.00	1800.00
327	10	35	10x10 Double	100	150	200	8	18000	2800.00	3100.00

Sand Pump Revolution Table

No. Pump	Size of Pump	Total Head in Feet									
		10	15	20	25	30	35	40	45	50	55
304	4	581	652	715	771	824	872	918	963	1002	1043
305	5	516	581	636	686	733	776	816	856	892	927
306	6	465	523	573	618	659	699	735	771	803	834
307	8	387	436	477	515	549	581	611	641	669	695
308	8	332	374	409	441	470	499	524	550	573	595
309	10	310	350	382	412	440	465	489	514	535	556
310	12	258	290	318	344	368	388	408	428	448	464
311	12	211	237	260	280	300	318	334	350	364	379



Class P—Single Stage Centrifugal Pump

Heads up to 125 Feet

With bearings entirely removed from the volute chamber and so designed that it is impossible for the water pumped to get into them.

Especially designed for pumping water containing sand or fine grit.

The bearings are very wide. The shaft is carried on two ring-oiler bearings with removable split liners. Between these two bearings is a ball thrust bearing for end thrust.

The gland is water-sealed and provided with drip pocket. Pump is of very rigid design.

No.	Price Iron Pump	Approximate Weight, Pounds	Diameter Discharge, Inches	Diameter Suction, Inches	Capacity per Minute, U. S. Gals.	Standard Pulley, Inches	Standard Speeds	
							10-foot Head	20-foot Head
1½	\$190.00	325	1½	2	40 to 150	4x 4	560	770
2½	195.00	355	2	2½	60 to 195	4x 4	575	780
3	200.00	475	2½	3	110 to 385	6x 6	430	600
3½	210.00	525	3	4	135 to 470	7x 6	485	660
4	250.00	675	3½	5	225 to 720	7x 8	440	570
5	265.00	750	4	6	250 to 845	8x 8	445	595
6	375.00	1100	5	7	350 to 1200	9x10	400	540
6	385.00	1200	6	8	400 to 1350	10x10	410	540

Larger sizes, motor driven, etc., quoted upon request.

Special Pumps

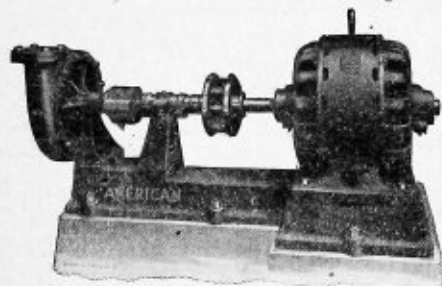


Fig. 1921. Single stage, horizontal, direct connected by flexible shaft coupling to motor. Heads up to 125 feet.

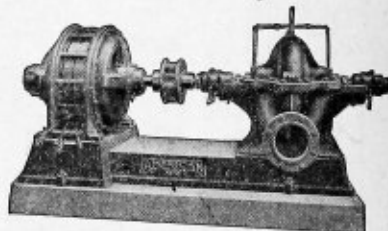


Fig. 1002. High pressure, double suction, enclosed runner, horizontal split volute, single stage, direct connected to electric motor.

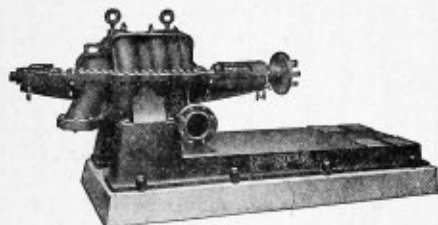


Fig. 1003. High pressure multiple stage pump with horizontally split volute, enclosed runner on base for motor drive. Shows three stage pump for 375-ft. head.



Fig. 1018. Double suction drainage pumps, 20 to 60-inch. Belted or arranged for direct engine connection.

When inquiring for special pumps—be sure to state capacity desired, both vertical and horizontal distance in feet, giving vertical distance from level of water to point of discharge, give length of suction pipe, also total number of elbows, valves and other fittings; state whether liquid contains alkali or acid and whether free from grit or sediment; state kind of power used; if electrical, give voltage, phases and cycles.

We have Pumps for every Requirement.

Fig. 900—Steam Driven Centrifugal Pumps

These outfits are compact and portable and used where but little elevation is required 20 to 30 feet maximum head.

No. Pump	Heads Up to, Feet	Capacity, Gallons	Size Pipe, Inches		Size of Engine		Price Each
			Discharge	Suction	Diameter	Stroke	
2	15	120	2	3	3 1/2	3 1/2	\$220.00
2 1/2	20	185	2 1/2	3 1/2	3 1/2	3 1/2	240.00
3	25	265	3	4	4 1/2	5	270.00
4	25	470	4	5	4 1/2	5	320.00
5	20	735	5	6	5	7 1/2	380.00
5	30	735	5	6	6	7 1/2	400.00
6	25	1060	6	8	6	7 1/2	440.00
8	25	2000	8	10	7 1/2	9	630.00
10	30	3000	10	12	10	10	1225.00

Steam ejector for priming is not included in price.

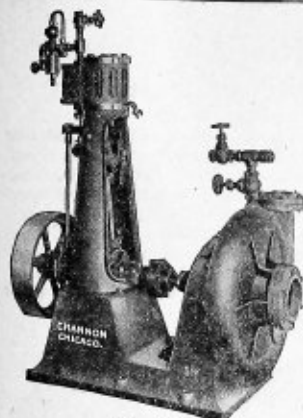


Fig. 900

Fig. 901—Gasoline Driven Centrifugal Pumps

Heads 20 to 25 Feet

A light and compact unit consisting of Class A horizontal centrifugal pump direct connected to a simple, sturdy gasoline engine.

No.	Capacity, Gallons per Minute	Size of Pump		H. P. of Engine	Approx. Weight, Pounds	Price
		Discharge, Inches	Suction, Inches			
1 AG	125	2	2 1/2	2	310	\$166.70
2 AG	265	3	4	3	500	233.35
3 AG	475	4	6	5	700	286.70
4 AG	750	5	7	10	1200	546.70
5 AG	1100	6	8	12	1700	653.35
6 AG	1500	7	9	20	1900	933.35

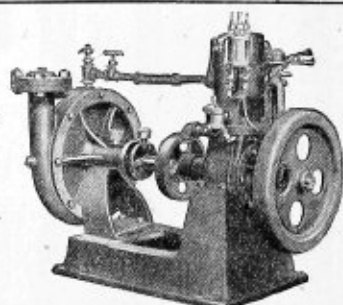


Fig. 901

Vertical Centrifugal Pumps

Type C.—Low pressure, single stage, vertical shaft, centrifugal pump, with ball bearings and stuffing box. Usually installed above water level. Pump is regularly furnished with flanged coupling, but clutch coupling can be supplied for special conditions. For total heads up to 50 feet.

Type G.—High pressure, single stage, vertical shaft, centrifugal pump, with ball bearings and stuffing box. When submerged, couplings and ball bearings are arranged as the submerged Type C. For total heads up to 100 feet.

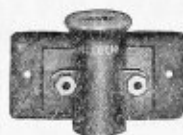
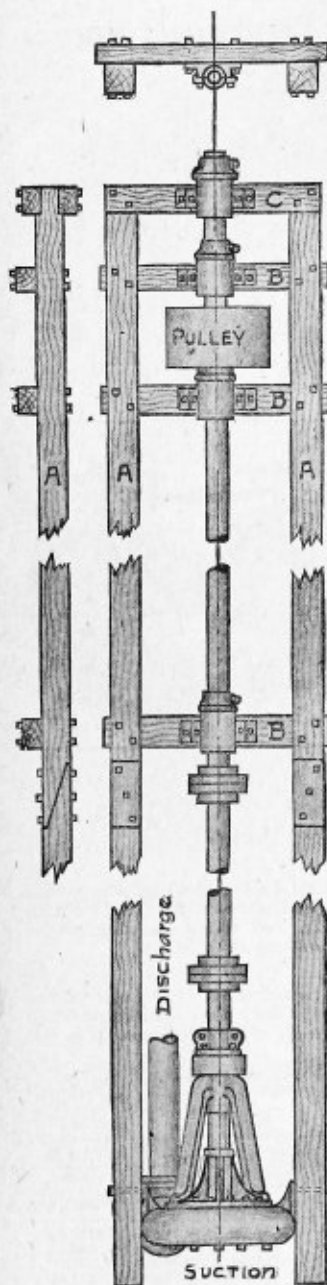


Size No.	Capacity per Min., U. S. Gals.	Discharge, Inches	Suction, Inches	Standard Pulley, Inches	Std. Speeds		Approx. Weight, Pounds	Type C		Type E	Type G
					10-ft. Head	20-ft. Head		Iron, Price Each	Brass, Fitted, Price Each	Iron, Price Each	Brass Fitted, Price Each
1 1/2	75	1 1/2	2	4x 6	560	770	125	\$ 75.00	\$ 90.00	\$ 89.00	\$104.00
2	125	2	2 1/2	4x 6	575	780	175	94.00	109.00	115.00	130.00
2 1/2	200	2 1/2	3	6x10	430	600	210	112.00	134.00	140.00	162.00
3	265	3	4	7x 9	485	660	275	137.50	159.50	172.00	194.00
3 1/2	410	3 1/2	5	7x14	440	570	370	160.00	180.00	188.00	216.00
4	500	4	5	8x13	445	595	410	162.00	192.00	202.00	232.00
5	750	5	7	9x16	400	540	560	205.00	258.00	257.50	309.50
6	900	6	8	10x18	410	540	630	250.00	302.00	312.00	364.00
7	1350	7	9	12x20	295	395	1215	325.00	405.00	410.00	490.00
8	1600	8	10	14x22	433	1280	1275	388.00	468.00	485.00	565.00

We have pumps for every requirement

Arrangement of Shafting for Driving Our Vertical Centrifugal Pumps

The illustration on this page shows the usual arrangement of shafting to drive our vertical centrifugal pumps in deep pits, trenches, etc. Each length of shaft is provided with two bearings and the set collars so placed above each bearing that the weight of each section of shafting is carried on its own bearings, thus removing the weight of shaft from the pump. Jaw couplings connect ends of the shaft. The standard length of each section of shaft is 20 feet. Shorter lengths can be supplied as needed. Great care should be taken to see that the shafting is properly lined up with the pump, as most difficulties experienced with vertical pumps are caused by improper setting of the pump and shafting.



Split Bearing



Set Collar



Jaw Coupling

Prices Shafting, Couplings and Bearings

No. of Pump	Diameter of Shaft	Price Shaft, per Lb.	Price Split Bearings, Each	Jaw Couplings		Price Set Collars, Each
				Fitted Each	Not Fitted, Each	
1½	1½	\$0.05½	\$3.00	\$10.00	\$ 7.00	\$0.75
2	1½	.05½	3.00	10.00	7.00	.75
2½	1½	.05½	3.00	10.00	7.00	.75
3	1½	.05½	3.00	10.00	7.00	.75
3½	1½	.05½	3.25	12.00	8.00	1.00
4	1½	.05½	3.25	12.00	8.00	1.00
5	1½	.05	3.75	12.75	8.50	1.20
6	1½	.05	3.75	12.75	8.50	1.20
8	1½	.05	5.00	13.50	9.00	1.40
10	2½	.05	6.25	15.75	11.25	1.60
12	2½	.05	6.25	15.75	11.25	1.60
15	2½	.05	6.25	15.75	11.25	1.60

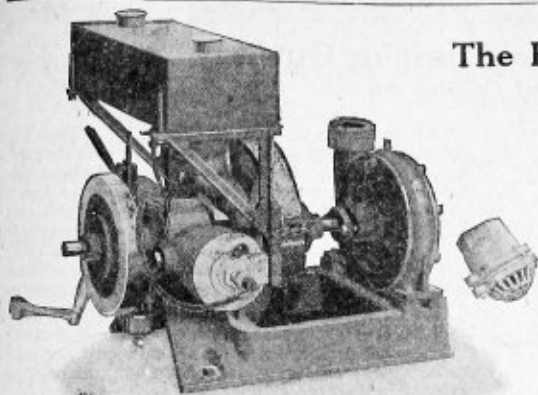
Sizes of Timber

No. of Pump	Diameter of Shaft	Pulley		Size of Timbers, Inches		
		Diameter	Face	A	B	C
1½	1½	4	4	4x4	2x4	2x4
2	1½	4	4	4x4	2x4	2x4
2½	1½	6	6	4x4	4x4	2x4
3	1½	7	6	4x4	4x4	2x4
3½	1½	7	8	4x4	4x4	2x6
4	1½	8	8	4x4	4x4	2x6
5	1½	9	10	6x6	4x4	2x6
6	1½	10	10	6x6	4x4	2x6
8	1½	14	12	6x6	4x6	4x6
10	2½	16	16	8x8	4x8	4x8
12	2½	20	16	8x8	4x8	4x8
15	2½	24	16	8x8	4x8	4x8

Fig. 791—Submerged Type on Timber Frame

The Pormo Portable Pumping Unit

Runs on Gasoline or Kerosene Heads
20 to 25 Feet



A light, compact, air cooled engine, direct connected to a centrifugal pump, high tension built-in flywheel magneto, two cylinder opposed type, non-vibrating.

By mounting this outfit on two skids it can readily be carried to any place on the job by two men.

Capacity, Gals. per Minute	Capacity of Pump		H. P. of Engine	Actual Weight, Pounds	Price
	Disch., Inches	Suction, Inches			
125	2	2 1/2	3	150	\$125.00
200	3	3 1/2	5	250	185.00

The Evinrude Unit Centrifugal Pump

It has but one moving part—the impeller. The large open passages and the absence of valves, sliding and reciprocating parts enables it to handle semi-fluids and water containing gritty or solid matter in large quantities at low cost.

Its low price, simplicity, compactness and low fuel cost have made it a very popular equipment. It requires only 17 1/2 x 24 inches floor space, weighs 133 pounds and can be easily handled by two men.

An engineer is not required to operate it. Any man on the job can do so. It is direct connected and no power is lost.

The ignition is built in the flywheel, and so insulated that the magneto cannot be affected even by a drenching rain.

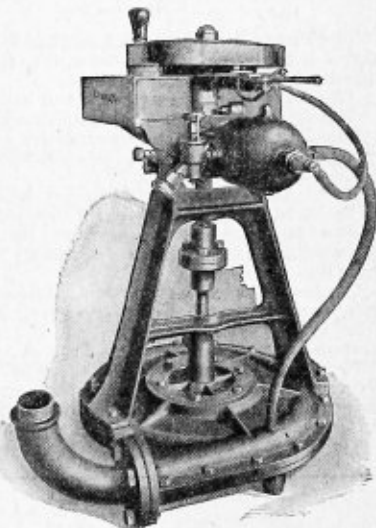
The lubricating oil is mixed with the gasoline, no oil cups are used. In the two horse power size one gallon of gasoline will run the pump for four hours.

The pump is set right down in the excavation and submerged in the water. No suction pipe—no priming. Start the motor with a half turn of the flywheel and the pump starts the water.

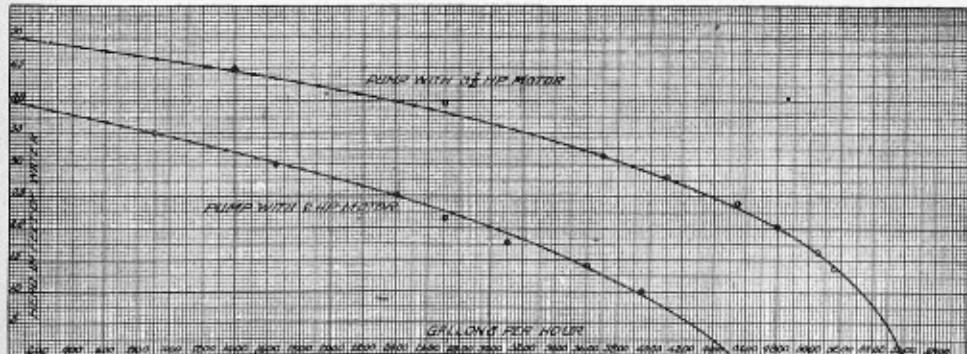
Average capacity of a 2 H. P. pump, 2400 gallons per minute against a 25-foot head.

Centrifugal pump, complete with 2 H. P. motor..... \$ 87.00
With 3 1/2 H. P. motor..... 140.00

Pump with 2 H. P. motor, net weight, 133 pounds; with 3 1/2 H. P. motor, 167 pounds.

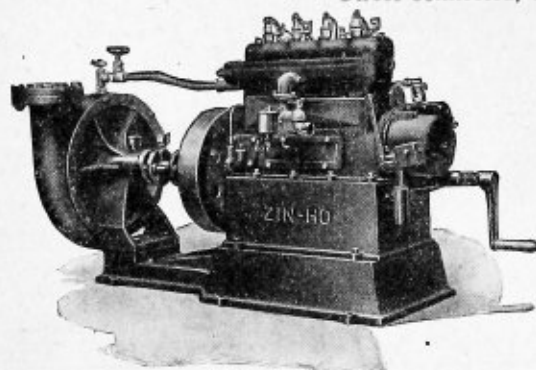


Capacity Curves of an Evinrude 1 1/2-inch Centrifugal Pump



Zin-Ho Centrifugal Pumping Outfit

Direct Connected, Gasoline Driven



Magnet Side

The Pump has 3-inch discharge and 4-inch suction and is equipped with a ball thrust bearing to take the end thrust of the runner. It is connected to the engine flywheel by means of an arm coupling, the whole being rigidly mounted on a substantial sub-base.

This is not a sand-pump but it will handle a small amount with the water.

May be fitted with foot valve so it may be primed. Supplied in brass lined or all brass at extra cost.

The Engine can be disconnected and used for other purposes, running a belt from the flywheel to a generator or to any machine desired to be operated. In this way it can be kept at work in case the pumping operation is not continuous.

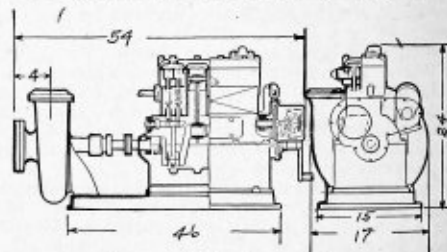
Every part is thoroughly tested before leaving the factory and is fully guaranteed to develop the full power and run steady. Any part proven to be defective will be replaced free of charge F. O. B. factory within one year from date of purchase.

Capacity 265 gallons per minute, 55-foot total head, 4-inch suction, 3-inch discharge, speed 1000 R. P. M., weight 550 pounds net.

List price.....\$347.00

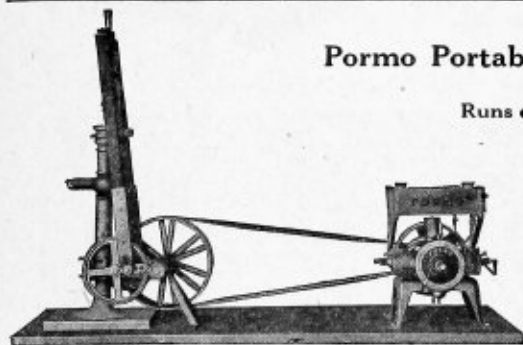
Regular equipment has cooling water pipe connected from pump to engine. Cooling tank or separate circulating pump charged extra. Extra charge for muffler if furnished.

The standard equipment as described is carried in stock at all times. Larger sizes built to order.



Pormo Portable General Utility Engine

Runs on Gasoline or Kerosene

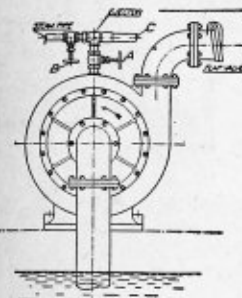


For operating pump standards with a light compact efficient engine. Two cylinder opposed type, air cooled. High tension built-in-flywheel magneto.

Owing to its light weight it is a very desirable engine to use for this work, as it may be removed by unscrewing four lag screws and used for sawing, churning, cream separating or general utility work.

No.	Horse Power	Speed, R. P. M.	Flywheel, Inches		Pulley, Inches		Floor Space, Inches		Height Over All, Inches	Shipping Weight Complete Pounds	Export Shipping Weight Complete Pounds	Price
			Diam.	Face	Diam.	Face	Length	Width				
3		600 to 2000	17	2	3 1/4	3	17	22	26	160	170	\$ 85.00
5		600 to 1600	22	2	4	2	24	34	32	185	195	130.00

Directions for Setting up and Operating Centrifugal Pumps



Cut A

Set the pump as close to the water as possible and arrange both suction and discharge pipes to use as few elbows as possible. Never set the pump more than 20 feet above the water.

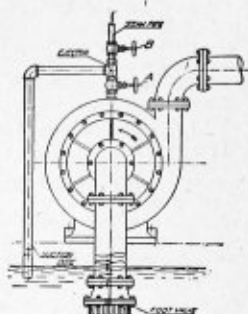
Warm water cannot be lifted as high by suction as cold water and very hot water must flow to the pump.

Be absolutely sure that every joint in the suction pipe is tight. Before starting, the pump and suction pipe must be entirely filled with water to prime the pump. The best method of doing this, if steam is at hand, is by means of an ejector and either a flap valve on the discharge or a foot valve on the suction. Cuts A and B show the arrangement and piping of the ejector in both cases. If a flap valve is used (Cut A), open the suction valve A and then the steam valve B. Allow the ejector to work until a good stream of water is discharged at C. Close the suction valve A, then the steam valve B and start the pump. Be sure to close valve A first.

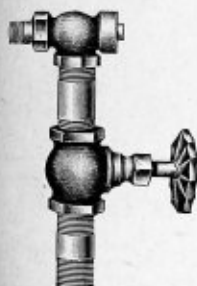
If a foot valve is used (Cut B), open the discharge valve A and then the steam valve B. Allow the ejector to work until the pump is entirely filled. Then close the valves and start the pump. If steam is not available, a foot valve as shown in cut B may be used and the pump filled at the opening in the top of the shell by means of a hose or by pouring in water.

On 8-inch and smaller pumps, a hand suction primer may be used, but we do not recommend it for sizes above 8 inches.

See that the pump runs in the direction of the spiral. Drain the pump in cold weather to prevent freezing, by unscrewing the plug in the bottom of the pump shell.



Cut B



Ejectors for Priming by Steam

No. Pump	No. Ejector	Diameter Steam Pipe, Inches	Diameter, Suct. and Disch., Inches	Price Ejector Complete with Valves	Price, Ejector Only
1 1/2	1	3/8	1/2	\$10.50	\$ 5.60
2	1	3/8	1/2	10.50	5.60
2 1/2	1	3/8	1/2	10.50	5.60
3	2	3/8	1/2	13.50	7.00
3 1/2	2	3/8	1/2	13.50	7.00
4	3	3/8	1/2	19.25	10.50
5	4	1	1 1/4	26.60	14.00
6	4	1	1 1/4	26.60	14.00
8	5	1	1 1/4	31.50	17.50
10	5	1	1 1/2	31.50	17.50
12	6	1 1/4	2	45.50	24.50
15	6	1 3/4	2	45.50	24.50

Inside Flap Valves



Faced and Drilled A. S. M. E. Standard

Size, ins. 6 8 10 12
Price each \$30.00 \$50.00 \$70.00 \$100.00



Hand Primers

Iron body. Leather valves.

Size, Inches	Price Each
4	\$30.00
5	36.00
6	40.00
8	55.00
10	75.00
12	85.00

Standard Foot Valves

Iron body. With strainer.
Leather disc.

Size, Inches	Price Each
2	\$ 2.40
3	3.90
4	7.30
5	11.25
6	14.75
8	41.00



Style 7 to 16-inch

Standard Straight-way Valves

Quick Opening

Iron body. Brass trimmings. Wedge gate. Sliding stem.

Size, Inches	Price Each
4	\$ 34.00
5	45.00
6	52.00
8	84.00
10	127.00
12	168.00

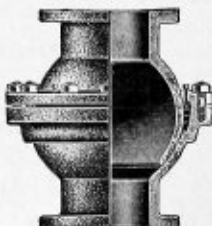


Flexible Joints

Flange Ends

Flanges feed. For steam and water.

Size, Inches	List Price Each
4	\$ 45.00
5	52.00
6	58.50
8	100.00
10	132.00
12	164.50



Electric Centrifugal Pumps

Or Automatic Sewage Ejectors

Entirely automatic, and as the pump is constantly submerged, no priming is necessary. The motor is controlled by a float which starts automatically when the liquid reaches a given height in the pit and stops when it is empty. The pump, discharge pipe, etc., are supported from the pit cover and all parts can be inspected or removed by simply lifting this cover. The pit may be of iron, brick or concrete.

We are prepared to furnish pumps of **any capacity** to suit **any conditions**.

Inquiries should state the character and amount of liquid to be pumped, the diameter and depth of pit, total height and distance to point of discharge.

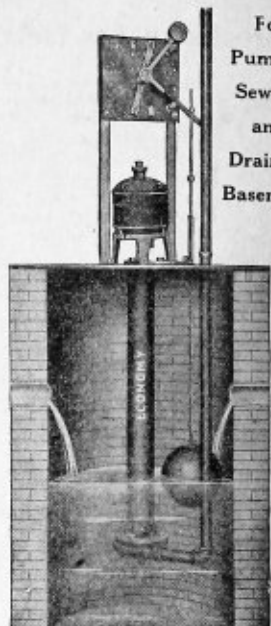
Regular construction includes pump and pit cover, for pit 5 feet deep, together with motor and float switch which can be mounted on adjacent wall or on the cover plate.

Specifications and Prices

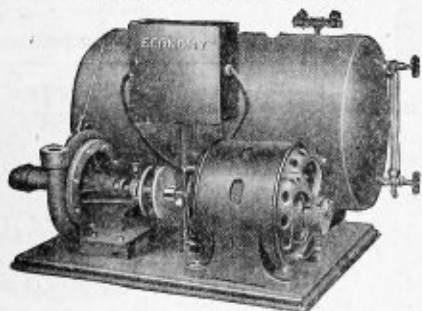
Based on pumping against a total head of 15 feet.

Gals. per Min.	Discharge Opening, Inches	Horse Power of Motor	Approx. Shipping Weight, Pounds	110-220 Volts, D. C. Motor	110-220 440-550 Volts, 2 or 3 Phase 60 Cycle A. C. Motor	110-220 440-550 Volts, Single Phase 60 Cycle A. C. Motor
10	1	$\frac{1}{4}$	225	\$140.00	\$140.00	\$146.75
25	$1\frac{1}{2}$	$\frac{1}{2}$	650	246.75	286.75	300.00
50	$1\frac{1}{2}$	$\frac{3}{4}$	570	226.75	253.50	266.75
75	$1\frac{1}{2}$	$\frac{3}{4}$	650	233.50	260.00	273.50
100	2	2	640	386.75	393.50	333.50
150	$2\frac{1}{2}$	3	750	480.00	486.75	553.50
200	3	5	1025	673.50	660.00	800.00
400	4	$7\frac{1}{2}$	1450	886.75	860.00	1000.00
500	5	10	1800	966.75	1133.50	1193.50

For
Pumping
Sewage
and
Draining
Basements



Electric Automatic Condensation Boiler Feed Pump and Receiver



Automatically handles the condensation in heating systems, separates the air from the water, venting the air and returning the water to boiler at high temperature. By quickening the circulation of steam through entire system it effects a considerable saving in heat units.

A unit consists of receiving tank, centrifugal pump and automatic switch.

The switch is simple and durable, 1, 2 or 3-pole, no trunnions, weights or pulleys used in its construction. Automatically starts the motor when condensation reaches a predetermined point in the tank and stops when water has been discharged into boiler.

No.	Sq. Ft. Direct Radiation Will Drain	H. P. Req. to Operate Against 10-lb. Boiler Pres.	2 or 3 Phase 60 Cycle A. C. Motor	Single Phase 60 Cycle A. C. Motor	D. C. Compound Motor
6	2000	$\frac{1}{4}$	\$246.75	\$266.75	\$260.00
7	5000	$\frac{1}{2}$	273.50	300.00	286.75
8	10000	1	286.75	313.50	293.50
9	25000	2	353.50	386.75	366.75
10	Built special to meet any condition.				

Centrifugal Mine Sinker Pumps



The pump is direct connected to vertical type motor which is protected from dripping water or falling rock by a metal hood.

The pump is suspended by rope, chain or cable and lowered as the shaft progresses.

It is very compactly built and mounted with motor in a rectangular channel frame.

We are prepared to furnish these outfits of any capacity and to suit any conditions.

Prices on application.

The "Emerson" Quick-Cleaning Strainer and Foot Valve

It is never necessary to take up suction pipe to clean strainer. No hinges or springs to get out of order. Applied to suction of any pump. Intake areas largely exceed size of pipe. Cannot cock or clog the valve. Strainer always seats itself properly. Easy to clean and keep clean.

The strainer is made of heavy perforated flange steel, the perforations being 7-16 inches in diameter in all sizes above four inches, and is riveted to a substantial top casting having a collar that fits loosely around the suction pipe, so that it can slide up and down without cramping, and the suction pipe acts as a guide. It is raised and lowered by the ropes, as shown.

The foot valve operates freely in guides cast into the valve body, making it possible to get large and generous openings through the valve with only a low lift of the gate, which prevents hammering and shocks.



Strainer Partially
Raised For
Cleaning

Suction Pipe, Inches	Price of Foot Valve and Strainer Complete.	Price of Strainer without Foot Valve
2	\$ 14.00	\$ 7.00
2½	15.00	7.50
3	18.00	9.00
3½	20.00	10.00
4	23.00	11.50
5	30.00	15.00
6	38.00	19.00
7	45.00	22.50
8	55.00	27.50
10	90.00	45.00
12	120.00	60.00
14	180.00	90.00
16	200.00	100.00
18	250.00	125.00
20	275.00	137.50
24	425.00	212.50

If Foot Valve only is wanted, the list price is 75% of Foot Valve and Strainer complete.

Standard Iron Foot Valves with Strainers

Tested to 100 pounds Hydraulic Pressure



Screwed
Pattern

Size, Inches	Price Screwed, Each	Price Flanged, Each	Size, Inches	Price Screwed, Each	Price Flanged, Each
¾	\$1.15	.....	4	\$ 7.30	\$ 9.50
1	1.30	.....	4½	10.50	13.00
1¼	1.40	.....	5	11.25	14.00
1½	1.90	.....	6	14.75	17.50
2	2.40	\$3.50	7	35.00	38.00
2½	3.30	4.50	8	41.00	45.00
3	3.90	5.75	10	64.00	70.00
3½	5.60	7.50	12	100.00	112.00

Suction Hose Strainers

Black Cast Iron



Size, Inches	Price	Size, Inches	Price	Size, Inches	Price
1	\$0.22	2½	\$0.80	5	\$2.40
1¼	.29	3	1.05	6	3.40
1½	.40	3½	1.70	7	5.00
2	.54	4	1.90	8	6.60

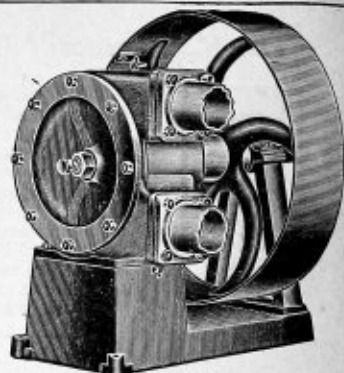
"Viking" Rotary Pumps

Elevations up to 150 Feet—Requires no Priming

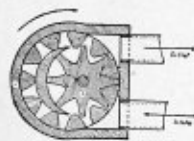
It has a positive action and a wide range of speeds. May be run in either direction and either port may be used for suction.

Referring to the sectional view shown—pump consists of two gears—the only moving parts—one, the outside or annular gear, revolves within the casing and is driven by the power pulley. The smaller gear, driven by the larger or internal gear, is set off center and meshes so that its outer circle is tangent to the outer circle of the larger gear at the center of the abutment or crescent shaped piece between the inlet or outlet. The crescent projection fills the space between the outer circle of the small gear and the inner circle of the large gear. The head and crescent projections are cast in one piece which also carries the spindle or shaft for carrying the smaller or idler gear.

After the water enters the pump it is carried around the pockets formed by the spurs of both gears and the crescent shaped abutment. When the gears begin to mesh, the water is forced into the discharge port. The crescent shaped abutment between ports then prevents its passage back into the entrance port, so that it must go on into the discharge pipe.



No. 4 Pump



Sectional View

	Weight	G. P. M.	R. P. M.	Price Iron	Brass Fitted	All Brass
3/4-inch connections pump complete.....	3	2 1/2	1800			\$ 13.50
1-inch connections pump complete.....	10	5	1200	\$ 20.00	\$ 25.00	27.00
1 1/2-inch connections pump complete.....	25	10	1200	27.00	33.50	40.00
2-inch connections pump complete.....	75	20	450	37.00	50.00	63.50
1-inch connections, sanitary.....	75	20	450	47.00	60.00	80.00
1 1/2-inch con. water and brine Style B.....	100	35	400	51.00	67.00	93.50
1 1/2-inch con. sanitary Style C.....	100	35	400	60.00	73.50	100.00
2-inch con. pump complete, belt drive.....	160	90	390	73.50	100.00	133.50
3-inch connections, pump complete.....	700	300	300	153.50	233.00	400.00
4-inch connections, pump complete.....	800	450	260	187.00	262.00	433.00
8-inch connections, pump complete.....	2000	1050	150	367.00		

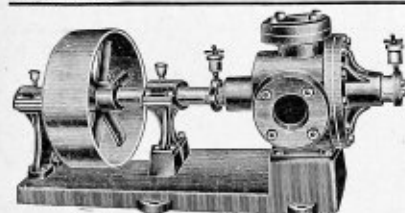
Special Oil Outfits

Single pumps, capacity 100 G. P. M., without power units. Price iron, \$113.50. Brass fitted..... \$133.50

Double pumps, capacity 100 G. P. M., each, gears and clutches, will operate with gasoline engine or motor, without power unit. Price iron, \$180.00. All brass..... \$208.00

With motor or engine, price on application. Give electric current if direct or alternating.
Brass fitted are working parts brass. High pressure heads, motor base, and power unit for direct connected or gear driven, additional cost. Price on application.

Notes.—Repair parts are proportioned so it costs practically the same as a whole pump. All brass pumps have iron base, pulley and standard.



Style of Nos. 6 to 13 Pump

Blackmer Rotary Pumps

Pressures up to 100 Pounds

Referring to the interior view, "B" is the piston and "C" the buckets. As the piston revolves the buckets are thrown out against the inside of the casing. Buckets drop into the extension chamber—lower part of cylinder or casing—at left and pass to the right, drawing in at suction and forcing out at discharge port.

Wear is automatically taken up by the buckets until they are completely worn out.

Lined pumps have removable liners for the inside of the casing.

Pump No.	Pipe Connections	Size of Pulley	Rev. per Minute	Gals. per Minute	Suction Lift	Maximum Pressure	Shipping Weight	Floor Space	Price			
									Solid Iron	Solid Bronze	Iron Lined	Iron, Bronze Lined
1	3/4	6x2	500	12	10	75	45	10x21	\$ 30.00	\$ 47.50		
2	1	6x2	500	20	10	75	55	10x21	34.00	57.50		
3	1 1/2	10x2 1/2	400	35	12	75	120	12x31	47.00	88.00		
4	2	10x 3	400	50	12	100	130	12x31	59.00	101.50	\$ 75.00	\$109.00
6	2 1/2	16x 4	250	100	15	100	350	16x40	89.00	201.00	117.50	179.00
8	3 1/2	18x 6	200	200	18	100	500	18x52	118.00	282.00	183.00	329.00
10	5	30x10	175	350	20	75	1350	30x80	Lined only	352.00	On	
12	6	36x16	150	500	20	75	2500	36x90	Lined only	513.50	App't'n	
6 Sp'l	2	12x 4	250	100	15	40	260	14x36	62.50	135.00		
										Capacity in Lbs. per Hour		
11	3/2 or 1	4x 1	700	4 1/2	1 1/2	40	20	4x12		26.00	2200	
01	1	6x 2	500	16	8	40	45	8x16	31.00	45.00	8160	
02	1 1/2-1 1/2	10x 2	350	30	10	40	75	10x23	38.00	74.50	15300	
03	2	12x 4	200	80	12	40	240	12x33	76.50	161.50	10800	
9	1	Hand		12	5		40		21.50	46.50		
5	1 1/2	Hand		15	5		65		22.00	50.60		
7	2	Hand		25	8		125		41.00	94.50		



Interior View

Bronze quotations subject to market fluctuations of metal.
Bronze pumps upon request. Tight and loose pulleys are extra.

We have a pump for every requirement.

Power Rotary Force Pumps

Fig. 120

For Elevations Up to 100 Feet, Speeds Up to 150 R. P. M.

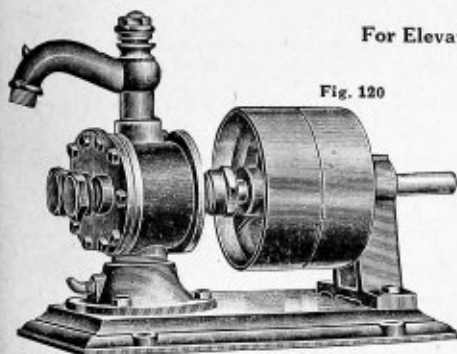


Fig. 120

This is the ordinary commercial rotary pump for intermittent work. Used largely for circulating purposes, and for creameries, dairies, refineries, factories, etc. Pumps a steady stream.

For discharging to an elevated tank, the cap on the top can be removed and placed on end of goose neck, and pipe connected to discharge straight up from pump.

For pumping acids, bronze pumps should be used, and when intended for hot liquids, should have metal check valves. Drip plugs are provided for draining pump in cold weather.



Showing Cams

Fig. 121

This is an improvement of the Fig. 120. It has both shafts extended through pump case, the four ends being supported by babbitted box bearings bolted to bed plate. This arrangement produces a much more durable and efficient pump, holding the cams in perfect alignment, and permitting of proper external lubrication. The suction may be taken at either side or underneath.

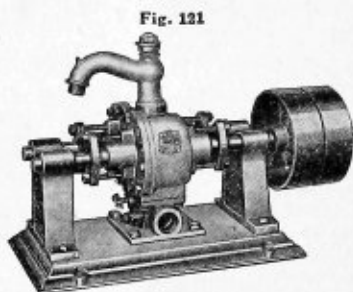
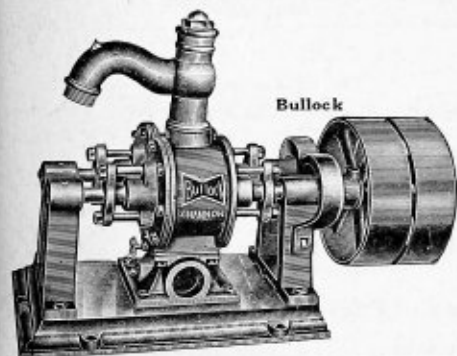


Fig. 121



Bullock

Bullock

For Elevations Up to 250 Feet or Equivalent Pressure. Speeds Up to 300 R. P. M.

Rotary pumps are popular, but one drawback of the cheaper varieties in the past has been their comparative short period of usefulness.

To overcome this, the Bullock pump is a still further development, exterior driving gears being added to relieve the strain and wear on the pumping cams. The driving gears are machine cut, and placed on the shaft between the outer bearings and pulleys, and are provided with gear guard.

Size No.	Cap'y at 100 R. P. M., Gals.	Piping, Inches		Size Pulleys, Ins.	Weight, Pounds			Prices								
		Suction	Discharge		Fig. 120	Fig. 121	Bullock	Fig. 120			Fig. 121			Bullock		
								Iron	Bronze Case & Cams	* Bronze	Iron	Bronze Case & Cams	* Bronze	Iron	Bronze Case & Cams	* Bronze
1	13	1¼	1	10x3	73	90	92	\$ 27.00	\$49.00	\$ 60.00	\$30.20	\$ 96.60	\$105.40	\$40.20	\$106.60	\$115.40
2	14	1¼	1	10x3	80	100	105	32.00	56.00	65.00	33.85	107.60	116.60	43.85	117.60	126.60
3	17	1½	1¼	10x3	90	110	115	38.00	63.00	75.00	42.75	125.40	134.40	52.75	135.40	144.40
4	27	1½	1½	12x3½	140	182	187	48.00	78.00	100.00	75.80	160.00	172.80	85.80	170.00	182.80
5	36	2	2	12x3½	150	190	195	54.00	90.00	120.00	82.40	180.00	195.20	92.40	190.00	205.20

*Bronze pumps have all parts coming in contact with liquid made of bronze.

†Figs. 121 and Bullock No. 4 pumps have 1 1/2 or 2-inch suction. No. 5 pumps have either, 2, 2 1/2 or 3-inch suction.

Shafts on Nos. 1, 2 and 3 are 1 1/8-inch diameter, Nos. 4 and 5, 1 1/4-inch diameter.

At a small additional cost these pumps can be especially fitted for pumping oils or gasoline.

Rotary Geared Circulating Pumps

For Oil or Water

Adapted for circulating cooling water on gasoline engines, for distributing oil on machine tools, etc. Very simple—just two accurately cut gears operating together in a machined and close fitting case. The cams or gears are milled to gauge on automatic machines. Regularly equipped with flanged pulley, as shown, but can be arranged with flat face pulley, sprocket or gear as desired.

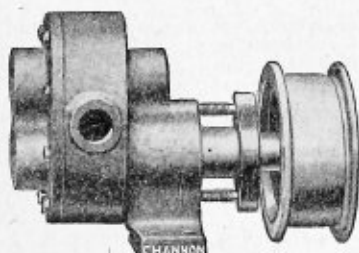


Fig. 2356

It permits supply being cut off at discharge without stopping pump and saves money because it is not necessary to buy an independent relief valve to complete circulating system.

To obtain best results, pump should be placed as near as possible to the level of oil in tank and a check valve and strainer used on suction pipe.

Fit these pumps to the machines you use—furnish them with the machines you make—and you'll never have trouble at this end of the circulating system.

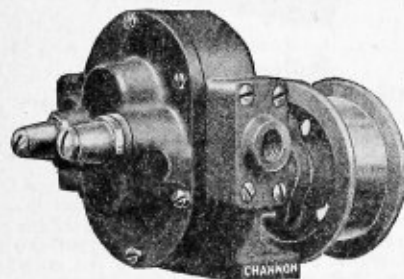


Fig. 1850

No.	Revs. per Minute	Capacity, Gallons per Minute	Suction and Disch. Con., Ins.	Flange Pulleys Size, Inches	Size of Drive Shaft, Inches	Wght., Lbs.	Price Fig. 1850	Price Fig. 2356
0	300 to 500	9 to 16½	1	5 x 1½	¾	20½	\$20.50	\$20.00
00	300 to 500	3¼ to 6¼	¾	3½ x 1½	¾	12½	20.00	19.20
000	300 to 500	2¼ to 3¾	½	3¼ x 1½	¾	10½	19.00	18.20
0000	300 to 500	1½ to 2½	¾	3½ x 1½	¾	8	19.00	18.20

No. 0 for gasoline engines from 8 to 15 horse power. No. 00 for gasoline engines from 2 to 6 horse power. No. 000 for gasoline engines from 2 to 4 horse power.



Relief Valve

Fig. 2356

This pump is not reversible and has no relief valve, a check valve in suction pipe being used.

It is extensively used on gasoline engines for circulating cooling water in the cylinder jacket, and on machines operating cutting tools only in one direction. It is recommended in all such cases where a relief valve is not needed.

Fig. 2357

Same as Fig. 2356, except that the direction of rotation may be reversed without changing the direction of the stream.

Fig. 1850

Is the same in all respects as Fig. 2356, except that it is equipped with relief valve concealed in the face plate of pump.

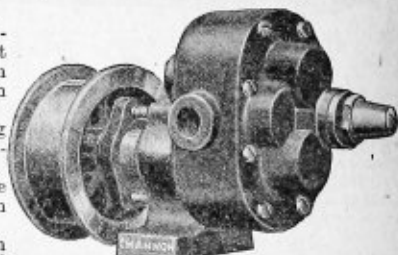


Fig. 1850

Fig. 1854.

This pump is similar to Fig. 1850 in material, workmanship and efficiency, but being reversible, it is equipped with double instead of single, automatic relief valve.

Used principally on machines operating cutting tools which reverse, such as automatic screw machines, lathes, etc. It will reverse automatically with machine delivering a continuous uniform flow of oil.

Also furnished without relief valve when valve is not needed.

Specifications and Prices

Not Reversible



Strainer

Reversible

No.	Revs. per Minute	Capacity, Gallons per Minute	Suction and Disch. Con., Ins.	Flange Pulleys Size, Inches	Size of Drive Shaft, Inches	Wght., Lbs.	Price Fig. 1854	Price Fig. 2357
00	300 to 500	5 to 10	¾	3½ x 1½	¾	27	\$27.20	\$26.00
000	300 to 500	2¼ to 3¾	½	3¼ x 1½	¾	16	22.00	20.80
0000	300 to 500	1½ to 2½	¾	3½ x 1½	¾	11	22.00	20.80

All pumps tested at 100 pounds pressure and valve set at 10 pounds. Pressure regulated by adjusting screw, reached by removing valve cap.

Strainers, sizes ¼, ½ and ¾-inch. Price each.....\$1.00

Strainers, sizes 1 and 1½-inch. Price each.....1.40

Relief valves, sizes ¾ and 1-inch. Price each.....2.40

Relief valves, sizes ½ and 1-inch. Price each.....2.80

Channon Portable Diaphragm Trench Pumps

Non-Chokable and Frictionless

For Pumping Dirty or Gritty Water



Side Suction

Nothing to wear but the rubber diaphragm which is quickly and cheaply replaced.

"We guarantee our Channon diaphragm pumps to handle more water with less labor and fewer repairs than any other pump of this class made."

We have been manufacturing these pumps for the past 20 years. They are popular in all sections and known as "Sewer Pumps," "Bilge," "Trench," "Mud," "Sludge," "Ditch Pumps," etc.

You will find them wherever you go on sewer, trench and foundation jobs of all kinds.

Operated by up and down movement of a long lever which raises and lowers a rubber diaphragm which is the only part that wears out. When worn it is quickly replaced at a cost of \$2.50 for the 2½-inch, \$3.00 for the 3-inch and \$4.00 for the 4-inch size.

The Channon diaphragm pump is of extremely simple and rugged construction—a rubber diaphragm and two check valves, supported by a strong cast iron casing. There are no pistons or plungers, vanes or springs—no parts in rubbing contact.

The water ways are large, direct and open and will quickly dispose of large quantities of drainage or sewage matter, sanitary deposits, mud, gravel and quicksand. This pump takes out the last inch of water—as it requires no priming—and for this reason is used in many large excavations after some other style of larger pump has been used for unwatering.

The handle socket is reversible and can be used on either side of the pump.

Rubber seated check valves provided above and below the diaphragm for holding the water.

We make three sizes to take 2½, 3 and 4-inch suction. The 3-inch size is the most popular for hand work. Very few of the 2½-inch size are sold. The 4-inch requires two men.



No.	Size of Suction Hose or Pipe, Inches	Capacity in Gallons per Hour	Side Suction		Bottom Suction		Price per Foot of Hose Including Couplings	Price of Galvanized Iron Strainer Each	Extra Diaphragms Each
			Weight of Pump, Pounds	Price of Pump, Only	Weight of Pump, Pounds	Price of Pump Only			
1	2½	1500	95	\$19.00	90	\$14.00	\$1.50	\$2.00	\$2.50
2	3	3500	175	24.00	170	16.00	2.00	2.50	3.00
3	4	6000	300	35.00	290	25.00	3.25	3.75	4.00

Pump Accessories



Diaphragms



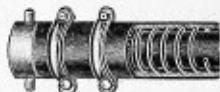
Hose Spanner Wrench



Hose Strainer



BULLOCK SPECIAL SUCTION HOSE



Showing Iron Pipe Nipple
Vulcanized in and Wired Outside

Suction Hose Carried
in 10, 12, 15 and 20-ft. Sections

Showing Couplings and Clamps
and Sectional View of Hose

Bullock Special Suction Hose.—Especially made for this kind of pump. A high grade hose which has proved in long service to be the best for the purpose. Made up on spring steel wires, spirally wound, with heavy frictioned duck smooth bore or waterway, ends enlarged.

We usually supply nipples wired in each end but furnish couplings and clamps when preferred.

Pump Repair Parts



U93
Bottom or Base



U96
Upper Valve



U98
Lower Valve



U86



U95



097 Upper Saucer



U90



U99 Top or Dome



U80 Large Gasket



U81 Small Gasket



U100 Valve Stop

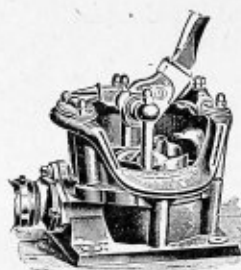
Part No.	U80	U81	U86	U90	U93	U95	U96	U97	U98	U99	U100	Handle
Size No. 1, each	\$0.60	\$0.50	\$1.40	\$1.50	\$ 8.00	\$1.50	\$1.20	\$1.50	\$1.20	\$5.00		\$3.50
Size No. 2, each	.85	.75	1.75	2.00	12.00	2.00	1.50	2.00	1.50	7.50		4.50
Size No. 3, each	1.35	1.20	2.25	2.50	17.50	2.50	2.25	2.50	2.25	11.10		4.50

Edson Type Diaphragm Pumps

Side Suction

Similar in type to our Channon diaphragm pumps but not as simple or as strongly constructed.

No. 3 compares in size with Channon No. 2—No. 4 with Channon No. 3.



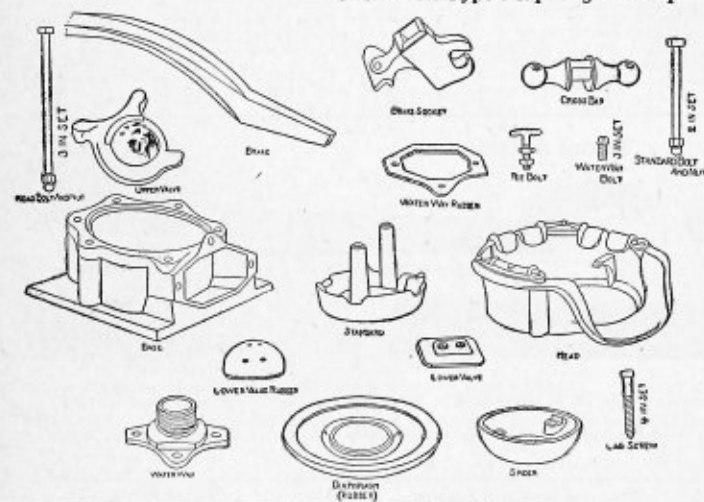
Bottom Suction

No. 3 compares in size with Channon No. 2—No. 4 with Channon No. 3.

Price of hose and strainer same as for Channon pumps, 3-inch \$1.50 per foot; 4-inch \$2.50 per foot, including couplings. Carried in 10, 12, 15 and 20-foot sections.

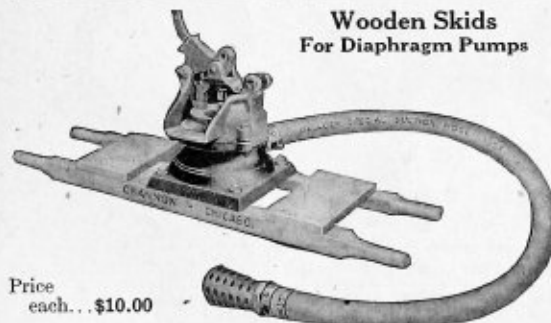


No.	Suction Hose, Inches	Capacity per Stroke, Gallons	Length of Stroke, Inches	Side Suction		Bottom Suction		Price of Galv. Iron Strainers	Price per Ft. of Hose, Including Couplings	Extra Diaphragm, Price Each
				Weight, Pounds	Price Each	Weight, Pounds	Price Each			
2	2½	½	2¾	112	\$19.00	104	\$14.00	\$2.00	\$1.50	\$3.00
3	3	1	3	185	24.00	160	16.00	2.50	2.00	4.00
4	4	2	4	285	35.00	280	25.00	3.75	3.25	5.00

Interchangeable Parts
For Edson Type Diaphragm Pump

Price List

Name	No. 2	No. 3	No. 4
Base	\$ 9.50	\$12.00	\$19.20
Head	6.00	7.60	13.00
Standard	1.80	2.00	3.20
Spider	1.00	1.80	2.00
Brake socket	1.40	1.40	2.70
Upper valve	1.30	1.30	2.20
Lower valve	.70		1.70
rubber	.70		1.70
Tee Bolt	1.40	1.60	1.60
Head bolt and nut, 3 in set	.70	.70	1.30
Brake	.50	.50	.60
Lag screw, 4 in set	4.50	5.00	7.60
Cross bar, bolt and nut, 2 in set	.16	.20	.24
Standard	.80	.90	1.50
Waterway	.50	.50	.60
Diaphragm (Edson Guar.)	.60	.70	.90
Waterway	4.00	5.00	6.80
Waterway bolt, 3 in set	3.40	4.50	6.50
Waterway rubber	.30	.60	.40
	.60	.80	.90

Wooden Skids
For Diaphragm Pumps

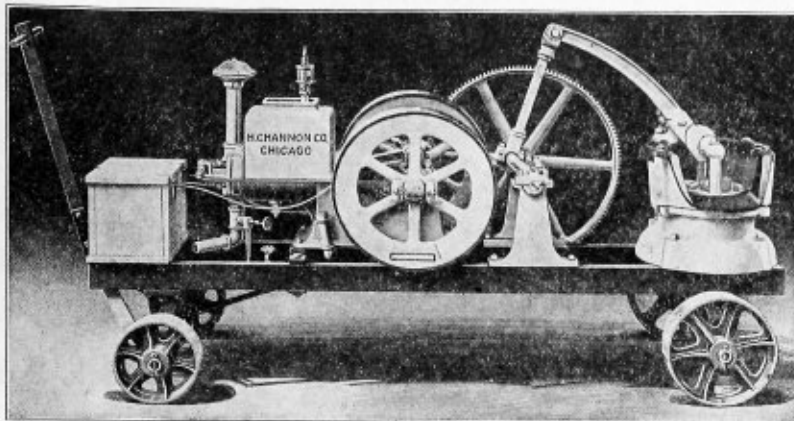
Price each...\$10.00

Manhole
Diaphragm Suction
and Force Pump

Side Suction



A small diaphragm pump for subways and manholes.
Suction, inches.....2
Discharge, inches.....1½
Weight, pounds.....50
No. OE. Price...\$30.00



Channon Portable Gasoline Engine Driven Trench Pump

A hand pump requires at least two laborers to keep going all day. This labor cost may be saved by purchasing one of our outfits which will usually pay for itself in about thirty to sixty days.

The capacity is four or five times greater than is obtainable by hand.

The diaphragm pump is fully described on a preceding page.

The gasoline engine, which is three horse power, is extremely simple and rugged and made for out-door use. The water for cooling the engine is contained in an open jacket, surrounding the cylinder, making the outfit self-contained.

No wood enters into the construction of this equipment. It is built on a substantial steel truck and is fully equipped, ready to run.

Complete outfit includes Edson type side suction, open side discharge, diaphragm pump with gasoline engine connected, complete as shown in cut. A 15 foot section of Bullock special rubber suction hose with nipples wired in or with couplings and clamps, suction strainer, wrench, and one extra rubber diaphragm—all ready to run.

Sizes and Prices

Outfit with 3-inch pump, 15 ft. hose, etc., weight about 900 lbs. \$186.66

Outfit with 4-inch pump, 15 ft. hose, etc., weight about 950 lbs. 240.00

These outfits carried in stock for immediate shipments. We carry hose in stock in lengths of 10, 12, 15, 18, 20 ft.

Channon New Diaphragm Force Pump With Closed Discharge No. 3



May be used on all work usually taken care of by the open spout type. Discharge fitted for hose or pipe and permits forcing the water to an elevation of 15 ft. above the pump, so that water can be lifted and forced against a total head, including suction and discharge, of 40 ft. A durable pump for handling large quantities of muddy and gritty water, sewage or semi-fluids. Equipped with an air chamber to steady the flow.

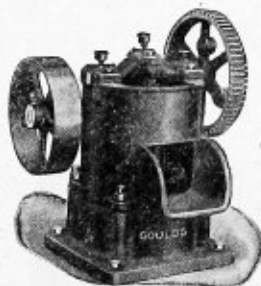
The Standard outfit includes a lever for hand operation, but pump may also be arranged with a jack for power operation.

Specifications

Stroke 3 inches; suction and discharge 3 inches; displacement per stroke, .75 gallon; approximate weight 200 lbs. Price.....\$30.00

Channon Diaphragm Pump

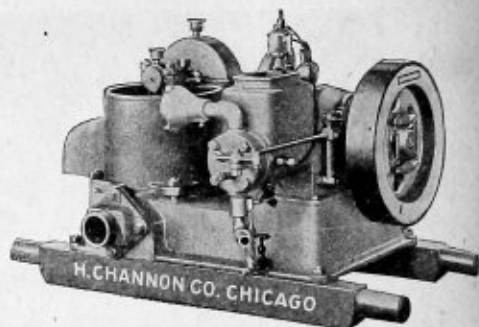
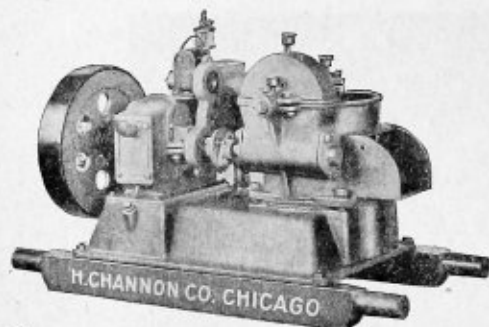
For belt or gear drive



date the speed of the engine. Fitted for side suction, 1 or 1½ horse power sufficient for ordinary service.

For pumping out excavations, cellars, trenches, quarries, or similar services where a portable power diaphragm pump is desired. The pump is back geared 5 to 1 and can be belted or geared to any engine with suitably proportioned gearing to accommodate the speed of the engine.

No.	Stroke, Ins.	Suction Pipe, Ins.	Displacement per Revolution, Gallons	Number of Revolutions Recommended	Apprx. Wt. in Lbs.	Fig. 1642 Price
3	2 1/4	3	.8	35 to 50	210	\$54.00
4	3 1/4	4	1.2	35 to 50	320	90.00



Channon Power Driven Diaphragm Bilge Trench Pump

New Improved Style with Worm Gear Drive

A portable power driven diaphragm bilge trench pump, mounted either on skid or truck, for the use of contractors and builders in pumping water from footings, trenches, cellars, cofferdams or on public works where it is necessary to raise large quantities of water. This pump is especially adapted to pumping muddy or gritty water.

This pump was designed from start to finish as a power pump, and each part was made with this end in view. It is not a hand pump connected by gearing and levers to an engine.

The pump is driven by a worm gear direct connected through a flexible coupling to the engine. In this way the entire speed reduction from engine to pump is made by means of one pair of noiseless gears. The worm and worm gear are enclosed in a dust-proof housing which is packed with grease.

The pump diaphragm is operated by an overhead crank carried in two liberal bearings.

The suction valve is rubber faced and can be easily removed for cleaning.

The discharge valve is of the vertical type which gives a much freer discharge than the flap valve generally used.

The engine was designed especially for this outfit. The crank case is entirely enclosed, making it dust-proof.

The ignition is of the jump spark type, equipped with the latest improved high tension magneto, direct geared to the engine.

The gasoline tank is formed by the sub-base, making a leak proof tank.

This sub-base also forms the base of the pump, making a very rigid and compact outfit.

The entire outfit only occupies a space two feet wide by three feet long, and weighs less than five hundred pounds.

The capacity is 3000 gallons per hour with the 3-inch suction pump, and 6000 gallons per hour with the 4-inch suction pump.

Pump No.	Water Cooled 4-Cycle Engine	Side Suction Pump	Pump Capacity per Hour	Net Weight of Outfit Complete on Skid	Shipping Weight of Outfit Complete on Skid	Price Complete on Skids	Price Complete on Truck
3	2	3	3000	475	550	\$180.00	\$200.00
4	2	4	6000	525	600	200.00	220.00



Cut on left shows the pump mounted on truck.

The truck frame is formed by the standard skids and can be attached to the skidded outfit at any time by means of six bolts.

The rear axle is carried by two cast brackets bolted to the side of the skids. The front axle is reinforced by a casting which forms the fifth wheel and is fastened by means of a king bolt to a piece of channel iron bolted to the under side of the skid.

The rear wheels are 14 inches in diameter and have a 3-inch face.

The front wheels are 8 inches in diameter with a 3-inch face.

Channon Diaphragm Force Pumps

Odorless

This pump is entirely enclosed by an air chamber and is designed for pumping out sewers, cess-pools, vaults and for handling dirty or gritty water or other disagreeable fluid or semi-fluid in a sanitary manner.

Also used for jetting or sinking piles and poles in sandy soil. The general construction, as will be seen from the sectional cut, is similar to that of our open top diaphragm suction pumps described in the preceding pages.

A rubber diaphragm with a special valve acts as a plunger—the inclined rubber faced suction valve offers the least obstruction to the passage of matter.

This is the simplest type of pump made—there is nothing to wear but the diaphragm which is easily and cheaply replaced. The diaphragm creates suction by an up and down movement and there are no complicated parts to get out of order and no sliding contacts to become worn by gritty materials.

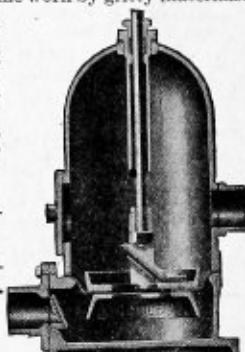
The waterways are large and permit an easy flow of the fluid. Pump has convenient hand hole for getting at interior without removing the air chamber.

The hand levers are of wrought iron and reversible.

The stroke is short and operates easily. Suction and discharge openings are threaded for standard and iron pipe thread.



Hand Pump



Sectional View

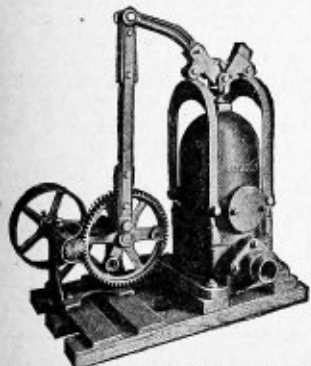
No.	Capacity per Stroke Gallons	Length of Stroke, Inches	Diameter Diaphragm, Inches	Suction and Discharge, Inches	Approximate Weight, Pounds	Price Pump only
715	1.72	3	13	3	267	\$72.00

Complete Pumping Outfits

No. 716. Hand Power Outfit—Consisting of pump with handles, as shown above, 15 feet of 3 inch Bullock special flexible rubber suction hose with couplings and clamps, strainer for suction—also 12½ feet of Bullock 3 inch, 4-ply rubber water discharge hose with couplings and clamps, spanner wrench, and one extra rubber diaphragm, mounted upon short wooden skids, ready to operate. Weight, about 400 lbs. Price.....\$160.00
Suction hose furnished in 10, 12, 15, 18 and 20 ft. lengths. Price per foot.....3.00
Discharge hose in 12½-25 and 50 ft. Price per foot.....1.50

No. 717. Belt Power Outfit as shown in illustration with pump jack mounted on wooden skids and including suction and discharge hose, etc., as above. Weight, 465 lbs. Price.....\$220.00

No. 718. Gasoline Engine Driven Outfit as shown at bottom of page mounted on truck and including suction and discharge hose same as furnished with No. 716 Outfit. Weight, about 975 lbs. Price.....\$400.00



Pump with Jack and Pulley for Belt Drive



Pump on Truck with Gasoline Engine Drive

"Jackson" Double Cylinder Hand Force Pump

Lift and Force 75 to 150 Feet



A simple lever pump adapted for a large variety of uses about factories, residences and for general service.

The capacity is large and but little manual power is necessary to deliver the maximum quantity of water.

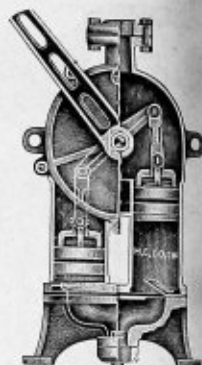
There are two cylinders with leather packed plungers which contain brass poppet valves; the suction valves are of leather.

The plungers operated alternately by the long malleable iron lever produce the same effect as the double-acting pump.

The lever can be placed on the shaft in four different positions.

Pump furnished as shown at the left with lugs cast on each side of the case for the purpose of securing to wall, post or plank. Can also be furnished with base as shown in right hand cut. Net extra for base, 50 cents.

Can be furnished with air chamber and cock spout at extra price. Metallic valves extra.



Sectional View with Base

Size No.	Size of Cylinders, Inches		Capacity at 45 Rev. per Min. Gals.	Suction and Discharge, Inches	Total Elevation, Feet	Approximate Weight, Pounds	Prices	
	Diameter	Stroke					Iron	Brass Lined
0	2	3	3.70	1	150	33	\$11.00	\$13.50
2	2½	4	7.65	1½	150	50	14.00	17.00
4	3	4½	12.15	1¾	125	60	17.00	20.00
6	3½	5	18.70	1½	100	86	20.00	24.00
8	4	5½	27.00	2	75	113	25.00	30.00

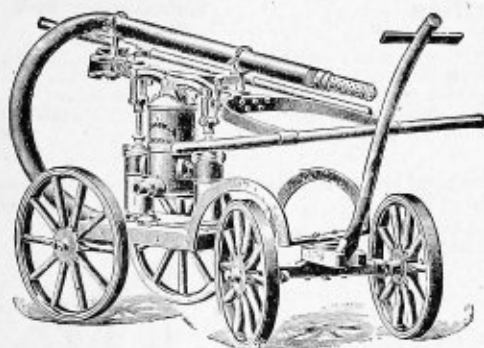


Fig. No. G—

For towns and villages without waterworks

Village Fire Engine

Swan Neck Type—With Gun-Metal Cylinders

Consists of a powerful pump, substantially mounted on a truck. Can be moved from one location to another by from one to four men and can be operated to its maximum capacity by 6 to 10 men, and with this force an effective fire stream can be thrown with ¾-inch nozzle opening from 50 to 70 feet vertically and from 60 to 90 feet horizontally.

The extreme distance that it will throw water is not material for protection—to put out fires—city fire departments do not depend upon the distance the engine will throw, but on the hose, carrying the nozzle as close to the flames as possible and delivering the greatest quantity of water possible on the flames. A sprinkling of water from the end of a 75 to 100-foot stream only creates gas that aggravates the flames—use hose and get the water to the flames.

Sizes and Prices

No.	Size of Cylinders, Inches		Suction Fitted for	Discharge Fitted for	Weight, Pounds	Capacity per Rev., Gallons	Price Without Hose, etc.
	Diameter	Stroke					
4	4½	6	2½-inch hose	1½-inch hose	600	.83	\$350.00
5	6	8	3-inch hose	2-inch hose	800	1.96	480.00

A complete outfit consists of pump and 25 feet of suction hose with couplings and strainer, and from 100 to 500 feet rubber lined cotton fire hose, with automatic couplings and screw tip nozzle.

For fire hose, couplings and nozzles, see index.

Hand and Power Piston Force Pump

For deep and shallow wells

Especially Serviceable in Creameries and Cheese Factories

Pump as shown is arranged for power only—to change to hand power, remove pulleys and substitute a hand wheel.

The barrel forms the cylinder in which a plunger is operated by a crank-shaft and pitman, both enclosed below the air chamber. The pump may be used for shallow wells without the use of a lower cylinder.

For deep wells, plunger and the lower valves are omitted—plunger guide is substituted and a connection provided for rod to extend down into well attached to a cylinder.

Cylinder is 3-inch by 5-inch stroke, suction $1\frac{1}{2}$, discharge $1\frac{1}{4}$ inches, pulleys 16x3, tight and loose.

Fig. 230. Hand power. Price each \$23.00
Fig. 231. Power pump. Price each 27.00
Out-board bearing furnished at \$4.00 extra.

We must know whether this pump is to be used for deep or shallow wells—see above.



Fig. 230 for Power

Fig. 230. Hand power. Price each \$23.00
Fig. 231. Power pump. Price each 27.00
Out-board bearing furnished at \$4.00 extra.

We must know whether this pump is to be used for deep or shallow wells—see above.

No. 149 Sanitary Milk Pump

Unexcelled for Creameries—Easily Dismantled
Readily Cleaned—Operates Smoothly and
Noiselessly—Speeds 100 to 200 R. P. M.

Face plate is attached to case by two malleable clamps—quick detachable and providing ready access to working parts of pump.

Cams are removable and encased in an accurately machined cylinder. Has tight and loose pulleys.

Size No.	Capacity 100 R. P. M. Gallons	Suction, Inches	Discharge, Inches	Size of Pulleys, Inches	Price Each
1	13	$1\frac{1}{4}$	1	7x2 $\frac{1}{2}$	\$20.00
2	14	$1\frac{1}{4}$	1	7x2 $\frac{1}{2}$	23.00
3	17	$1\frac{1}{2}$	$1\frac{1}{4}$	7x2 $\frac{1}{2}$	31.50
4	27	$1\frac{1}{2}$	$1\frac{1}{2}$	11x3	52.00
5	36	2	2	11x3	59.00

Plumbers' Brass Force Pump

Brass cylinder and brass plunger leather packed, with brass case check valve and hose coupling. In operating this pump a hose is connected to pipes to be cleaned, and pump is set in a vessel of water.

No.	Diameter Cylinder, Inches	Discharge Hose, Inch	Price Each
0	2	$\frac{3}{4}$	\$12.00



Boiler Test Pump

Hand-Power Bronze-Fitted

This is a substantial double-acting pump, capable of being worked by one man against 500 pounds pressure. It has brass piston (packed), brass piston rod and forged connections.

Piston 2 inches in diameter.

Length of stroke, 5 inches.

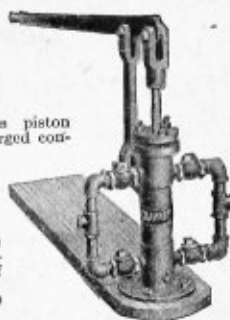
Suction for 1-inch pipe.

Discharge for $\frac{3}{4}$ -inch pipe.

Weight 60 pounds.

Repacking or cleaning out is conveniently done by simply unbolting and lifting the pump off its base.

Price each \$35.00



Hydraulic Pressure or Test Pump For Testing Boilers, Pipes, Etc.

Cylinder and base cast in one piece. Suction and discharge valves have brass valve seats, poppets and caps, and are flanged and bolted to cylinder. Revolving top. Sectional lever with link.



Fig. 867

No.	Stroke, Inches	Suction and Discharge, Inches	Working Pressure, Pounds	Price Each
0	5	1	700	\$22.00
1	5	1	550	23.00
2	5	1	400	23.50
3	5	1	200	24.00

Fig. 115 Hand Rotary Barrel Pump

A reliable pump for handling fluids of any description from a barrel or hoghead and forcing it into a tank or reservoir.

Fitted with a new device for holding suction pipe rigidly in the bung of barrel having any size of bung $1\frac{1}{2}$ to 4 inches in diameter.



No.	Gals. per Min. 100 Rev.	Suction, Ins.	Discharge for Hose, Inches	Wt., Lbs.	Bronze, Price	Iron, Price
1	13	1	1	45	\$47.20	\$15.50
2	14	1	1	55	52.00	18.00
3	17	$1\frac{1}{4}$	$1\frac{1}{4}$	65	60.00	21.00

Price includes 3 feet of suction pipe, hose coupling, hook and patented holder, but no hose.

Double-Acting Suction and Force Pumps

Fig. 276 Monarch Double Lever Pump



Adapted for fire protection in factories, residences, for filling and cleaning boilers, for washing decks, etc., on dredges and boats. For use anywhere as a suction and force pump against pressures up to 125 pounds.

Pump comes mounted on wooden plank as shown and is fitted for both iron pipe and hose connection.

Cylinders are brass-lined; valves, valve-seats and piston rods are bronze and are accessible by simply removing the two toggle bolts holding the air-chamber.

Lever and sockets are malleable iron. The valves are in pairs, one set above the other, producing maximum efficiency. Very best materials throughout.

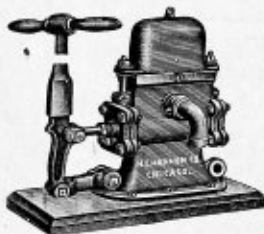
Diameter Cylinder, Inches	Length Stroke, Inches	Suction, Inches	Discharge, Inches	Weight, Pounds	Price Each
5	6	2½	2	200	\$55.00

Fig. 275 Monarch Single Lever Pump

Same description as Fig. 276 but smaller size. Single lever and socket are malleable iron.

Suction fitted for both iron pipe and hose.

Cylinder is 3-inch diameter by 5¼-inch stroke, suction 1½, discharge 1¼ inches. Weight, 100 lbs. Price.....\$13.00



Boiler Feed Pump

For supplying water to boiler where city pressure will not overcome boiler pressure. It permits the city water to run through without interference, and is only used when the pressure will not operate against the boiler pressure.

The pump will work against a pressure of 300 pounds.

Iron cylinder, plunger brass tubing.

Price.....\$15.00

Fig. 387 Rockford Single Lever Pump

Ratchet Handle

This model combines recognized good points in construction and design with original and practical features. Some recognition of the merits of this pump will be gained from cut and the detailed description following.

Cylinder is brass lined and is of sufficient length to give a 4-inch stroke.

Suction and discharge openings are provided at both sides of pump, making possible connection from either side as condition may require. The heads attach to flange on cylinder with four ¾-inch cap screws. The joints are perfectly tight, both the flange and heads being faced and fitted with rubber gaskets.

Valves. The four valves are of brass with leather discs and rest on brass seats in pairs, one set elevated to retain prime.

All valves are accessible and can be readily removed by unscrewing caps.

Plunger. Consists of three cast iron followers machined to fit the cylinder accurately and equipped with two best quality cupped leathers. Is attached to brass covered piston rod operating through brass stuffing nut in head.



Ratchet Head. This style of head is conceded to be very practical for horizontal double-acting pumps as it reduces the leverage and requires less power to operate. A strictly high grade pump in every way.

Diameter Cylinder, Inches	Length Stroke, Inches	Suction Pipe, Inches	Disch. Pipe, Inches	Weight, Pounds	Price Each
3	4	1½	2	100	\$16.50

Supplied with air attachment for air pressure systems for \$2.00 net extra.

No. 118 Hand Rotary Force Pump

With Pedestal Base

The fly or balance wheel measures 14½ inches in diameter and can be operated by the average man at the rate of 75 revolutions per minute.

The pedestal elevates the pump to a convenient position for operating.

Will draw water or other liquid 15 feet and force to an elevation of 75 feet.

By removing cap on upper discharge and placing same at end of spout discharge pipe can be connected for elevating water.



Size No.	Cap'y Gals. per Min.	Suction, Ins.	Discharge, Ins.	Diameter Balance Wheel	Weight, Pounds	Price Iron Pump
1	13	1½	1	14½	68	\$15.50
2	14	1½	1	14½	75	17.50
3	17	1½	1½	14½	85	23.00



"Bullock" Double Acting Tank Pump

This pump is radically different from the ordinary run of agricultural tank pumps—it was designed with the intention of producing the best, most accessible and durable pump of this type on the market.

The Bullock tank pump is exceptionally heavy—each individual casting or part is reinforced—giving double strength throughout and producing a practically indestructible pump capable of withstanding the most severe requirements.

It is compact, "low-down" and with all working parts easy to get at—all important essentials in tank pump construction.

The Cylinder—is bored full 5 inch diameter and polished—fitted with seamless drawn brass lining also fitted with brass drain plug. Both ends of the cylinder are flanged to receive the front and back head, either of which can be easily removed at any time by loosening the cap screws. The joints at front and back are perfectly tight, both the cylinder flanges and heads are faced true and fitted with rubber gaskets. The suction is fitted for 2 inch diameter iron pipe also with union coupling for 2 inch hose. Discharge is fitted for 2 inch pipe also with union coupling for 2 inch hose. The stroke of the pump is 5 inches.

Valves—The four valves are of cast iron turned up on a lathe and ground onto brass valve seats, in separate boxes and in pairs—one set of valves elevated above the other to retain the priming.

All the valves are easily accessible and can be removed by unscrewing the caps.

Plunger—Consists of three cast iron followers machined to fit the cylinder accurately and are equipped with two 5 inch best quality cup leathers. Plunger is attached to polished cold rolled piston rod operating through brass stuffing box nut in cylinder head.

Ratchet Head—This style of head is conceded to be the most practical for horizontal double-acting pumps, as it reduces the friction and requires about 50 per cent less power to operate than the ordinary fulcrum cap. On either stroke of the handle the cogs or teeth engage at a point directly in line with the center of the piston rod—as a result the piston operates in a direct horizontal position with the least possible friction—rod guides hold piston in perfect alignment.

Bullock Tank Pump—Capacity 25 gallons per minute, with brass lined cylinder 5 inch diameter by 5 inch stroke, suction and discharge both for 2 inch pipe or hose. Weight

\$16.00

5 inch stroke, ratchet handle, suction and discharge both for 2 inch pipe or hose. Weight 110 pounds. Price.....

Bullock Special Oil Pump

Made specially for handling oils from tank cars to tank wagons. Will handle oils of most any nature including heavy road oil.

Price..... **\$22.00**

Little Giant Tank Pump

This pump, while not in the same class as the Bullock Tank Pump described above, is simple and has all working parts arranged so as to be readily accessible.

The removal of four nuts expose both the suction and discharge valves for any adjustments that might be necessary. The valves are of the hinge type, simple and reliable. The water openings are ample size to eliminate friction, making this an easy working pump.

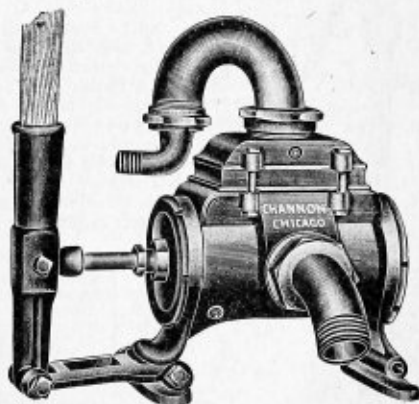
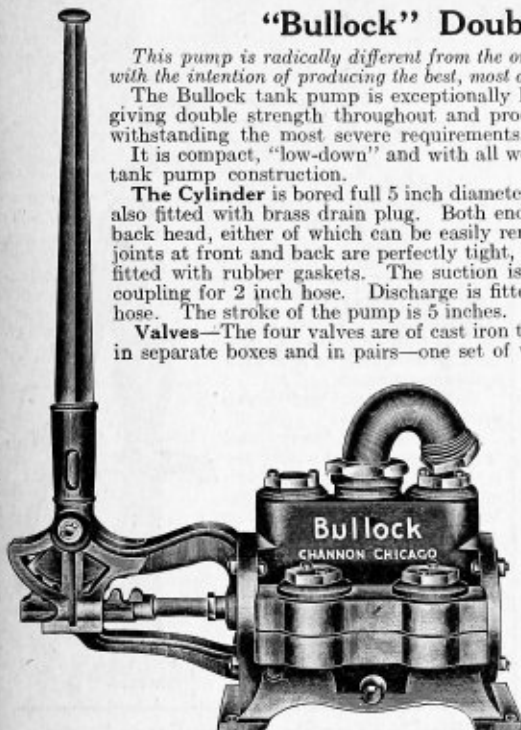
It has a 5-inch stroke and a 5-inch diameter cylinder, giving a capacity of .425 gallons per stroke—is tapped in discharge and suction for a 2-inch pipe, also arranged with unions for hose.

The design is such that the handle may be attached to either side of the pump to suit the convenience of the user. Drain plugs are provided, that the pump may be drained, a particularly good feature when used in a freezing temperature.

Little Giant Tank Pump—Cylinder 5 inches diameter by 5 inch stroke, suction and discharge both 2 inches, pipe and hose. Weight 65 pounds.

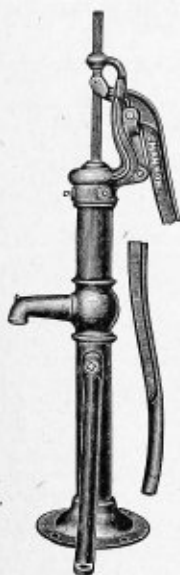
Price each..... **\$12.00**

For Suction and Discharge Hose see Rubber Section



Hand and Windmill Pumps

Fig. 61 Windmill Lift Standard



Closed Top

A good pump for medium and deep wells

Standard. Strong, but not cumbersome, well made to withstand heavy duty. Tapped just below spout for $1\frac{1}{4}$ -inch pipe; can be tapped for $1\frac{1}{2}$, 2, or $2\frac{1}{2}$ -inch if desired. Bearing for cap measures $3\frac{3}{4}$ -inch diameter and 2-inch high.

Cap. Closed top pattern equipped with swinging fulcrum. Fastens to stand with $\frac{3}{8}$ -inch by $\frac{7}{8}$ -inch set screw. Readily adjusted to any position on stand. Fitted with cap bushing to accommodate 1 by $\frac{1}{2}$ -inch windmill slide bar. Handle and fulcrum are connected by steel pins.

6-inch stroke, 67 pounds.
Price each.....\$7.50
10-inch stroke, 72 pounds.
Price each.....\$8.00

Fig. 172 Force Pump
For Hand and Windmill

A first class and reliable force pump, for deep wells and heavy duty.

Standard. Plain pattern, well proportioned. Back outlet for elevating water 1-inch; can be fitted for $1\frac{1}{4}$ or $1\frac{1}{2}$ -inch if desired. Tapped in base for $1\frac{1}{4}$ -inch pipe, but may be arranged for $1\frac{1}{2}$, 2 or $2\frac{1}{2}$ -inch pipe. Piston rod is $\frac{5}{8}$ -inch polished steel and connects to windmill bar with malleable coupling.

Stuffing box nut and thumb screw are of brass.

Cap. Extra heavy and fastens to standard with three set-screws. Handle and fulcrum attach to cap with $\frac{3}{8}$ -bolts. A bushing is fitted into upper part of cap and serves as a guide for windmill bar.

Bolted spouts in either the plain, syphon or cock style can be furnished if desired.

6-inch stroke, 66 pounds.
Price.....\$8.00
10-inch stroke, 75 pounds.
Price.....\$8.70



Fig. 172 Set Length Force Pump

For Hand or Windmill Use
Anti-Freezing—6-inch Stroke

Standard. Heavy and strong. Back outlet for elevating water for 1-inch connections. Can be fitted for $1\frac{1}{4}$ -inch. Piston rod is $\frac{5}{8}$ -inch and connects to windmill bar with malleable coupling. Stuffing box nut and thumb screw are of brass.

Cap. Extra heavy and fastens to standard with three set-screws. Handle with fulcrum attached to cap with $\frac{3}{8}$ -inch bolts. A bushing is fitted into upper part of cap and serves as a guide for windmill bar.

Bolted spouts either plain, syphon or cock style furnished if desired. Extra price.

One hose attachment and cut-off clevis are included with the pump.

No.	Size Pipe, Inches	Cylinder, All Iron, Style D, Inches	Price Each
2	$1\frac{1}{4}$	$2\frac{1}{2} \times 10$	\$11.20
4	$1\frac{1}{4}$	3×10	11.50
6	$1\frac{1}{2}$	$3\frac{1}{2} \times 10$	12.00
8	2	4×10	12.80

Cast spout regularly furnished.

Fig. 133 Double Acting Force Pump
For Deep Wells or Windmills

Lower cylinder may be from $2\frac{1}{2}$ to $3\frac{1}{2}$ -inch—not furnished unless ordered.

Standard is of lattice pattern and is cast in half sections with the cap. Plunger Rod is of $\frac{1}{2}$ -inch and connects to windmill bar with special coupling.

Air Chamber Pipe is $\frac{3}{4}$ -inch and connects with lower bridge as does also the discharge pipe of the same diameter. A goose-neck attaches to the upper end of discharge pipe and is fitted with clevis for hose attachment.

Upper Cylinder consists of a seamless drawn brass tube in which operates the differential plunger producing a steady uniform flow of water.

This pump can be equipped for shallow well by removing the lower nut and inserting 3×10 -inch cylinder into the combination cap.

Weight, 80 pounds.
 $2\frac{1}{2}$ -inch, no lower cylinder. Price each.....\$15.70
3-inch, no lower cylinder. Price each.....\$16.00
 $3\frac{1}{2}$ -inch, no lower cylinder. Price each.....\$16.70
Add for 3-way cock as shown.....4.00
Lower cylinders are extra.



No. 1413 Spray Pumps

With brass valves and ground bevel brass seats, 2-inch removable cylinder and hemp packed plunger for either hot or cold mixture.

Has valve located between air chamber and pump, which retains the pressure of the air chamber on the nozzles and relieves the valves of the pump.

Plunger is brass and hemp packed. Cylinder is a seamless drawn brass tube two inches in diameter and removable.

The special gear leverage adapts this pump particularly for spraying purposes where the work is done under heavy pressure.

Price with pressure gauge and strainer.....\$30.00

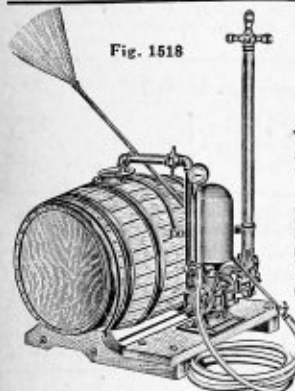
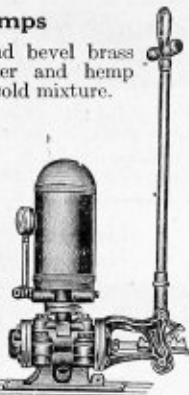


Fig. 1518

Complete Barrel Spray Outfit

Mounted on skids with 50-gallon barrel and mechanical agitator.

With Fig. 1413 pump, 50-gallon barrel on skids, with pressure gauge, two 15-foot leads of $\frac{1}{2}$ -inch 7-ply discharge hose, two spray nozzles, two 8-foot pipe extensions with lever shut-off and mechanical agitator. Price.....\$56.00

Fig. 529 Eclipse Pail Spray Pump

With jet agitators and rubber ball valves.

Made in two styles, one with foot stirrup as shown, the other with bucket or pail attachment.

All parts in contact with liquid are of brass. Acid solutions can be used for spraying fruit trees, shrubbery, flowers or vines. Weight $5\frac{1}{2}$ pounds.

Price includes three feet of $\frac{1}{4}$ -inch rubber tubing and spray nozzle. Price.....\$5.50



Spray Nozzles



Fig. 1563 Reg. Vermorel



Fig. 1559 45° Angle



Fig. 1564 Grad. Vermorel

Produce a perfect mist of fine spray at low pressures, spraying a large area with a small quantity of liquid. All for $\frac{1}{4}$ -inch iron pipe. Three styles shown, each.....\$1.20

Closed-Top Pitcher-Spout Pump

Long lever, revolving closed top, secured by set screw. Cylinder with open spout. High bolted base fitted for iron or lead pipe connection. Stroke No. 5 is 5 inches. No. 4, $4\frac{1}{2}$ inches; balance 4 inches.

Sizes and Prices

Number	Diameter Cylinder	Suction Fitted for Pipe	Weight, Lbs.	Iron, Price	Brass Lined Cylinder, Price
1	2 $\frac{1}{2}$	1	21	\$2.20	\$3.90
2	3 $\frac{1}{2}$	1 $\frac{1}{2}$	23	2.40	4.30
3	4 $\frac{1}{2}$	2	26	2.60	4.80
4	5 $\frac{1}{2}$	2 $\frac{1}{2}$	30	3.20	5.40
5	6 $\frac{1}{2}$	3	38	4.80	7.50

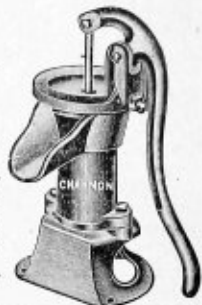


Fig. 85 Hand Lift Pump Standard

Suitable for outside cisterns and shallow wells. Light, substantial and inexpensive.

Standard tapped in base below spout for $1\frac{1}{4}$ -inch pipe. Tapped $1\frac{1}{2}$ or 2-inch when so ordered. Cap bearing measures $3\frac{3}{8}$ -inch diameter and $1\frac{5}{8}$ -inch high.

Cap fastens to stand with $\frac{7}{8}$ x $\frac{1}{8}$ -inch set screw and can be adjusted to any position. Pump rod attaches to handle with malleable coupling and screw. Bolt connects handle to cap. Weight 43 pounds. 6-inch stroke.

Price.....\$5.00



Fig. 85

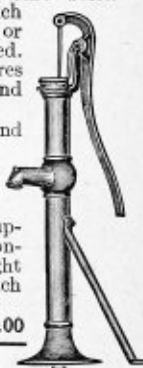


Fig. 404 Set Length Lift Pump

Anti-Freezing

A well made pump for shallow well and cistern use.

Cap fastens to standard with set screw and can be adjusted to any desired angle.

Standard is of straight stock pattern with $1\frac{1}{4}$ -inch spout and flanged base. Brace is supplied with each pump.

Cylinder, 3x10 inches. Plunger and valve leathers are cut from best quality leather stock. Cylinder and all working parts are turned upon special machinery.

Cylinder is connected to standard by full length $1\frac{1}{4}$ -inch wrought iron pipe.

Cylinder tapped for $1\frac{1}{4}$ -inch suction pipe; can be tapped $1\frac{1}{2}$ -inch if desired. Galvanized or extra length pipe furnished, if ordered, at nominal cost.

Weight, 55 pounds. 6-inch stroke. Price.....\$6.50

Fig. 404

The Johnson Brass Well Screen



Has inlet slot cut accurately to width and extending spirally around the tube, giving largest possible intake capacity per foot of length.

In shape the slot is narrowest on the outside and by widening inwards prevents choking.

Slot widths are measured in thousandths of an inch and any width from four to thirty thousandths can be made.

The sectional cut shows the endless inlet with the sharp lip that keeps it free from sand; and the short oval holes that make the screen strong, with all widths of slot.

Prices in 2-foot Lengths and Longer

Diam. well pipe, inches...	2	2½	3	3½
Lin. ft. of inlet, per ft....	30	39	48	56
Price of screen, per ft....	\$3.80	\$4.00	\$5.00	\$7.00
Attachments, per set....	3.00	3.60	5.00	7.00

Diam. well pipe, inches...	4	4½	5	6
Lin. ft. of inlet, per ft....	65	74	82	100
Price of screen, per ft....	\$8.00	\$9.00	\$10.40	\$13.20
Attachments, per set....	8.00	9.00	10.00	12.00

Diam. well pipe, inches...	7	8	10	12
Lin. ft. of inlet, per ft....	117	130	164	195
Price of screen, per ft....	\$17.80	\$23.00	\$35.50	\$47.00
Attachments, per set....	14.00	16.00	36.00	48.00

In ordering state diameter of well pipe, length and slot number desired.

Couplings for Wood Pump Rods



Made with socket for the end of the rods to prevent them from splitting. Galvanized to prevent rusting.

No.	432	435	436	437	438½
For rods, inches....	1-1½	1-1½	1½-1¾	1½-1¾	1-1½
No. of holes....	2	3	3	4	4
Threads, I. P.	¾	¾	¾	¾	¾
Price per pair....	\$0.36	\$0.40	\$0.48	\$1.60	\$0.48

Forged Sucker Rod Couplings



With straight box and pin of same size, as the well couplings and interchangeable with them.

No.	408	409	410	411	412
Box and pin, inches....	5½	7½	1	1½	1½
No. of Thds.	12	10	10	8	8
Size Wd. Rd., inches....	1½	1½	1½	2¼	3½
For Work. Barl. 1½-2¼	2¼-2¾	2¾-3¼	3¼-5¼	5¼-8¾	
Price, galv., set....	\$1.55	\$2.10	\$3.20	\$4.70	\$10.80

Octagon Wood Pump Rods



Made of selected ash and are furnished, unless otherwise specified, in random lengths of about 20 feet.

Size of rod, inches....	1½	1½	1½	2¼	3½
For work, barrels....	1½-2¼	2¼-2¾	2¾-3¼	3¼-5¼	5¼-8¾
Price, blank, ft.	\$0.08	\$0.10	\$0.18	\$0.27	\$0.58
Price with gal. frgd. sucker Rd. Cplgs. & Cop. rivets, per ft. ....	.20	.27	.40	.65	1.50



No. 801. Suction Strainer

For Open Wells and Cisterns With Set Screw

Made of malleable iron, galvanized and covered with good quality brass wire cloth.

Pipe size, inches	¾	1	1½	1½	2	2½
Price each....	\$0.37	\$0.37	\$0.42	\$0.47	\$0.65	\$0.91

Hexagon Pump Rod Couplings

Galvanized Malleable Iron or Brass

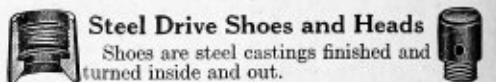
				Mall. Brass
7½-in. 14-thrd.	Price ea.	\$0.08	\$0.24	
7½-in. 12-thrd.	Price ea.	.08	.24	
7½-in. 12-thrd.	Price ea.	.10	.35	

Pipe to Rod Couplings No. 429

	For ¾-inch pipe and ¾-inch iron rod. Each. Galv.	\$0.30
--	--------------------------------------------------	--------

Hexagon Lock Nuts

	For ¾-inch rod galv.	Each.	\$0.08
	For 7/8-inch rod galv.	Each.	.08
	For 1-inch rod galv.	Each.	.10



Drive Shoes		Drive Heads		
Size, inches	1½	2	2½	3
Shoes, each	\$1.25	\$1.25	\$1.65	\$2.50
Heads, each	2.70	3.25	7.80	11.70
Size, inches	4	5	6	8
Shoes, each	\$ 5.00	\$ 8.75	\$11.25	\$15.00
Heads, each	20.80	31.20	39.00	

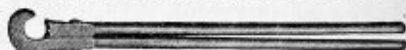


Babcock Pipe Lifter and Holder

Handles 1 to 2-in. pipe. Price....\$7.80

Lifting and Sliding Tongs

Used for Lowering Pipe Into Wells



Lifting Tong Number 613



Sliding Tong Number 612

Price List—Numbers 612 and 613

	No. 1, Ins.	No. 2, Ins.	No. 3, Ins.	No. 4, Ins.	No. 5, Ins.
Used for pipe....	¾-in.	1-in.	1¼-in.	1½-in.	2-in.
Price each....	\$4.40	\$5.00	\$5.50	\$6.05	\$6.60

Standard Earth Augers



This Standard well boring outfit will dig a well 20 to 100 feet deep with equal ease. No pressure needed, simply turn the handle and it bores into the earth with its own weight. Auger can be adjusted to bore wells from 8 to 16 inches in diameter.

As soon as the length of the auger has been reached, unscrew the auger head and connect another piece of extension pipe. The couplings for this purpose are supplied with each outfit. They are of malleable iron and fastened with bolts.

When well becomes so deep it is difficult to hold the auger steady, a quadruple expansion brace is supplied. This brace pushes against the sides of the well, steadies the auger and keeps the well straight.

Bores through any formation of earth. Stones or gravel do not interfere. If a stone too large to go into the auger is struck, unscrew auger head and screw on Standard Ram's Horn which is made of tool steel and will twist around any ordinary sized rock and bring it out.

Outfit No. 1. For boring wells 40 feet deep and less. Consists of one No. 10 earth auger, two expansion blades, 40 feet connection pipe, 12 special malleable couplings with bolts, 1 Standard internal grapple. Price.....\$18.00

Outfit No. 2. For boring wells 100 feet deep and less. Consists of 1 No. 10 earth auger, 2 expansion blades, 100 feet connecting pipe, 24 special malleable couplings with bolts, 1 extension brace and stem, 1 Standard internal grapple. Price.....\$37.50

No. 5 auger boring 4 different sized holes, viz., 5, 6, 7 and 8 inches in diameter, 3½ feet deep. Price each.....\$5.25

No. 8 auger boring 7 different sized holes, viz., 8, 9, 10, 11, 12, 13 and 14 inches in diameter, 3½ feet deep. Price each.....\$5.60

No. 10 auger boring 9 different sized holes, viz., 8, 9, 10, 11, 12, 13, 14, 15 and 16 inches in diameter, 3½ feet deep. Price each.....\$6.35

No. 14 auger boring 7 different sized holes, with telescope stem for boring holes 8 feet deep. Price each.....\$10.00

No. 16 auger boring 9 different sized holes, with telescope stem for boring holes 8 feet deep. Price each.....\$10.00

Any of our augers can be extended for deeper or shallow well boring by simply coupling on extra pipe.

Earth or Well Augers

Fig. 600. Chisel bit auger for clay and hard pan.

Fig. 602. Ribbon auger for general boring.

Fig. 603. Twist auger for general boring.

Any style same price.

Size hole will make.....	2	2½	3
Thrd. for pipe.....	1	1½	1½
Price each.....	\$6.00	\$6.50	\$7.00
Size hole will make.....	3½	4	4½
Thrd. for pipe.....	1½	2	2
Price each.....	\$8.50	\$10.00	\$15.00
Size hole will make.....	5	6	
Thrd. for pipe.....	2	2	
Price each.....	\$20.00	\$25.00	

Figs. 600, 602, 603

Sand Pump

Fig. 629



Size of Well, Inches	Price Each
2	\$ 4.25
2½	4.75
3	5.10
4	6.80
5	8.50
6	10.20
7	12.00
8	13.60

No. 615

No. 616



Sand Pumps and Drills

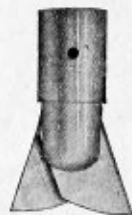
Furnished with either ball or flat poppet valve.



Size of well, inches.....	2	2½	3	4
Fitted for pipe, inches....	1	1	1½	2
Price each.....	\$2.40	\$3.60	\$4.80	\$6.00



No. 67 Male Paddy



No. 611 Female Paddy

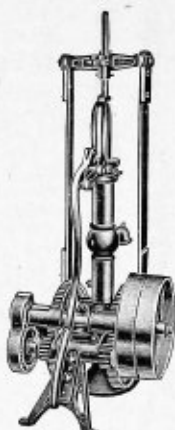
Expansion Drills

Size, Inches	Price Each
2	Paddy makes 4 -inch hole \$ 7.60
2½	Paddy makes 4½ -inch hole 10.00
3	Paddy makes 5 -inch hole 13.00
4	Paddy makes 6½ -inch hole 16.75

Pump Jacks



No. 0



No. 3



No. 4



No. 5

For operating pump standards by power that are now operated by hand or used in connection with windmills. Pitmans are adjustable to any height of pump standard. Foot rest for bolting securely to platform serves also as brace for pump stand. Swivel pump connection admits of setting jack at almost any angle to pump standard and affords quick connection from power to hand and back again without the use of bolts. When a pump is set directly under a windmill it can be operated in three different ways—by hand, by windmill or by gasoline power.

Size No.	Description	Suitable for Gasoline Engine	Back Geared	Strokes, Inches	T. & L. Pulleys, Ins.	Wgt., Lbs.	Price Each
00	Attaches to pump standard only, no connection to platform.	Up to 2 H. P.	4 to 1	5-7½-10	12x2	90	\$ 4.40
0	Attached to pump and supported by foot on platform.	Up to 2 H. P.	4 to 1	5-7 -10	13x2	110	6.00
1	Single gear and disc crank.	Up to 2 H. P.	4 to 1	5-7 -10	13x2	120	7.00
000	Double gears.	Up to 2 H. P.	4 to 1	5-7 -10	13x2	130	7.50
2	Double gears.	Up to 2 H. P.	4 to 1	5-7 -10	13x2	172	10.50
3	Compound geared for motor or high speed engine.	Up to 2 H. P.	5½ to 1	5-7 -10	13x2	205	13.50
4	Deep well, 4-inch pipe, open top lift pump head, no stuffing box.	2 to 5 H. P.	7 to 1	6-8-10-12-14-16	15x3	316	27.00
5	Deep well, 4-inch pipe, stuffing box, force pump head.	3 to 1 H. P.	6 to 1	6-8-10-12-14	15x3	330	32.00
	Air attachment for No. 5.					22	11.00

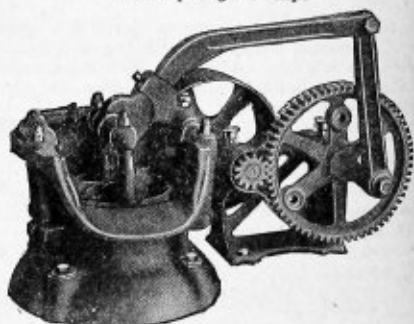
Motor Drive Pump Jack

For motor drive on windmill pump for deep well work.

It is made extra wide, measuring 13 inches between the gear wheels, which adapts it for use with 3-way pumps.

Shaft 1½ inches. Pulley 24x2½ inches. Back gears reduce the speed of 1750 R. P. M. motor to 35 strokes of pump.

Price of jack, without motor or pump, as shown in cut.....\$15.00

Pump Jack
For Diaphragm Pumps

It consists of a strong box-type frame carrying two shafts with gear and pinion. Large babbit bearings with grease cup lubrications.

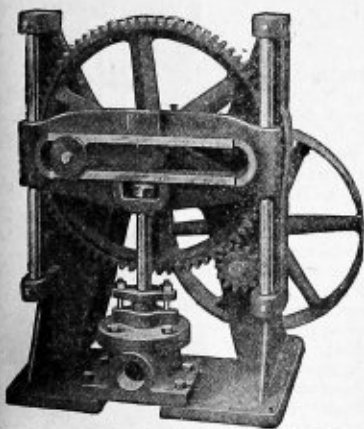
Extended end of shaft fitted with 12x3-inch pulley for belt drive sprocket for chain drive. With machine cut auxiliary gear and pinion for direct connections, if desired.

Stroke, Inches	Geared	Approx. Weight, Pounds	Floor Dimen., Inches	Fitted With	Price
4, 6, 8 & 10	5 to 1	78	7¼x10¼	Pulley	\$15.00
4, 6, 8 & 10	10 to 0	73	7¼x10¼	Engine Gearing	21.25



Jack Connected to Pump and Motor

The Allrite Pumping Head



The Allrite pumping head will handle a 4-inch cylinder 70 feet or less in the well, or a 2½-inch cylinder 170 feet in the well. Places between these points should have a suitable size cylinder.

To the base plate of the frame is attached the pipe head, which is tapped for pipe to well cylinder and delivery pipe. Smaller well pipe can be used by bushing the head. The delivery pipe should have a swing check valve near head to hold water up. When not used to the limit, the pumping head will also elevate to a moderate height. The pipe head is made in two parts to allow top piece to be taken off to remove the plunger when full sized pipe is used on shallow wells.

Dimensions

Stroke 12 inches—Geared 6 to 1.

Pulley 18 inches for 4-inch belt.

Pipe head tapped for 4-inch pipe with 2-inch discharge.

Floor space 22x23 inches, height 30 inches, weight 400 pounds.

Price, \$77.00

The "Colco" Pump

Non-Corrosive—Large Capacity—Easily Accessible—Perfectly Sanitary

Designed and built for the special purpose of pumping all kinds of corrosive fluids which require all bronze construction.

For use in chemical works, canning and bottling plants, breweries, distilleries, etc.

The cylinder, valve and all internal working parts coming in contact with the fluid are made regularly of bronze, or can be made of any special alloy. All parts are machined and smoothly finished.

It is easy to take apart and put together for cleaning after each run if desired.

No wrenches or tools are required to disassemble it, and no packing is destroyed in doing so. By loosening lock screw at top, yoke can be swung out. Top cap lifts off, exposing the discharge valve which is in the piston. Cylinder lifts off, exposing all of the piston and the suction valve. All these parts are easily removed.

Its design is mechanical, and the material and workmanship in its construction are high class in every detail.

It is furnished with tight and loose pulleys and the upper part of pump can be turned so that connections can be made from either side.

It is practically noiseless in operation. The suction and discharge valves are air cushioned, and there is no friction to injure the fluids.

A by-pass with valve is between the suction and discharge for regulating the capacity if maximum is not needed. It can be regulated while the pump is running.

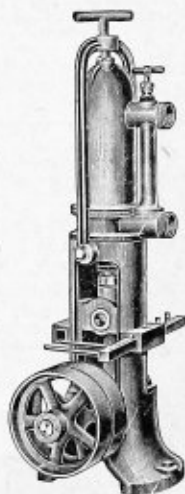
The two joints between suction box and cylinder, and between the cylinder and cap, are metal and are further sealed with a round rubber ring which is merely compressed in a square groove.

The piston is non-packed, having the groove rings. No packing comes in direct contact with the liquid.

The connections of the pump are regularly standard pipe thread, but can be furnished with sanitary unions if desired.

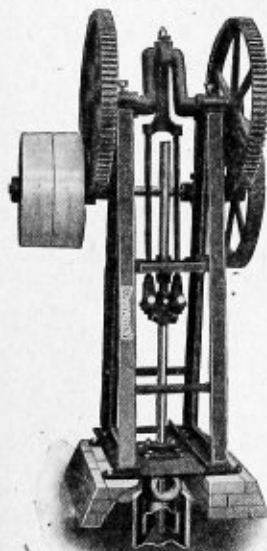
Its capacity is very large for its size. It occupies very little floor space and requires little power for operation. It has passed the most rigid inspection of many sanitary boards.

Always state the nature of the liquids to be pumped with their consistency and whether hot or cold. This pump can be made of other alloys to suit liquids if bronze is not suited.



Specifications and Prices

No.	Cylinder		Capacity per Hour, Gallons	Suction, Ins.	Discharge, Ins.	T. & L. Pulleys	Floor Space, Inches	Strokes per Minute	Elevation in Feet	Weight, Pounds	Price	Sanitary Unions, Extra
	Diam.	Stroke										
1	4½	1½	1000	1½	1½	8x2	11x15	120	60	110	\$112.50	\$3.75
2	5½	1½	2000	2	2	10x2	13x17	120	60	125	156.25	5.00



Style A
For double acting cylinders
with all steel displacement
plunger.

Deep Well Power Pump Heads

Double geared with balance wheel. Machine cut gears for operating single or double acting water cylinders.

Two Styles:

Style "B" for single acting cylinders.

Style "A" for double acting cylinders.

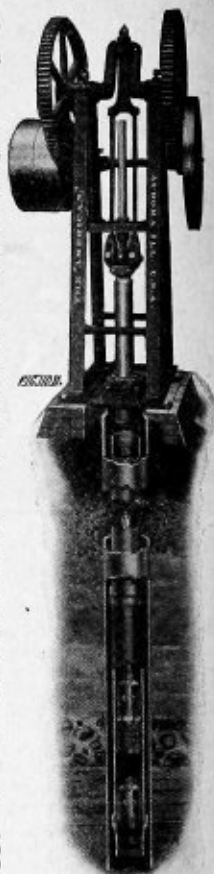
When used with single acting cylinders the heads are equipped with a brass differential displacement plunger.

These heads are extremely heavy in design to meet the requirements of heavy lifts on deep wells or large volumes of water. Bearings are extra large and the heavy balance wheel gives continuous steady motion.

Illustration at right shows details of Style B head ready for operation—single acting cylinder.

This type of well is bored and cased as shown. The well piping extends down through all surface formations and is driven firmly into the underlying rock stratum, excluding possibility of contamination from surface seepage. The water is usually derived from a sand or gravel stratum, with a rock capping seal above, forming a filtration plant science has never equaled. When there is a tendency of the sand or gravel in the water bearing stratum to cave or pump out, a screen of suitable length and diameter is placed below the water cylinder to exclude it.

The brass working barrel of a single acting deep well pump placed in pumping position in the well is shown. It is placed at the lowest pumping water level in the well, preferably equipped with 35 feet of suction pipe below, to prevent the possible intake of air. It is connected by a wrought iron pipe, of a larger diameter than the bore of the cylinder, to the base of the pump head, to permit drawing out of the plunger and valves through the pipe. The plunger is connected with the reciprocating mechanism at the surface by wood or metal rods, having screw threaded joints.



Style B

No.	Stroke in Inches	Proportion of Gearing	Total Lifts Varying with Diam. of Cyl., Ft.	Pipe Connection or Smaller		Floor Space and Height in Inches	T & L Pulleys		Speed R. P. M.	Horse Power Extreme Load	Approx. Weight, Lbs.	Price Either Style
				Suct.	Disch.		Diam. Ins.	Face Ins.				
27	24	6.8 to 1	325-800	6	4	36x51x 91	24	6	25-45	10	2150	\$475.00
28	24	8 to 1	200-600	8	6	46x61x 96	28	8	25-45	15	4000	760.00
29	24	8 to 1	200-600	12	10	58x73x102	40	10	20-30	50	7500	1424.00

No. 31½ has outboard bearings on pulley shaft.

For extreme loads increase pulley diameter 15 per cent, at extra cost.

Pipe connections can be bushed smaller if desired.

Junior Belted Deep Well Pump Head

Single Geared—With Cut Gear and Pinion

Can be used with either single or double acting water cylinders.

May be belted to any source of power. The head is placed directly over the well on a brick, stone, concrete or timber foundation and is so constructed that the entire frame can be slid backward on the bed plate when one desires to remove plunger from the well to repack cylinders, etc.

The plunger rod is made of forged steel. The discharge pipe, which sustains the water cylinder in the well, is screwed into a tee, placed at the base of the pumphead and is held in place by the weight of this pipe and by bolts in the foundation.



No.	Stroke in Inches	Proportion of Gearing	Total Lifts According Diam. of Cylinder, Feet	Pipe Connection or Smaller		Floor Space and Height, Inches	Pulleys		Speed, Rev. per Min.	Horse Power, Extreme Load	Approx. Weight, Lbs.	Price
				Suct. Ins.	Disch. Ins.		Diam. Ins.	Face Ins.				
30	8	5 to 1	50 to 300	4	2	27x21x39	12	3	30-60	1	400	\$110.00
31	16	5 to 1	150 to 800	6	2½	39x23x63	18	4	30-60	1½	1350	320.00
32	24	6.8 to 1	150 to 500	6	3½	42x54x91	18	4	25-45	5	2000	405.00

Motor Driven Unit Well Heads quoted upon request.

For cylinders and other accessories, see index.

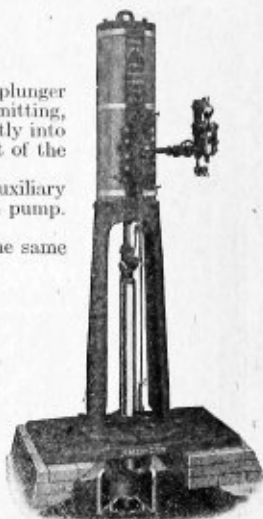
Steam Driven Deep Well Pump Head

Used with Single Acting Deep Well Cylinders

This engine has a brass differential displacement plunger, made on a forged steel plunger rod, by means of which a part of the water is discharged on the down stroke, permitting, in many cases where water is forced to a considerable distance above ground directly into stand pipe or pressure main, the use of a smaller steam head and removing part of the load from pump rods and valves in the well.

Steam is admitted by a single balanced ground valve, operated by a special auxiliary finger turned valve stem, the simplest valve construction employed in any steam pump. Since valve is balanced but little steam is required to operate it.

Also made with an all-steel plunger for operating double acting cylinders at the same price.



No.	Steam Cyl.		Water Pipes*		Diam. Brass Diff. Plunger, Ins.	Steam Pipes		W. R. Cyls. Takes	Approx. Weight, Lbs.	Price
	Diam., Ins.	Stroke, Ins.	Well, Lps.	Disch., Ins.		Steam, Ins.	Ex., Ins.			
4	5	24	4½	3	1½	¾	1	¾	660	\$196.00
5	6	24	5	3½	3	1	1½	1½	820	213.00
6	6	36	5	3½	3	1	1½	1½	950	260.00
7	8	24	6	4	3	1½	1½	1½	1150	314.00
8	8	36	6	4	3	1½	1½	1½	1300	330.00
10	10	36	8	6	4	1½	2	1½	1550	376.00
12	12	36	8	6	4	2	2½	1½	2280	600.00
13	14	36	8	6	4	2½	3	1½	2600	670.00

*If smaller wanted—bush openings. Nos. 12 and 13 made for 10 and 7-inch if so ordered. Special heavy duty heads in larger sizes upon request.

Junior Steam Driven Deep Well Pump Head

For use in small factories, creameries, cotton gins, etc.

This pumping head is used in connection with working barrels or set length water cylinders for pumping drilled or open wells.

The remarkably simple design of this engine has made it a leader, many thousands of them are now in use.

The long stroke sizes are recommended. They not only pump more water per minute with the same diameter of cylinder, but the water valves last longer.

To make a complete plant there is required besides the head, pumping rods, water pipe, working barrel, and, if water is to be forced a considerable distance, an air chamber and discharge check valve. Where the steam pressure varies excessively a pressure reducing valve can be used to good advantage.

No.	Steam Cyl.		Floor Space, Ft. Sq.	Hght., Ft.	Steam and Water Pipes				Approx. Wght., Lbs.	Price
	Diam., Ins.	Stroke, Ins.			Steam, Ins.	Exh't, Ins.	Suct., Ins.	Disch., Ins.		
16	4	8	1½	3½	½	¾	3	2	235	\$ 77.00
17	4	12	1½	4	½	¾	3	2	260	84.00
18	4	16	1½	4½	½	¾	3	2	285	96.00
19	5	16	1½	5	¾	1	4	3	350	108.00

Suction may be bushed to connect to smaller pipe and discharge also reduced proportionately.

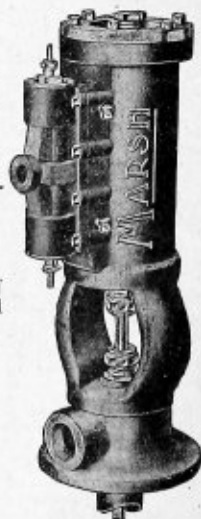
Marsh Steam Driven Deep Well Pump Head

With Plain Yoke Base

For deep or shallow wells. Can be attached to any plunger rod.

A simple, moderately priced head. Has regulating valves for equalizing the motion of the rod when used with single acting cylinders, where the work is all on the up-stroke and the weight of the heavy rod might otherwise cause the piston to drop too suddenly.

No.	Steam Cyl.		Steam and Water Pipes				Well Rod, Inches	Floor Space, Inches	Approx. Weight, Pounds	Price
	Diam., Ins.	Stroke, Ins.	Steam Pipe	Exhst. Pipe	Well Pipe	Disch. Pipe				
20	4	6	¾	¾	2	1½	8x8	80	\$ 40.00	
21	4	8	¾	¾	2½	1½	8x8	85	50.00	
22	5	12	¾	¾	2½	2	12x12	200	80.00	
23	6	12	1	1	3	2½	12x12	250	100.00	
24	6	24	¾	1	3	2½	18x18	450	180.00	
25	6	36	¾	1	3	2½	18x18	500	250.00	
26	7	24	1	1½	3	2½	18x18	480	300.00	



For Well Head Accessories, see Index.

"American" All Brass, Double Acting, Double Quantity, Removable Valve, Water Cylinder

Can be repacked without removal of cylinder shell from well.
Overcomes friction loss in forcing the water up a smaller main pipe.
About same power required by single acting pump—
but double the quantity of water.

The advantage of this cylinder over others is in the plunger rod—all the valves are mounted on this rod and are drawn from the well with it at a single operation—it is easily repaired and saves the expense of drawing the pump pipe out of well.

The illustration at the right shows all parts in position when being removed for repairs—B shows top brass ball, seated within a steel cage—C is a section of the brass piston tube—D shows removable brass check valve—E shows plunger with four cup shaped leather packings—F is a section of bottom brass piston tube—G is bottom brass check valve which seats at bottom of cylinder—H shows portion of check lifter, which raises the lower check valve from its seat when valves are being removed for repairs.

The Valves are of smaller diameter than the inside diameter of the column or discharge pipe.

Discharges the full capacity of the cylinder on the down stroke as well as on the up stroke—therefore, it is not only double-acting—but actually gives double quantity of water.

Will pump twice as much water as any single acting cylinder of the same displacement—when run at the same speed.

The flow is constant—therefore, there is less vibration or water-hammer and the plunger rod is not subjected to as heavy strains, consequently can be operated at much higher speed.

The cylinder I and plunger rods G and H are of X heavy seamless drawn brass tubing. All other metal parts are of cast brass, including top and bottom couplings into which suction and discharge pipes are screwed. The valves S1 and S2 and D1 are extra heavy and of best quality rubber. The ball valve D2 is of brass, the cage is of steel. The plunger J is packed with cup leathers as at L, the hollow rods G and H where they travel through the valve seats are packed with special flanged leather as at K and K1; this prevents leakage of water around the rods and is very essential.



Operation

On the up stroke, valve S1 opens and space A below the plunger is filled, at same time the discharge valve D1 opens and water in space E above the plunger is forced up into discharge pipe F.

On the down stroke, valves S1 and D1 close and valve S2 opens and water is drawn through hollow rod H (indicated by arrow C) and fills space E. At same time the ball discharge valve D2 opens and the water in space A below the plunger is forced up through the hollow rod C (indicated by arrow M1 and M2) into the discharge pipe F.

It may be used with our belt driven or our steam pump heads.

If water is obtained in caving materials, have well completed with screen before putting in pump.

No.	Inside Diam. Cylinder, Inches	Maximum Stroke, Inches	Theoretical Capacity When Plunger Travels 100 Up Feet per Minute		Pipe Thread at Top, Inches	Pipe Thread at Bottom, Inches	Smallest Diameter of Well Cylinder Will Go In, Inches	Approx. Weight, Pounds	Price Each
			Gallons per Minute	Gallons per Hour					
33	3 1/4	24	73.5	4400	3 1/2	3	4 3/4	90	\$105.00
34	3 1/4	36	73.5	4400	3 1/2	3	4 3/4	110	115.00
35	3 3/4	24	96.5	5800	4	3 1/2	5 5/8	125	145.00
36	3 3/4	36	96.5	5800	4	3 1/2	5 5/8	135	165.00
37	4 1/4	24	118	7080	4 1/2	4	6	140	180.00
38	4 1/4	36	118	7080	4 1/2	4	6	160	195.00
39	4 3/4	24	151	9050	5	5	6 5/8	175	217.00
40	4 3/4	36	151	9050	5	5	6 5/8	200	235.00
41	5 1/4	24	229	13730	6	5	8	240	301.00
42	5 1/4	36	229	13730	6	5	8	290	325.00
43	6 1/4	24	283	17000	7	6	9	320	415.00
44	6 1/4	36	283	17000	7	6	9	350	444.00
45	7 1/4	24	379	22710	8	6	10	380	530.00
46	7 1/4	36	379	22710	8	6	10	400	590.00
47	8 1/4	24	496	29800	9	7	12	530	760.00
48	8 1/4	36	496	29800	9	7	12	550	796.00
49	9 1/4	24	622	37300	10	9	13	590	970.00
50	9 1/4	36	622	37300	10	9	13	615	1070.00
51	11 1/4	24	911	54700	12	10	15	900	1460.00
52	11 1/4	36	911	54700	12	10	15	950	1550.00

Can furnish flush cap type at same price—in this type the inside diameter of the cylinder is larger than the inside diameter of discharge pipe or column, also the pipe connections and size of well is considerably smaller.

All Brass Artesian Well Cylinder

Fig. 448

With Bronze Ball Valves

For heavy work and deepest wells.
This cylinder may be placed in open wells and in drilled wells where the pipe or casing is large enough to admit the cylinder attachments. For best results the cylinder should be placed in the well at a point where it will be submerged. A strainer may be connected to the bottom coupling. Standard pipe threads used in both couplings.

Shell is made of heavy seamless brass tubing. Valves are extra heavy and fitted with four perfect cup leathers and bronze balls.

The plunger and lower valves can be removed through the connecting pipe, which is larger in diameter than the bore of the cylinder—convenient when repairs are necessary.

Wood sucker rods with forged couplings are recommended.

Intermediate sizes take place of next larger size.



Inside Diam. and Stroke, Inches	Cap. per Stroke, Gals.	L'gth Pump Barrel, Inches	Out-side Diam. Caps. Inches	Top and Bottom Conn. Pipes, Inches	Out. Wood Sucker Rod, Inches	Price Each
1 1/2 x 16	.100	36	2 1/2	1 1/2	1 1/2	\$ 15.00
1 3/4 x 24	.154	44	2 3/4	1 3/4	1 3/4	16.50
1 3/4 x 20	.100	27	2 3/4	2	1 3/4	17.50
1 3/4 x 16	.160	33	2 3/4	2 1/2	1 3/4	19.00
1 3/4 x 24	.250	41	2 3/4	2 1/2	1 3/4	21.00
2 x 16	.275	35	3	2 1/2	1 3/4	28.00
2 x 24	.410	43	3	2 1/2	1 3/4	30.00
2 1/4 x 36	.610	55	3 1/4	2 1/2	1 3/4	34.00
2 1/4 x 10	.257	31	3 1/4	3	1 3/4	34.00
2 1/4 x 16	.411	37	3 1/4	3	1 3/4	36.00
2 1/4 x 24	.610	45	3 1/4	3	1 3/4	38.00
2 1/4 x 30	.770	51	3 1/4	3	1 3/4	40.00
2 1/4 x 36	.925	57	3 1/4	3	1 3/4	42.00
3 x 10	.360	35	4	3 1/2	1 3/4	45.00
3 x 16	.574	41	4	3 1/2	1 3/4	48.00
3 x 24	.862	49	4	3 1/2	1 3/4	52.00
3 x 30	1.060	55	4	3 1/2	1 3/4	55.00
3 x 36	1.292	61	4	3 1/2	1 3/4	58.00
3 1/2 x 10	.478	37	5 1/4	4	2 1/4	67.50
3 1/2 x 16	.764	43	5 1/4	4	2 1/4	70.00
3 1/2 x 20	1.050	47	5 1/4	4	2 1/4	72.50
3 1/2 x 24	1.147	51	5 1/4	4	2 1/4	75.00
3 1/2 x 28	1.340	55	5 1/4	4	2 1/4	77.50
3 1/2 x 30	1.374	57	5 1/4	4	2 1/4	80.00
3 1/2 x 36	1.720	63	5 1/4	4	2 1/4	85.00
3 1/2 x 42	2.000	69	5 1/4	4	2 1/4	90.00
4 x 10	.614	39	5 3/4	4 1/2	2 1/2	87.50
4 x 16	.982	45	5 3/4	4 1/2	2 1/2	90.00
4 x 20	1.230	49	5 3/4	4 1/2	2 1/2	92.50
4 x 24	1.473	53	5 3/4	4 1/2	2 1/2	95.00
4 x 28	1.720	57	5 3/4	4 1/2	2 1/2	97.50
4 x 30	1.842	59	5 3/4	4 1/2	2 1/2	100.00
4 x 36	2.210	65	5 3/4	4 1/2	2 1/2	105.00
4 x 42	2.600	71	5 3/4	4 1/2	2 1/2	110.00
4 1/2 x 10	.767	41	6 3/4	5	2 1/2	120.00
4 1/2 x 16	1.227	47	6 3/4	5	2 1/2	127.50
4 1/2 x 20	1.530	51	6 3/4	5	2 1/2	131.50
4 1/2 x 24	1.840	55	6 3/4	5	2 1/2	135.00
4 1/2 x 28	2.150	59	6 3/4	5	2 1/2	138.50
4 1/2 x 30	2.300	61	6 3/4	5	2 1/2	142.50
4 1/2 x 36	2.760	67	6 3/4	5	2 1/2	150.00
4 1/2 x 42	3.220	73	6 3/4	5	2 1/2	157.50
5 x 16	1.798	54	7 1/4	6	2 1/2	160.00
5 x 20	2.2	58	7 1/4	6	2 1/2	167.50
5 x 24	2.696	62	7 1/4	6	2 1/2	175.00
5 x 30	3.36	68	7 1/4	6	2 1/2	207.50
5 x 36	4.04	74	7 1/4	6	2 1/2	217.50
5 x 42	4.71	80	7 1/4	6	2 1/2	227.50
6 x 16	2.479	59	8 1/2	7	3 1/2	280.00
6 x 20	3.097	63	8 1/2	7	3 1/2	290.00
6 x 24	3.716	67	8 1/2	7	3 1/2	300.00
6 x 30	4.646	73	8 1/2	7	3 1/2	320.00
6 x 36	5.576	79	8 1/2	7	3 1/2	335.00
7 x 24	4.9	70	9 1/2	8	3 1/2	450.00
7 x 30	6.26	76	9 1/2	8	3 1/2	480.00
7 x 36	7.34	82	9 1/2	8	3 1/2	500.00
8 x 24	6.247	77	11	9	3 1/2	725.00
8 x 30	7.809	83	11	9	3 1/2	775.00
8 x 36	9.37	89	11	9	3 1/2	825.00

All Brass Eureka Tubular Well Cylinder

Fig. 450. Usually recommended when locating cylinder above screen point

Made of seamless drawn brass tubing and filled with poppet plunger and check valves. It is set in place, after the well is made, by means of seating tool attached to drill rod.

The seating tool revolves the cylinder proper and screws it down to the spring dog coupling, which holds firmly to the inside walls of the pipe or well casing. The rubber packing between cylinder and coupling is thus forced out against the pipe, making a firm tight joint.

Price includes valves and spring dog coupling.

Size of Well, Inches	Inside Diameter, Inches	Stroke, Inches	Price Each
2	1 3/4	12	\$ 6.40
2 1/2	1 3/4	16	7.60
2 1/2	2 1/4	12	11.00
2 1/2	2 1/4	16	12.50
3	2 1/4	12	15.00
3	2 1/4	16	17.00
3 1/2	3	12	30.00
3 1/2	3	16	33.00
4	3 1/2	16	35.00
4	3 1/2	24	42.00
4 1/2	4	16	50.00
4 1/2	4	24	58.00
5	4 1/2	24	60.00
5	4 1/2	36	80.00
6	5 1/2	24	112.00
6	5 1/2	36	136.00
8	7 1/2	36	360.00
8	7 1/2	42	400.00

Seating Tool for Eureka Cylinder

Cyl. ins.	2	2 1/2	3	4
Price each	\$0.60	\$0.90	\$1.20	\$2.40
Cyl. ins.	5	6	7	8
Price, each	\$6.00	\$8.00	\$10.00	\$12.00

Brass Jacket Drive Well Points

Made of galvanized wrought pipe punched with elliptical holes and covered with brass wire cloth protected by a heavy perforated brass jacket. Driving plug is malleable iron.

No.	Inside Diam. and Length, Point	Length Jacket, Inches	Openings Area, Sq. In.	No. of Gauge and Price Each		
				No. 60	No. 80	No. 90
74	1 x 24	18	15	\$ 33.00	\$ 46.00	\$ 52.00
78	1 x 36	30	25	51.00	66.00	76.00
90	1 1/2 x 24	18	20	36.00	52.00	60.00
94	1 1/2 x 30	24	26 1/2	46.00	64.00	75.00
98	1 1/2 x 36	30	33	56.00	76.00	90.00
100	1 1/2 x 42	36	39 1/2	66.00	88.00	105.00
102	1 1/2 x 48	42	45 1/2	76.00	100.00	120.00
136	1 1/2 x 24	18	22 1/2	48.00	65.00	75.00
140	1 1/2 x 30	24	30	60.00	80.00	96.00
144	1 1/2 x 36	30	37 1/2	72.00	96.00	114.00
148	1 1/2 x 48	42	52 1/2	120.00	155.00	186.00
152	1 1/2 x 60	54	67 1/2	144.00	185.00	222.00
156	1 1/2 x 72	66	82 1/2	176.00	225.00	270.00
160	2 x 24	18	26	75.00	94.00	110.00
168	2 x 36	30	43 1/2	105.00	130.00	154.00
172	2 x 48	42	62	135.00	166.00	198.00
176	2 x 60	54	78 1/2	165.00	202.00	242.00
180	2 x 72	66	96	195.00	238.00	285.00
184	2 1/2 x 36	30	50	180.00	230.00	260.00
188	2 1/2 x 48	42	70	230.00	300.00	340.00
192	2 1/2 x 60	54	90	280.00	370.00	420.00
196	2 1/2 x 72	66	110	330.00	440.00	500.00
204	3 x 48	42	94 1/2	360.00	470.00	520.00
208	3 x 60	54	112	420.00	550.00	610.00
212	3 x 72	66	139	480.00	630.00	700.00
214	3 x 84	78	166	560.00	720.00	800.00
206	3 1/2 x 48	42	98	460.00	580.00	660.00
210	3 1/2 x 60	54	126	520.00	660.00	750.00
213	3 1/2 x 72	66	140	600.00	750.00	840.00
218	3 1/2 x 84	78	168	680.00	840.00	960.00
220	4 x 72	60	150	780.00	960.00	1080.00
224	4 x 96	84	210			

Flush or tubular well points, extensions or points with other gauge or perforations, upon request. Be sure to state mesh of gauge desired.



Pump Cylinders or Working Barrels

In the cylinders listed below, Styles "D" and "C" are iron body—Style "D" has iron plunger, yoke and valve—Style "C" has iron plunger, brass yoke and valve. Styles A, B and E are brass body and brass lined types—Style A has iron caps and nuts, iron plunger, brass yoke and valve—Style B has iron caps and nuts, brass plunger, yoke and valve. Style E is all brass with two leather plungers.

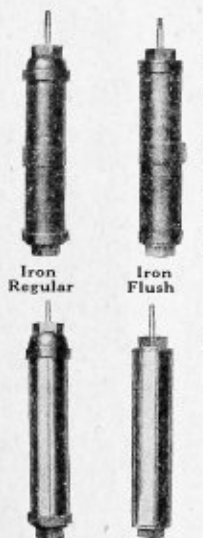
In the cylinder plungers Fig. 1 shows plunger furnished in Style B cylinders. It has brass yoke, poppet and follower, one leather and galvanized iron stub. Fig. 2—furnished in all Style A, C and D cylinders—10-inch size only. Design A has brass yoke and poppet, iron follower, one leather and galvanized iron stub. Design D is constructed entirely of iron with one leather and galvanized iron stub. Fig. 3—furnished in all Style A, C and D cylinders—12 and 14-inch sizes—construction same as designated in Fig. 2.

Fig. 4. Same as Fig. 3, furnished in Style A, C and D cylinders in sizes 16, 18 and 20 inches.

Fig. 5. Design B plunger complete, same as Fig. 2 and has two leathers.

Fig. 6. Design A, C and B plunger, same as Fig. 2 and has two leathers.

Fig. 7. Design B plunger, has brass yoke, follower and ball valve, two leathers and galvanized iron stub. Can be furnished in any type of cylinder.



Iron Regular Iron Flush



Fig. 1 Fig. 2 Fig. 3 Fig. 4 Fig. 5 Fig. 6 Fig. 7

Size	1 1/4	2	2 1/4	2 1/2	2 3/4	3	3 1/4	3 1/2	4	4 1/2	5	5 1/2	6	8
------	-------	---	-------	-------	-------	---	-------	-------	---	-------	---	-------	---	---

10-inch Cylinders—Price Each

Style D	\$ 3.75	\$ 4.00	\$ 4.35	\$ 4.70	\$ 5.00	\$ 5.40	\$ 5.80	\$ 6.20	\$ 6.60	\$ 7.00	\$ 7.40	\$ 7.80	\$ 8.20	\$ 8.60
Style C	4.50	4.75	5.10	5.45	5.80	6.15	6.50	6.85	7.20	7.55	7.90	8.25	8.60	8.95
Style A	7.50	7.75	8.00	8.25	8.50	8.75	9.00	9.25	9.50	9.75	10.00	10.25	10.50	10.75
Style B	8.00	8.25	8.50	8.75	9.00	9.25	9.50	9.75	10.00	10.25	10.50	10.75	11.00	11.25
Style E	10.75	11.00	11.25	11.50	11.75	12.00	12.25	12.50	12.75	13.00	13.25	13.50	13.75	14.00

12-inch Cylinders—Price Each

Style D	5.50	5.75	6.00	6.25	6.50	6.75	7.00	7.25	7.50	7.75	8.00	8.25	8.50	8.75
Style C	6.25	6.50	6.75	7.00	7.25	7.50	7.75	8.00	8.25	8.50	8.75	9.00	9.25	9.50
Style A	8.00	8.25	8.50	8.75	9.00	9.25	9.50	9.75	10.00	10.25	10.50	10.75	11.00	11.25
Style B	9.25	9.50	9.75	10.00	10.25	10.50	10.75	11.00	11.25	11.50	11.75	12.00	12.25	12.50
Style E	12.50	12.75	13.00	13.25	13.50	13.75	14.00	14.25	14.50	14.75	15.00	15.25	15.50	15.75

14-inch Cylinders—Price Each

Style D	6.00	6.25	6.50	6.75	7.00	7.25	7.50	7.75	8.00	8.25	8.50	8.75	9.00	9.25
Style C	6.75	7.00	7.25	7.50	7.75	8.00	8.25	8.50	8.75	9.00	9.25	9.50	9.75	10.00
Style A	8.50	8.75	9.00	9.25	9.50	9.75	10.00	10.25	10.50	10.75	11.00	11.25	11.50	11.75
Style B	9.75	10.00	10.25	10.50	10.75	11.00	11.25	11.50	11.75	12.00	12.25	12.50	12.75	13.00
Style E	12.75	13.00	13.25	13.50	13.75	14.00	14.25	14.50	14.75	15.00	15.25	15.50	15.75	16.00

16-inch Cylinders—Price Each

Style D	6.00	6.25	6.50	6.75	7.00	7.25	7.50	7.75	8.00	8.25	8.50	8.75	9.00	9.25
Style C	6.75	7.00	7.25	7.50	7.75	8.00	8.25	8.50	8.75	9.00	9.25	9.50	9.75	10.00
Style A	9.00	9.25	9.50	9.75	10.00	10.25	10.50	10.75	11.00	11.25	11.50	11.75	12.00	12.25
Style B	10.50	10.75	11.00	11.25	11.50	11.75	12.00	12.25	12.50	12.75	13.00	13.25	13.50	13.75
Style E	13.00	13.25	13.50	13.75	14.00	14.25	14.50	14.75	15.00	15.25	15.50	15.75	16.00	16.25

18-inch Cylinders—Price Each

Style D	6.75	7.00	7.25	7.50	7.75	8.00	8.25	8.50	8.75	9.00	9.25	9.50	9.75	10.00
Style C	7.50	7.75	8.00	8.25	8.50	8.75	9.00	9.25	9.50	9.75	10.00	10.25	10.50	10.75
Style A	9.50	9.75	10.00	10.25	10.50	10.75	11.00	11.25	11.50	11.75	12.00	12.25	12.50	12.75
Style B	11.00	11.25	11.50	11.75	12.00	12.25	12.50	12.75	13.00	13.25	13.50	13.75	14.00	14.25
Style E	13.75	14.00	14.25	14.50	14.75	15.00	15.25	15.50	15.75	16.00	16.25	16.50	16.75	17.00

20-inch Cylinders—Price Each

Style D	7.50	7.75	8.00	8.25	8.50	8.75	9.00	9.25	9.50	9.75	10.00	10.25	10.50	10.75
Style C	8.25	8.50	8.75	9.00	9.25	9.50	9.75	10.00	10.25	10.50	10.75	11.00	11.25	11.50
Style A	10.00	10.25	10.50	10.75	11.00	11.25	11.50	11.75	12.00	12.25	12.50	12.75	13.00	13.25
Style B	11.50	11.75	12.00	12.25	12.50	12.75	13.00	13.25	13.50	13.75	14.00	14.25	14.50	14.75
Style E	14.00	14.25	14.50	14.75	15.00	15.25	15.50	15.75	16.00	16.25	16.50	16.75	17.00	17.25

The 1 1/4-inch cylinders furnished flush only. Cylinders 2 to 3 1/4-inch diameter are regularly tapped at the top and bottom for 1 1/4-inch pipe, the 3 1/2-inch for 1 1/2-inch pipe and 4-inch and over for 2-inch pipe. 1 1/4-inch all brass cylinder tapped only for 1-inch pipe. All cylinder stubs fitted for 3/4-inch couplings, but may be fitted for 1/2-inch if desired.

Unless specified iron cylinder, except 10-inch, will be sent Style C—brass lined and brass body cylinder. Style A cylinders are regularly equipped with outside caps and nuts. Flush caps and nuts are extra.

The "Rife" Hydraulic Ram

Patented-Automatic

For the Supply of Water to Villages, Estates, Farm Houses, Cottages, Railroad Tanks and for Irrigating Purposes.

The hydraulic ram is a self-acting pump which utilizes the momentum of a fall of water to force a part of the water to an elevation many times as high as the fall used to operate the ram.

The simplicity and durability of this machine makes it useful and economical for forcing water to distant and elevated points.

A slight fall only is required to operate the ram, but as the amount of fall is increased, its operation becomes more powerful, and will force water in a proportionately larger flow or to a higher elevation.

The amount of water delivered or the proportion of the water raised to the amount wasted in operating the ram, varies with the amount of fall and height to which it is elevated.

An increase in the fall or decrease in the head will cause a corresponding increase in the amount of water delivered by the ram.

Rams are frequently used for forcing water 100 to 200 rods and to elevations of 100 to 150 feet.

Water can be used direct from the ram or from a storage tank which is kept filled by the ram.

The Rife ram will force water to an elevation of 20 to 30 feet for every foot of fall obtained in the flow of stream. The wearing parts are of unusual durability, simple, few in number and easily replaced.

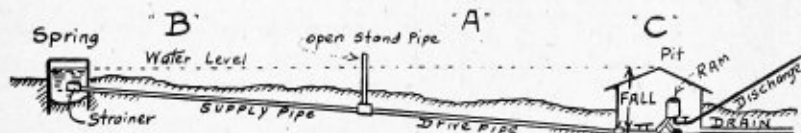
The Double Acting Ram is used where combined flow of spring and creek is necessary for water supply.

Showing Sizes 10 to 40.

Method of Operation.—See sectional view. Escape valve "C" is open permitting flow down the drive pipe to increase in velocity until lifting force of escaping water is sufficient to raise and close this valve, cutting off flow. As drive pipe "A" is quite long, holding a large quantity of rapidly flowing water, this water when suddenly stopped forces a small portion of the water into air chamber "E" through delivery valve "D." As soon as pressure in air chamber "E" becomes equal to the pressure suddenly created in drive pipe "A," the valve "D" closes again, thus trapping the water which has entered "E." This water, in entering, has caused the air to become compressed in air chamber "E" and this is what forces the water into delivery pipe "F."

Valve "C" remains up against its seat as long as the high pressure exists in the drive pipe "A," but as this pipe is open at the intake end, the extreme pressure cannot exist there more than a fraction of a second during which time the water in the drive pipe "A" has rebounded, which causes a partial vacuum under the escape valve "C," allowing it to drop back to its original position. At this point the cycle of operation is again started. The air feeder "H" admits a small quantity of air during each cycle, which supplies the necessary compressed air for the air chamber, also for pneumatic system when used.

Information necessary. Flow of water in gallons per minute. Fall in feet. Distance in which fall is obtained. Height above ram water is to be raised. Distance water is to be delivered. How many gallons per day are required. If double acting ram, state flow, in gallons, of spring water per minute and fall from spring to ram.

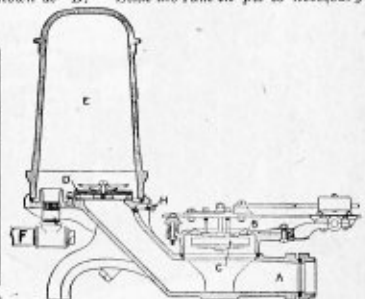


Method of locating. Locate ram the proper distance from spring or water supply and connect as shown at "A." Conduct water to an intermediate reservoir or standpipe located at proper distance from ram and connect as shown at "B." Sink the ram in pit to necessary depth and lay drain pipe as at "C."

Three feet is the least number of feet of fall recommended.

No.	Price		Weight Lbs.	Gallons per Min. Required to Operate Ram	Piping Drive Pipe Delivery Pipe	Dimensions in inches		
	Single Acting	Double Acting				Height	Length	Width
10	\$ 50.00	\$ 60.00	150	2 to 6	1 1/2	26	34	12
15	55.00	65.00	175	6 to 12	1 3/4	26	36	12
20	60.00	70.00	225	8 to 18	2	29	39	14
25	65.00	76.00	250	12 to 28	2 1/2	29	40	15
30	75.00	85.00	275	20 to 40	3	31	43	15
40	150.00	165.00	600	30 to 75	4	43	57	20
60	275.00	300.00	1200	75 to 150	6	56	72	27
80	500.00	550.00	2200	150 to 300	8	76	96	36
120	750.00	850.00	3000	375 to 700	12	105	100	32

To arrive at amount of water delivered—multiply the gallons per minute available for supplying ram by the number of feet of fall. Multiply this amount by 40, then divide by height in feet the water is to be delivered. Multiply this amount by 24 gives the capacity in gallons for 24 hours.



Sectional View

A—drive pipe, B—discharge, C—escape valve, D—delivery valve, E—air chamber, H—air feeder

Suction and water conducting hose described and priced on another page.

No. 386 Gasoline Garage Pump

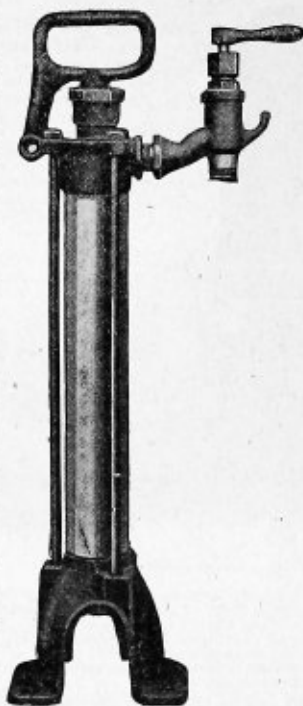


For elevating gasoline, kerosene and oils of similar nature from an underground tank or reservoir and delivering to receptacle at any point within a radius of 50 feet from the pump. Suitable hose can be attached to spout for delivering oil to auto.

Working head or cylinder consists of a seamless brass tube, to which is fitted an iron cap and base. The cap is in one piece and chambered for a fibre gasket—making a tight joint. The base is connected to cylinder in the same manner. Four bolts connect the cap and base, holding all parts firmly in place. The gland stuffing-box nut used prevents all leakage around the piston. This head, including sub-base, is mounted on an iron pipe pedestal 25 inches high. Height of pump is 34 inches from base to discharge and 43 inches to highest point.

Plunger is brass; no leather or packing of any kind is used. Three brass rings fit into the follower and are held in position by a yoke which screws into follower. An original feature of this pump is the all brass trip valve, located in the sub-base. This valve is ground on to a brass seat and operated by a nickel plated button and stem. When operating the pump this valve must be closed and the stem pulled out. When through pumping, to drain, open valve by pushing in the button. Pump is provided with a device for locking the lever to prevent tampering. Position of discharge is adjustable.

Direct Action Gasoline Garage Pump



This is another style of hand operated gasoline pump. Like the No. 386 it is constructed to comply with the specifications and requirements of the national board of fire underwriters. It has been approved and bears the label of inspection attached to cylinder. It occupies very little space, works easily and has a large pumping capacity.

The handle can be locked down to prevent tampering and it is provided with a safety cock on which a pail may be hung or to which a hose may be attached to carry the gasoline to an automobile or power boat tank.

Diameter
Eve, ins. 2
Stroke, ins. 12
Suction, ins. 1
Weight, lbs. 16
Price \$16.40

No.	Price Each	Approximate Capacity, per Stroke	Diameter Cylinder, Inches	Stroke, Ins.	Wght., Lbs.
2	\$26.40	1 pint	2 1/4	5	40
6	\$4.00	1 quart	3 1/2	5	46

No. 391. Power Rotary Force Pump for Gasoline

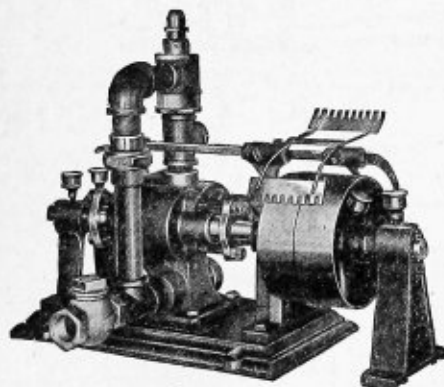
Approved by National Board of Underwriters

These pumps are designed for economical and absolutely safe handling of gasoline and other oils of a similar combustible nature.

Adopted by manufacturers of dry cleaning systems for installation in connection with their equipment and by users of gasoline generally, as a sure precaution against explosions and fire and to comply with the requirements of fire insurance companies, city ordinances and state laws. Can be connected to draw from two or more tanks containing different liquids.

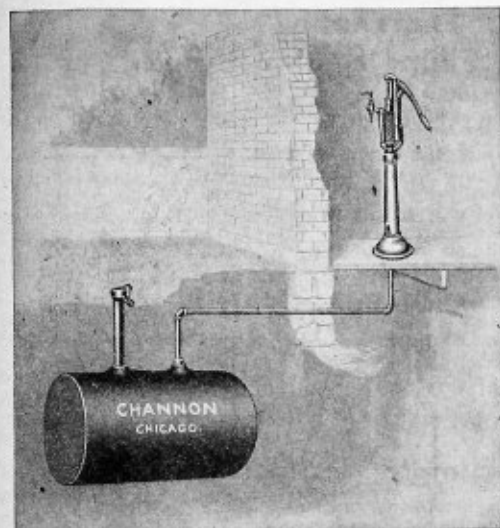
These pumps have Tobin bronze shafts, brass check and relief valves, copper depolarizer, brass oil cups, bronze cams, brass valve and galvanized malleable fittings.

The bronze cams are milled to gauge and adjusted to fit the accurately bored case with just enough clearance to secure the maximum efficiency.



No. 391 Rotary Gasoline Force Pump

Size No.	Capacity at 100 R. P. M.	Suction Fitted for	Disch'ge Fitted for	Size of Pulley, Inches	Wght., Lbs.	Price Each
391	13 gals. per Min.	1 1/4-inch pipe	1 1/4-inch pipe	7 1/2 x 2 1/2	155	\$75.00



We furnish Piping enough to place Tank about 20 feet away from Pump

How to Place Tank

To comply with the insurance regulations in most states, the tank should be buried far enough underground so that at least two feet of earth will cover it. The use of cinders or ashes around the tank should be scrupulously avoided, as they start a chemical action that will corrode and rust through any exposed metal. Black earth, clay, or gravel will give no trouble in this respect.

The pumps furnished are specially designed for this class of work. The cylinder is heavy seamless brass tubing and all valves, piston and piston-rod are brass. The valves are accurately ground to their seats. A suitable stand is furnished, placing the pump within easy reach. The suction pipe may be taken from either the bottom or side of bottom flange. A lock and key is furnished to protect the gasoline supply. By substituting self-measuring pump any outfit can be converted from a non-measuring to a high grade measuring system.

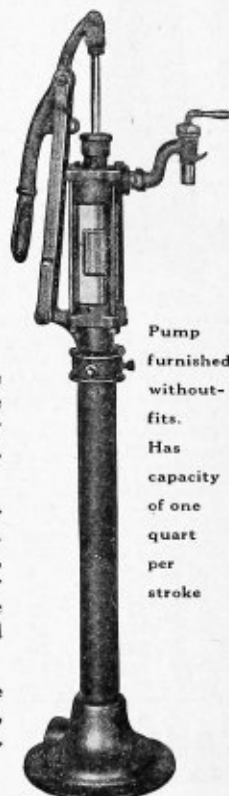
Prices below include welded or riveted tank as desired, pump, filler pipe complete with dust-proof cap, two locks and keys, filler tube with screen, suction tube, pipe and fittings as shown cut and fitted, ready to install. Gasoline hose is extra.

Gasoline Underground Storage Outfits

For Garages and Supply Depots

Comply with all Insurance and State Laws
Covering Storage of Gasoline

These outfits are designed to meet the growing demand for a high grade storage system—they are built right—entirely removing all danger of explosion, fire, theft, loss by evaporation or leakage—they are dependable in every respect.



Pump
furnished
without-
fits.
Has
capacity
of one
quart
per
stroke

Complete Outfit Using Riveted Tank

Number of Outfit	Capacity in Gallons	Price with 14-Gauge Tank	Price with 12-Gauge Tank
216	65	\$ 55.50	\$ 65.00
217	120	64.00	76.00
218	180	70.00	84.00
219	230	80.00	97.00
220	275	90.00	112.00
221	315	100.00	125.00
222	365	112.00	140.00
223	500	130.00	160.00
224	825	195.00	225.00
225	1025	225.00	225.00

Complete Outfit Using Welded Tank

Number of Outfit	Capacity in Gallons	Price with 14-Gauge Tank	Price with 12-Gauge Tank
226	65	\$ 55.00	\$ 65.00
227	120	62.00	73.00
228	180	67.00	80.00
229	230	78.00	94.00
230	275	88.00	110.00
231	315	98.00	120.00
232	365	110.00	135.00
233	500	127.00	160.00
234	825	190.00	225.00
235	1025	225.00	225.00

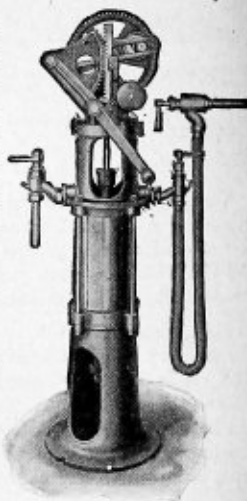


Side Walk Pump

Each outfit consists of pump with tank of capacity and gauge stated. The tank has a suction line extending to the bottom, which is fitted with an all-brass wire screen foot valve, and an all-brass check valve. A 2-inch double construction fill-pipe with fine wire screen filter and lock cap is also furnished with each tank. 1½-inch galvanized pipe is used for connecting the pump to the suction line in the tank. This is not furnished.

Prices

Complete Outfit Garage Pump with Tank				Complete Outfit Curb Pump with Tank			
Outfit No.	Capacity Tank, Gallons	Gauge Steel	Price	Outfit No.	Capacity Tank, Gallons	Gauge Steel	Price
21- 2	110	14	\$123.00	41- 2	110	14	\$217.00
21- 3	165	14	131.00	41- 3	165	14	225.00
21- 5	275	14	148.00	41- 5	275	14	242.00
21- 5	275	12	153.00	41- 5	275	12	250.00
21- 7	375	12	178.00	41- 7	375	12	270.00
21-10	550	14	193.00	41-10	550	14	287.00
21-10	550	12	207.00	41-10	550	12	300.00



Garage Pump

Motor Driven Positive Force Rotary Pumps

For Gasoline Filling Stations

A very efficient and compact unit. Size 22x12x60 inches high. Suitable for curb or inside use.

It has a ¾ H. P. electric motor direct connected to a ¾-inch pump, which delivers 10 gallons per minute.

It has a 10-gallon meter which also shows quarts on dial, obviating the risk of short or overmeasure.

The meter is thoroughly tested and accurate.

Ten feet of gasoline hose furnished with each outfit.

Gross weight about 125 pounds. Painted a good red.

Persons wanting a first class power driven pump will make no mistake in ordering this outfit.

Price.....\$333.00

Pump with Cover
RemovedPump with Cover
for Curb Use

The Doran Gasoline Filling Station Pumps

The Doran self-measuring gasoline pump is without question the best on the market.

All pumping motion is forward, there being no reverse motion. Five revolutions of the crank give a complete up-and-down pump stroke and one gallon of liquid. Ten revolutions give two gallons.

The action is continuous, in fact no other pump equals it in pumping efficiency or in ease of operation.

Furnished either with or without storage tanks.

Curb Pump

The Curb pump has the same equipment as below together with an 8-foot length of armored gasoline hose, fitted with a new model, long fill-pipe nozzle with a fine mesh wire screen filter.

Price.....\$171.50

Electric fixture wired for connection with a 10-inch ruby globe. Price extra..\$15.00

Garage Pump

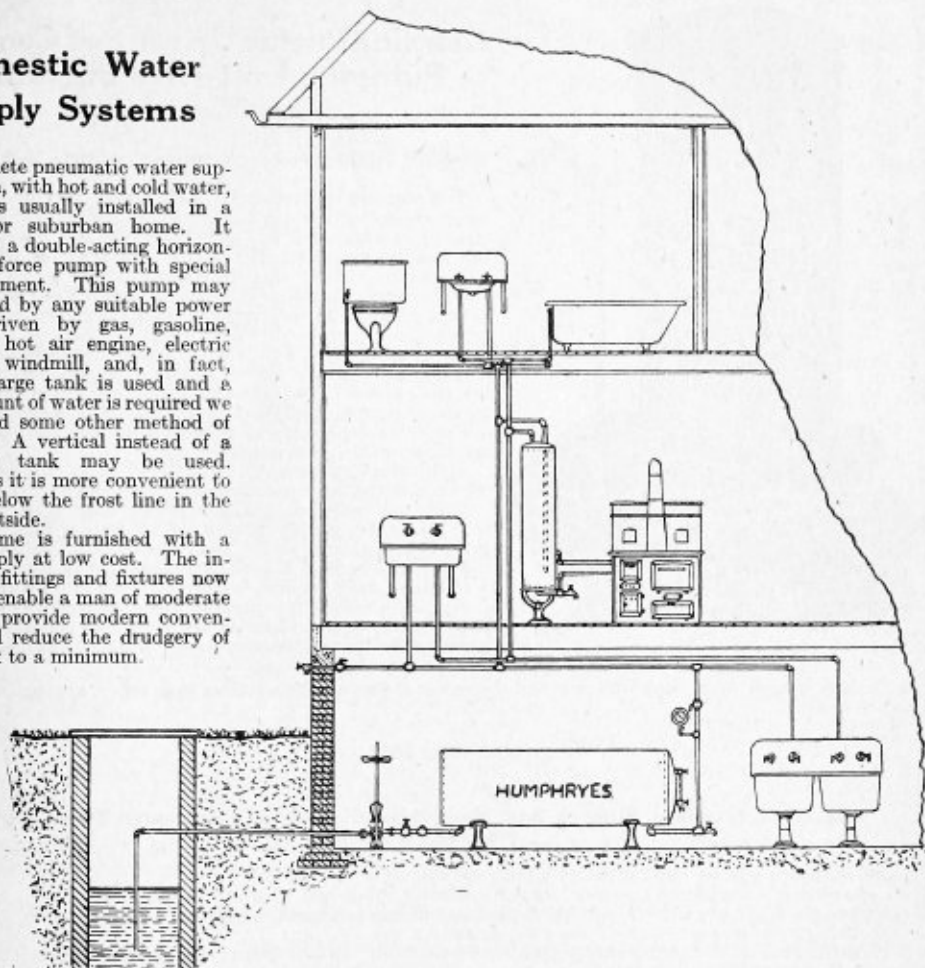
The Garage pump has a 10-gallon register which may be set back to "0" from any point. A 1½-inch suction line is used, and a brass to iron ground seat union and an all-brass check foot valve is furnished with every pump.

Price.....\$77.50

Domestic Water Supply Systems

A complete pneumatic water supply system, with hot and cold water, such as is usually installed in a country or suburban home. It consists of a double-acting horizontal hand force pump with special air attachment. This pump may be replaced by any suitable power pump, driven by gas, gasoline, steam or hot air engine, electric motor or windmill, and, in fact, where a large tank is used and a large amount of water is required we recommend some other method of pumping. A vertical instead of a horizontal tank may be used. Sometimes it is more convenient to bury it below the frost line in the ground outside.

The home is furnished with a water supply at low cost. The inexpensive fittings and fixtures now furnished enable a man of moderate means to provide modern conveniences and reduce the drudgery of housework to a minimum.



The application of compressed air to the moving of liquids is not new. It has been used in various forms for a great many years, but the successful application has been brought about only in the past few years and after a great deal of experimental work. The experimental stage is now past and the pneumatic water system is a pronounced success. Thousands of such systems are now in operation. Their reliability is attested by the fact that many large public buildings depend upon this system alone for their water supply.

Operation

The operation of the pneumatic water works system is exceedingly simple. The essential apparatus consists merely of a pump, an air-tight tank and the necessary pipes for the transmission of water. The pump and the tank must of a necessity be designed for their work. If water be pumped into an air-tight tank, it occupies part of the space originally occupied by air. There is no escape for the air, and it is therefore crowded or compressed into a smaller space. Additional pumping will further compress the air until the limit of the apparatus is attained. If a valve at the bottom of the tank is now opened, the water will be forced out by the expansion of the air. Under these conditions, the entire amount of water will be forced out of the tank.

A house equipped with the pneumatic system has perfect fire protection. In large cities the water pressure is usually less than 50 pounds. This pressure is easily available with the pneumatic system and it is equivalent to that given by a tank elevated to a height of one hundred and fifteen feet.

The following pages contain descriptions and prices of a few popular sizes and types of pneumatic pumpers, enamel ware, etc. Write for full information and catalog on special outfits.

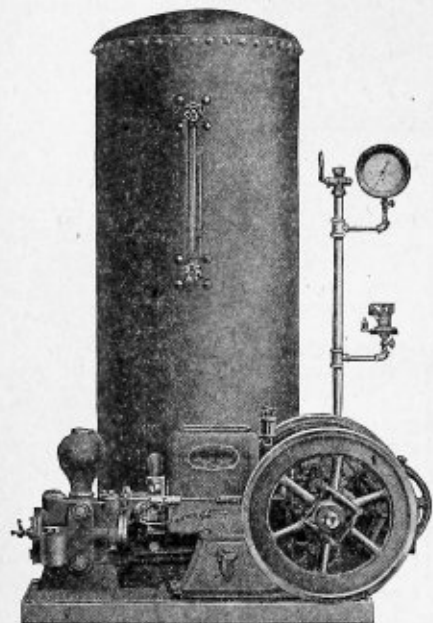


Fig. 300

Gasoline Engine Driven Self Contained Pumping Unit With Pneumatic Tank Connected

With All Fittings Necessary for a Complete Water System

This pumping unit consists of a $1\frac{1}{2}$ horse power gasoline driven, direct connected pump for use where the vertical suction distance does not exceed 20 feet. It has the fuel reservoir cast in the base, doing away with all danger from leaking gasoline. The ignition is furnished by a water-proof magneto, built on and directly connected to the engine, making necessary the use of only one wire to connect with the spark mechanism on the cylinder.

The gearing driving the pump may be instantly detached by a simple movement of a lever handle. By disengaging the gearing, the gasoline motor is available for other power work, it being regularly equipped with a 5x8-inch pulley, allowing economical operation of numerous labor saving devices such as washing machines, cream separators, etc.

All bearings are jig babbitted and all gears are machine cut minimizing the noise usually incident to gear driven units.

The pump proper on the unit is brass lined with brass valve seats, the valve poppets are one piece, leather faced and have extra long guides to insure proper seating. The pump piston rod is one piece solid bronze turned and polished.

It can be used with any sized pneumatic or open tank.

Fig. 300 gasoline pump has a capacity of 450 gallons per hour. It has magneto ignition and air intake valve. The engine is instantly detachable for power work. Automatic circuit breaker for stopping engine.

All valves, gauges, wood supports, pipe and fittings as shown above including foot valve, are cut and fitted, ready to install.

Fig. 300

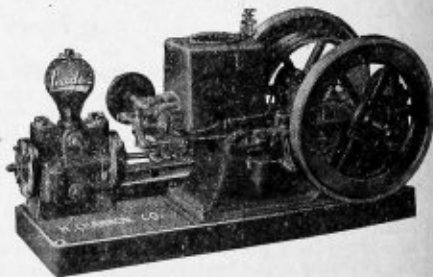
Prices of Standard Pumper and Most Popular Sizes of Pneumatic Tanks with Necessary Fittings

Fig. 300 Standard pumper only, fitted with magneto and air intake valve.....	\$150.00
If air compressor is wanted on pump in place of intake air valve, add to price.....	5.00
If complete dry battery ignition is wanted in place of magneto, deduct from price.....	7.00
If both battery and magneto ignition are wanted, add.....	10.00
Fig. 300 equipment complete, with 24-inch by 6-foot tank. Total capacity 140 gallons, working capacity 95 gallons. Weight 955 pounds. Price.....	\$250.00
Complete with 30-inch by 6-foot tank. Total capacity 220 gallons, working capacity 145 gallons. Weight 1085 pounds. Price.....	\$265.00
Complete with 30-inch by 8-foot horizontal tank. Total capacity 295 gallons, working capacity 195 gallons. Weight 1305 pounds. Price.....	\$280.00

The Pumper consists of a $1\frac{1}{2}$ H. P., direct connected gasoline pumping unit, as shown.

The gasoline motor is equipped with a speed changing lever acting directly on the governor, which allows the speed of the motor to be changed instantly while operating. This permits the capacity to be increased or decreased as desired.

If equipped for operation on natural or artificial gas, instead of gasoline, add \$12.50 to above prices, or for operating on both gas and gasoline add \$25.00.



Standard Pumper for Fig. 300 unit

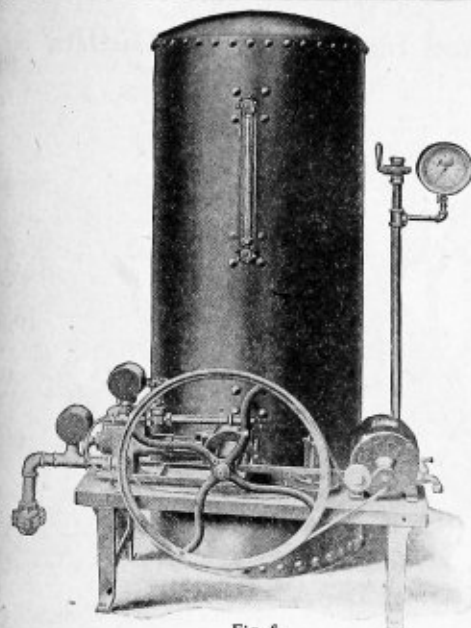


Fig. 6

Automatic Self Contained Electric Pumping Unit

Connected with pneumatic tank and all fittings necessary to make a complete water system.

This electric pumping unit is for use only where vertical suction distance is not more than 20 feet.

The pump is a fine piece of workmanship, with brass lined cylinder. All working parts enclosed in a dust-proof case and running constantly in an oil bath, which feature, together with a flexible flat belt drive, insures the maximum power being transmitted to the pump piston and permits the use of a medium speed motor.

The water cylinder is fitted with an air intake valve for supplying air to a pressure system.

The pump, motor and controller, are all mounted on a cast iron base, making a very compact rig.

This unit is built in two sizes, 180 and 360 gallons capacity per hour. The 180-gallon size is arranged with motor for two pressures, 35 pounds and 50 pounds maximum, the 35-pound pump being recommended for open tank work. The pump of 360 gallons capacity is equipped with motor for one pressure only—50 pounds maximum.

In ordering be sure to state voltage, whether current is direct or alternating, whether one, two or three phase and what cycle, also type and number of pump.

Price List Pumper Only

Pump No.	Capacity per Hour Gallons	Pipe Connections		Total Head in Feet	Maximum Pressure Pounds	Shipping Weights Pounds	List Prices		
		Suction Inches	Discharge Inches				Type R, with A. C. 1, 2 or 3 Phase 60 cycle motor 110 or 220 volts	Type S, with D. C. 110 or 220 volt Motor	Type T, with D. C. 30 or 60 volt Motor
1	180	3/4	1/2	110	50	160	\$125.00	\$108.00	\$125.00
2	180	3/4	1/2	75	35	140	108.00	95.50	108.00
3	360	1	3/4	110	50	245	162.50	145.75	179.00

These pumping units can be used with any size of pneumatic or open tank. We list below the popular sizes or pneumatic tanks complete with fittings.

Specifications and Prices Complete Units

WITH No. 1 Electric pumper, capacity 180 gallons per hour against maximum pressure of 50 pounds, complete with motor for A. C. S. P. 60 cycle 110 or 220 volt current.

Automatic pressure controller set to cut in at 30 pounds minimum and out at 50 pounds maximum.

All valves, gauges, motor, controller, pipe and fittings as shown above, cut and fitted ready to install.

Complete with 24-inch by 5-foot tank. Total capacity 120 gallons, working capacity 80 gallons. Weight 580 pounds. Price.....\$193.00

Complete with 24-inch by 6-foot tank. Total capacity 140 gallons, working capacity 95 gallons. Weight 630 pounds. Price.....\$196.00

Complete with 30-inch by 6-foot tank. Total capacity 220 gallons, working capacity 145 gallons. Weight 760 pounds. Price.....\$205.00

WITH No. 3 Electric pumper, capacity 360 gallons per hour against maximum pressure of 50 pounds, complete with motor A. C. S. P. 60 cycle 110 or 220 volt current.

Automatic pressure controller set to cut in at 30 pounds minimum and out at 50 pounds maximum.

All valves, gauges, motor, controller, wood supports, pipe and fittings as shown above, cut and fitted ready to install.

Complete with 30-inch by 6-foot tank. Total capacity 220 gallons, working capacity 145 gallons. Weight 860 pounds. Price.....\$264.00

Complete with 30-inch by 8-foot tank. Total capacity 295 gallons, working capacity 195 gallons. Weight 1000 pounds. Price.....\$266.00

Complete with 30-inch by 10-foot tank. Total capacity 365 gallons, working capacity 240 gallons. Weight 1130 pounds. Price.....\$274.00

Complete with 36-inch by 10-foot tank. Total capacity 525 gallons, working capacity 350 gallons. Weight 1365 pounds. Price.....\$295.00

Power Pumps Especially Designed for Pneumatic Outfits

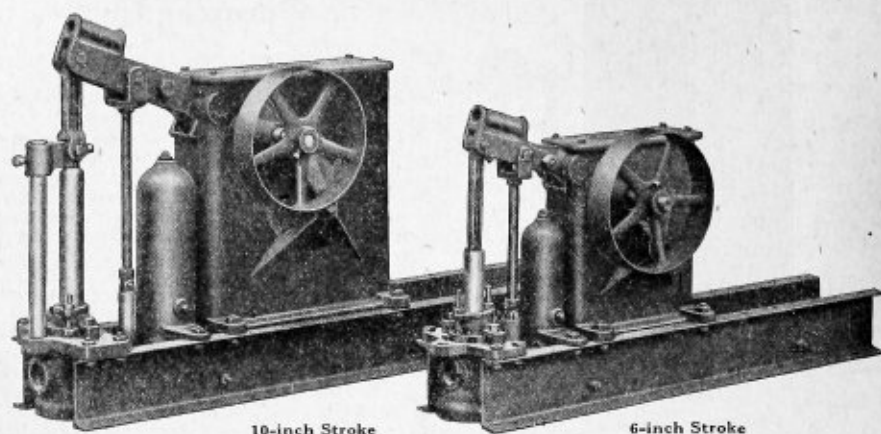


Fig. 5. Oil Cased Deep Well Heads

Simplicity in the design of this pump has been so thoroughly worked out as to develop a principle of operation altogether new.

A pinion and gear with crank-pin operating in a slotted lever, bell crank type, constitutes the complete transmission, insuring positive lubrication and reducing noise and wear and tear to the minimum.

When a cylinder $2\frac{1}{2}$ inches or larger is used, a $1\frac{3}{4}$ -inch differential plunger is furnished. The differential plunger which is used only in connection with a single acting cylinder, allows for a discharge of a part of the water on the down stroke, producing an even flow and reducing strains on pump rod and connections. When a cylinder smaller than $2\frac{1}{2}$ inches is installed, the regular $\frac{5}{8}$ -inch plunger rod will be furnished, unless otherwise specified.

A belt tightener insures maximum belt contact and the load can be relieved while starting by simply lifting the idler pulley until engine is running at proper speed.

The air compressor plunger is operated directly from the bell crank and is connected to the discharge head, into which the air is directly forced. The supply to air compressor can be controlled by air cock on inlet.

The channel steel base as regularly furnished is for pump alone, and is 2 feet 4 inches long, but if electric or gasoline power is to be used, we will furnish channels four feet long for bases at no additional cost. If power is wanted, we can furnish either gasoline or electric motor.

Table of Capacities and Duties

Prices

Nominal Inside Diam. of Well Casing or Drop Pipe, in Inches	Exact Inside Diam. of Cylinder or Working Barrel, in Inches	Outside Diameter of Differential Plunger or Rod, in Inches		Nominal Size of Octagon or Square Wood Rod, in Inches		Nominal Inside Diameter of Discharge Pipe, in Inches		Piston Displacement in Gallons per Hour		Pounds Pressure per Square Inch at Discharge Outlet
		6-inch	10-inch	6-inch	10-inch	6-inch	10-inch	6-inch	10-inch	
2	1 $\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	1 $\frac{1}{8}$	1 $\frac{3}{8}$	1	1 $\frac{1}{4}$	161	266	100
2 $\frac{1}{2}$	2 $\frac{1}{8}$	1 $\frac{1}{4}$	1 $\frac{3}{8}$	1 $\frac{3}{8}$	1 $\frac{5}{8}$	1 $\frac{1}{4}$	1 $\frac{3}{8}$	247	412	75
3	2 $\frac{3}{8}$	1 $\frac{3}{4}$	2 $\frac{1}{8}$	1 $\frac{5}{8}$	1 $\frac{7}{8}$	1 $\frac{3}{8}$	1 $\frac{1}{2}$	370	618	50
3 $\frac{1}{2}$	3 $\frac{1}{8}$	1 $\frac{3}{4}$	2 $\frac{1}{4}$	1 $\frac{7}{8}$	1 $\frac{7}{8}$	1 $\frac{1}{2}$	2	516	860	25
4	3 $\frac{3}{8}$	1 $\frac{3}{4}$	2 $\frac{1}{4}$	1 $\frac{7}{8}$	2 $\frac{1}{4}$	1 $\frac{1}{2}$	2	688	1150	25

6-inch stroke, 17x48-inch space, weight 370 pounds. Price \$ 80.00

10-inch stroke, 20x60-inch space, weight 585 pounds. Price 145.00

Specify in your order whether long or short base is wanted.

Size of pump pulley must always be specified in ordering, otherwise 12-inch pulley suitable for engine or line shaft drive will be furnished.

Discharge head is regularly tapped for 4-inch drop pipe and 1 $\frac{1}{4}$ -inch discharge. Bushings of sizes mentioned above will be furnished as ordered.

Bulldozer Power Pump With Air Compressor for Pneumatic Water Works Service

Self Contained Ready for Operation

Specifications

The **Cylinder** is formed by the main body of the pump and is bored and lined with a heavy seamless drawn brass tubing 3 inches in diameter with 5-inch stroke.

The **Gears** are double, with $1\frac{1}{4}$ -inch face, and back geared 5 to 1. All gears are cut.

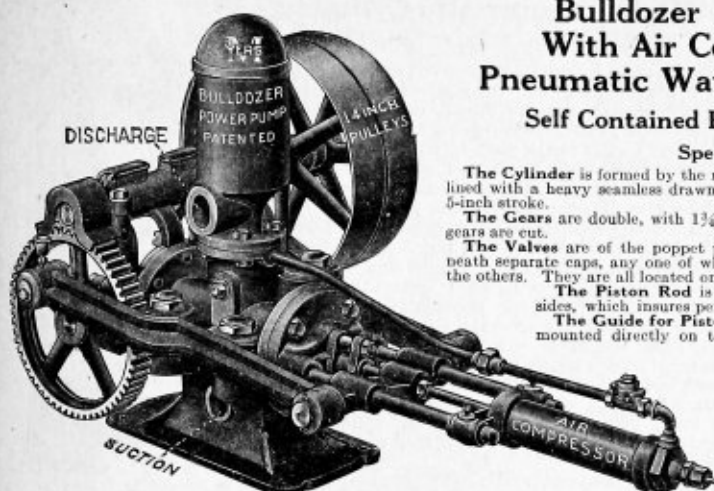
The **Valves** are of the poppet pattern, and placed immediately underneath separate caps, any one of which can be removed without disturbing the others. They are all located on top of the pump.

The **Piston Rod** is brass covered, and driven from both sides, which insures perfect alignment.

The **Guide for Piston** is composed of two heavy steel rods, mounted directly on the head of the pump, insuring perfect alignment.

The **Pulleys** are 14x2 $\frac{1}{2}$ -inch face, tight and loose.

The **Air Compressor** is a seamless brass body cylinder, mounted directly on the yoke guide of the pump, the piston rod of the pump serving as a piston for the air compressor.



Capacity 400 gallons per hour.	Size of water cylinder 2	x5 inches, of air cylinder 1 $\frac{1}{4}$ x5 inches.	Price	\$65.00
Capacity 650 gallons per hour.	Size of water cylinder 2 $\frac{1}{2}$ x5 inches, of air cylinder 2	x5 inches.	Price	72.00
Capacity 900 gallons per hour.	Size of water cylinder 3	x5 inches, of air cylinder 2	x5 inches.	80.00

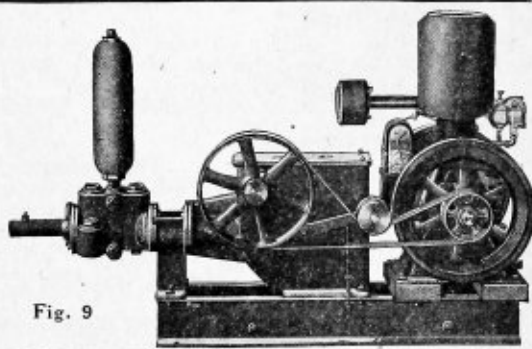
Oil Cased Suction Pump

Can be operated by gas engine, as shown, electric motor, line shaft, or any other available power. Gears enclosed in oil tight case, reducing wear and noise to the minimum and eliminating danger from exposed gears.

Designed primarily for pressure water system pumping, but adapted for various forms of pumping where compactness, rigidity and durability are essential and pressure desirable.

Price on any kind of power direct connected to pump on application.

Diam. of Pump Cylinder, Inches	Stroke, Inches	Diam. of Suction	Diam. of Discharge	Nominal Capacity Gallons per Hour	Price Pump Only For Belt Drive
3	5	1 $\frac{1}{4}$	1 $\frac{1}{4}$	700	\$105.00
4	5	2 $\frac{1}{2}$	2	1200	126.00
5	5	2 $\frac{1}{2}$	2	2000	148.00



Electric House Pump

For Use with Open or Pneumatic Tank Outfits or Shallow Wells

Capacity 60 gallons per hour

Specifications

The **Plunger** is all brass, $1\frac{1}{4}$ -inch in diameter, hemp packed.

The **Stroke**, 2-inch.

Suction and Discharge, $\frac{1}{4}$ -inch.

The **Valves** are brass, leather faced—brass seats.

Belt Pulley, 20x1 $\frac{1}{2}$ inches.

The **Stand** is fitted with a hardwood board, to which the motor is attached.

The **Speed**, from 100 to 135 revolutions per minute.

The **Air Cylinder** is cast brass neatly bored and polished.

The air is controlled by moving the lever "A" into a vertical or horizontal position. When set in a horizontal position it pumps air into the tank through the water line. When set in a vertical position the air is discontinued.

Floor Space, 16x20 inches. Motor $\frac{1}{4}$ H. P., driven from electric light wire.

An Ideal Booster pump for city water line where pressure is light.

For Pressure Tank Systems

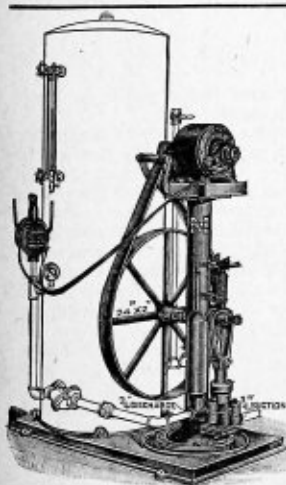
Electric house pump with air compressor and $\frac{1}{4}$ H. P., A. C., 60 cycle, single phase, 110 volt motor, with belt. List

Electric house pump with air compressor and $\frac{1}{4}$ H. P., A. C., 60 cycle, single phase, 110 volt motor and automatic electric switch and belt. List

For the above pumps fitted with 110 volt D. C. motor, deduct from the above list prices, \$5.00.

For open tank service deduct from list, \$8.00.

Prices on application for outfits with motors for any current not mentioned above.



Hydro-Pneumatic Cylinder

Fig. 1445

To be used in connection with any force pump head for forcing air into pneumatic pressure tanks through regular discharge pipe. An ordinary water cylinder is used with this pneumatic cylinder, but is not a part of it.

This cylinder has a capacity of about one-third more area than the water cylinder located below it. This one-third of the capacity of the pneumatic cylinder not being supplied by the water cylinder supplies itself with air taken through the air pipe. When the pump is not required to pump air, it can be shut off by means of a lever extending to the base. When the air is shut off this extra area of the pneumatic cylinder would form a vacuum. To provide against this a by-pass taken from the upper part of the cylinder above the plunger, through which by-pass this extra requirement is supplied from the discharge. In this way, we do not detract from the amount of water that is supplied by the lower pumping cylinder, but the cylinder, under these circumstances, simply acts as a part of the discharge pipe.

2 1/2-inch hydro-pneumatic cylinder to be used with a 2-inch pumping cylinder, 12-inch stroke. Price each.....\$11.00

3-inch hydro-pneumatic cylinder to be used with 2 1/2-inch pumping cylinder, 12-inch stroke. Price each.....\$12.00

3 1/2-inch hydro-pneumatic cylinder to be used with 3-inch pumping cylinder, 12-inch stroke. Price each.....\$14.00

20-inch stroke. Price quoted on application.

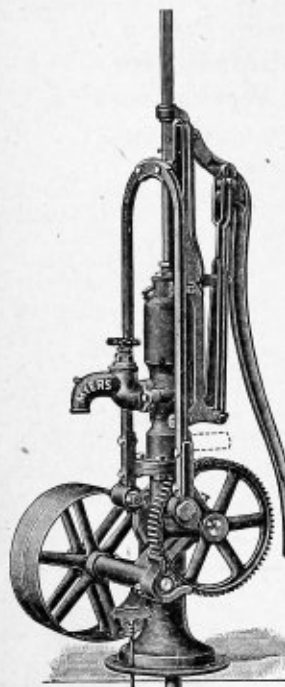


Fig. 388 Working head

Fig. 388

The Defiance Working Head

For belt, hand or windmill power. It has malleable head, machine cut gears, cock spout, back outlet tapped 1 1/2-inch. Back geared 6 to 1, 6 and 9-inch stroke. Complete on one base ready to connect and run.

Will raise water 150 feet. Speed 35 to 40 R. P. M. Price.....\$25.00

Filled with 3-inch seamless brass air compressor on top. Price.....\$35.00

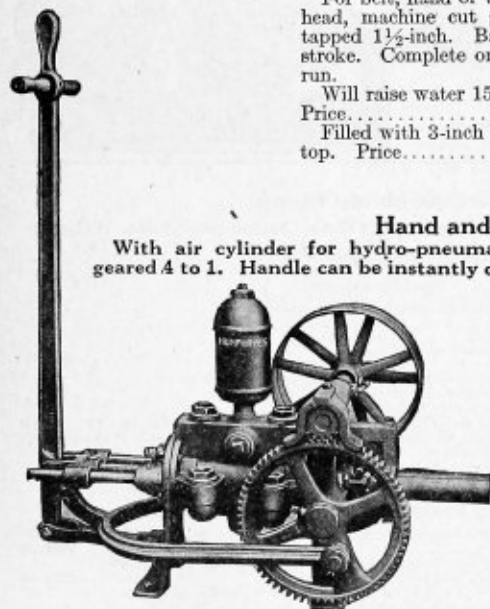


Fig. 778

Fig. 778

Hand and Power Piston Pump

With air cylinder for hydro-pneumatic pumping. 12x2 tight and loose pulleys. Back geared 4 to 1. Handle can be instantly disconnected when power is used.

The valves are all constructed of metal and are leather faced. Each valve has an individual valve box and to expose or remove the valve, merely unscrew the cap of the valve box, disturbing no other part of the pump.

The air compressor is constructed of 2-inch seamless brass tubing, has its own individual plunger with brass plunger rod—has brass ball valves, with brass seats, and discharges through 3/8-inch pipe into the top of the pump, above the upper valves. It is provided with pet cock, and by opening or closing same, the air supply can be increased, diminished or cut off.

Height over all, 23 inches. Width over all, 19 inches. Length over all, 36 inches. Actual floor space 9x17 inches. 3x5-inch brass lined cylinder, 1 1/2-inch suction, 1 1/4-inch discharge. Price.....\$45.00

Less air cylinder. Price.....40.00

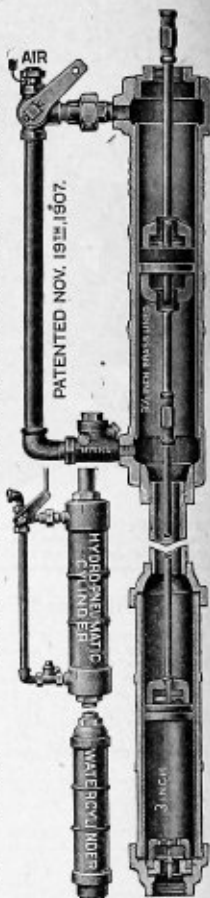


Fig. 1445

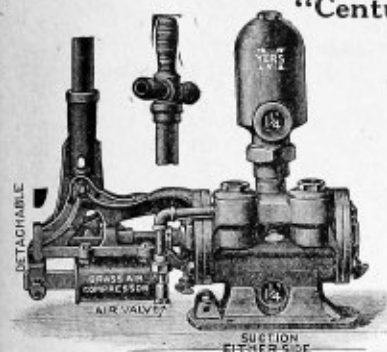
"Century" Cog Gear Hydro-Pneumatic Force Pump

The Ratchet Movement Against the Same Pressure will Operate with One-third Less Power than Direct Lever Movement

The pump is fitted with brass lined cylinder, brass valve seats and rubber face valves, each valve located under an individual cap, can be removed without disturbing any of the other parts; has brass covered piston rod with heavy brass stuffing nut.

Fitted with a 2½-inch cast brass air compressing cylinder, bolted immediately under the handle bracket. It is so arranged that the natural movement of the pump handle operates the air compressor. When air is not required this part is detached entirely from the pump by removing the pin that connects the piston rod to the air compressor. The air is discharged from the compressor into the pump above the discharge water valves and directly into the water line.

Price—Hydro-Pneumatic Cog Gear Century Low Down Pump as illustrated above. 3-inch brass lined cylinder, suction and discharge tapped for 1¼-inch pipe. **\$18.00**



"Planet" Double Acting Force Pump

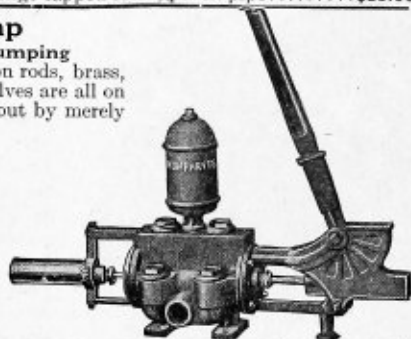
With Individual Air Cylinder for Hydro-Pneumatic Pumping

These pumps with special air cylinders have brass cased piston rods, brass, leather faced valves, brass seats, and brass stuffing boxes. The valves are all on the outside of the pumps and can be readily exposed, or taken out by merely removing the valve box caps which are directly over them.

The air cylinders are separate from the water cylinders. The air supply can be increased, diminished, or cut off entirely, by closing or opening the pet cock at the side of the air cylinder. The air cylinders are of brass tubing 2 inches in diam. and have individual plungers and plunger rods.

The valves used in connection with the air cylinders are brass balls and have perfect seats.

No.	Diameter of Cylinder	Stroke	Suction	Discharge	Price, Iron Cylinder	Price, Brass Lined Cylinder
2	2½"	5"	1¼"	1"	\$17.00	\$18.00
4	3"	5"	1½"	1¼"	18.00	19.00



Bulldozer Power Working Head With 3-in. Brass Air Compressor

For supplying water from deep wells to pneumatic tanks, using ordinary well cylinders or working barrels. Machine cut back gears 5 to 1, suction up to 4-inch pipe. Discharge 2 inch to 3-inch pipe.

Will operate against 75 lbs. pressure, when properly piped and not restricted. The air compressor is a seamless brass body cylinder, mounted directly on the yoke guide of the pump, the piston rod of the pump serving as a piston for the air compressor. The plunger is double leather. The air is forced directly from the cylinder into the discharge pipe of the pump through which it is conveyed to the pressure tank. The entire outfit is complete within itself, mounted ready for operation.

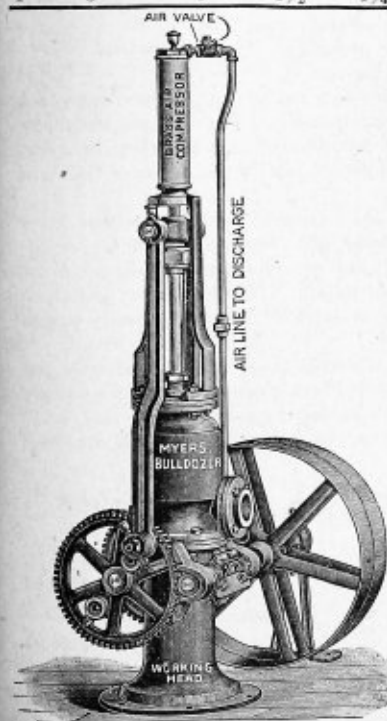
This working head is built especially for deep well work. Its construction insures great lifting power, strength and capacity. The power is applied direct to the piston from the two drive wheels, one on each side of the main stand. By this construction side motion and wear are eliminated.

As the gears are on one side, the work is done on the direct upward motion, the piston passing down on the angle. This insures great lifting power and light wear. All boxes are parted and babitted. Has outer shaft bearer with universal adjustable box; steel pinions.

It is so constructed that by uncoupling the piston (see coupling nut in cut) and removing the piston rod, a 4-inch plunger can be withdrawn through the head. The well pipe is attached to a pipe flange located below the air chamber, hence any size pipe, from 2-inch pipe to 4¼-inch casing can be used by changing the flanges. The pipe can be withdrawn through the base.

Will raise water 200 feet. Should be run not over 35 revolutions per minute and less on deep wells.

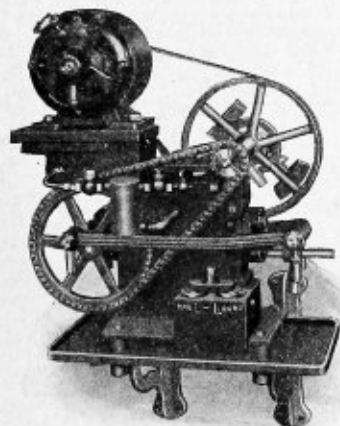
Bulldozer Power Working head, with air compressor, 5, 7½ and 10-inch stroke, without water cylinder or pipe (state size of well pipe to be used) Price \$90.00



Channon Special Electric House Pump

For Use With Pneumatic Water Systems in Residences, etc.

Can be operated from ordinary lamp socket without affecting the lights.



Pump on Bracket

This is a compact, substantial, and well-built pump, particularly adapted to all kinds of pumping where a moderate supply of water is required and electric power available, such as pumping soft water into house tanks, as an independent water works plant, or as a booster pump where city pressure is low.

Reliability: This pump is built very strong and compact, with the best material and workmanship. All bearings are very large for the work required, insuring continued good service. Bearings are well provided with oiling devices, and of the same kind as used on the motor bearings. All of them are convenient of access and are easy to inspect and refill.

The cylinder is lined with brass and the piston is made of bronze metal. There are no cup leather packings on



Pump On Legs

the piston, as they are not required. The valves, valve seats and valve caps are all made of good brass, and valves have a protective facing to make them seal tight and free from wear or injury. These valves are of new patented design, and the results of many years' experience in making pump valves for all kinds of work. An important feature is that any one of the valves can be removed by simply unscrewing the nut over the valve clamp.

A motor with ample power is mounted on the top for compactness and drives the pump by a combination belt and silent chain drive, doing away with any gear noise, or belt tightener, and keeping the friction at a minimum. It has also a **special automatic governor clutch** on the shaft pulley. This clutch allows the motor and driving pulley to get to speed before the clutch takes hold to start the pump. The strong motor and clutch drive provide surplus starting power to take care of any drop of voltage in the line. This is necessary to give satisfactory work under all conditions.

This pump can be set on legs on the floor, or fastened to the wall on brackets. It is neat in appearance and an ornament in the house. When furnished with automatic switch for closed tank use, the operation is entirely automatic. Installation is very simple, as no intricate wiring or difficult piping is necessary.

The cost of operation is very small, amounting to only a few cents a day, as it operates from a lamp socket without in any way interfering with the house lights.

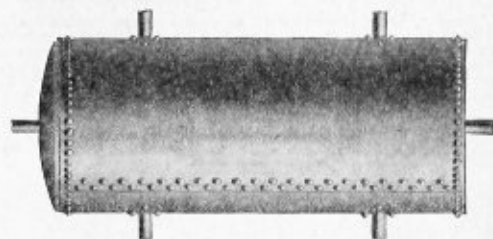
Specification No. 1: Capacity 120 to 180 gallons per hour. Suction pipe $\frac{3}{4}$ inch. Discharge pipe, $\frac{1}{2}$ inch. Length of pump, 18 inches, height 18 inches, width 12 inches. Maximum pressure 50 pounds. Weight 100 pounds.

Price of pump complete with automatic electric switch and motor for 110 volt D. C. or 110 volt A. C. single phase, 60 cycle. **\$120.00**

Specification No. 2: Capacity 300 gallons per hour. Suction pipe 1 inch. Discharge pipe $\frac{3}{4}$ inch. Price. **\$160.00**



Hydro-Pneumatic Tank for Pressure Systems



Hot Water Storage Tank for Water Storage Only

Hydro-Pneumatic Tank List

All Hydro-Pneumatic tanks are tested to 125 pounds air pressure and guaranteed for a working pressure of 85 pounds to the square inch.

Manholes ordered in tanks of diameters 48 inches and less, will be placed in the head unless otherwise specified.

Ordered in tanks of diameters over 48 inches, up to and including 84 inches, manholes will be placed in the shell unless otherwise specified.

In tanks 8 feet and 9 feet in diameter, the manholes are always placed in the shell.

Cap'y. Gals.	Diam., Ins.	Length, Ft.	Weight, Lbs.	List
120	24	5	340	\$ 56.00
140	24	6	390	60.00
165	24	7	435	68.00
190	24	8	490	77.00
235	24	10	575	91.00
180	30	5	450	69.00
220	30	6	505	74.00
255	30	7	560	80.00
295	30	8	615	87.00
365	30	10	745	104.00
440	30	12	870	120.00
265	36	5	630	90.00
315	36	6	695	97.00
370	36	7	780	103.00
420	36	8	860	113.00
525	36	10	1010	135.00
635	36	12	1165	156.00
735	36	14	1360	178.00
865	42	8	1355	162.00
720	42	10	1610	192.00
865	42	12	1845	221.00
1010	42	14	2080	250.00
1150	42	16	2320	279.00
940	48	10	1995	227.00
1130	48	12	2275	260.00
1315	48	14	2545	294.00
1500	48	16	2805	327.00
1695	48	18	3125	369.00
1880	48	20	3390	393.00
2260	48	24	3920	459.00

All 6-foot tanks tapped for vertical or horizontal installation.

Standard Hot Water Storage Tanks

All Standard storage tanks are for vertical or horizontal installation, tested to a hydrostatic pressure of 100 pounds to the square inch, and are guaranteed for a working pressure of 65 pounds per square inch.

All Standard tanks 36 inches and smaller have single riveted longitudinal seams. All larger tanks have double riveted longitudinal seams.

Capacity Gallons	Size		Weight Lbs.	Opening Size	List Price	List Price		
	Ins.	Fe.				Std. Coil & Pipes	Plain Coil	Galv. Coil
66	20x	4	225	1 1/2	\$43.00	1	\$18.00	\$22.00
85	20x	5	260	1 1/2	45.00	1	19.00	24.00
100	24x	4	280	1 1/2	47.00	1 1/4	22.00	26.00
120	24x	5	325	1 1/2	50.00	1 1/4	23.00	28.00
140	24x	6	360	1 1/2	54.00	1 1/4	24.00	30.00
150	30x	4	425	2	56.00	1 1/4	22.00	26.00
180	30x	5	490	2	60.00	1 1/4	23.00	28.00
220	30x	6	555	2	65.00	1 1/4	24.00	30.00
250	30x	7	620	2	72.00	1 1/4	25.00	32.00
295	30x	8	685	2	78.00	1 1/4	26.00	34.00
315	36x	6	740	2	82.00	1 1/2	32.00	39.00
365	36x	7	825	2	90.00	1 1/2	34.00	42.00
420	36x	8	910	2	98.00	1 1/2	36.00	44.00
525	36x	10	1060	2	112.00	1 1/2	40.00	49.00
430	42x	6	890	2	106.00	1 1/2	32.00	39.00
500	42x	7	985	2	114.00	1 1/2	34.00	42.00
575	42x	8	1080	2	124.00	1 1/2	36.00	44.00
720	42x	10	1270	2	140.00	1 1/2	40.00	49.00
865	42x	12	1460	2	158.00	1 1/2	44.00	53.00
1000	42x	14	1650	2	176.00	1 1/2	48.00	58.00

Extra Heavy Hot Water Storage Tanks

All extra heavy storage tanks are for vertical or horizontal installation, tested to a hydrostatic pressure of 150 pounds to the square inch, and are guaranteed for a working pressure of 100 pounds per square inch. All extra heavy tanks have double riveted longitudinal seams. All heads are flanged and dished to a radius equal to the diameter of the shell.

Cap'y. Gals.	Size, Ins. & Fe.	Weight, Lbs.	Size Open'g	List Price
120	24x 5	410	1 1/2	\$ 60.00
140	24x 6	470	1 1/2	65.00
180	30x 5	530	2	70.00
220	30x 6	600	2	78.00
250	30x 7	670	2	86.00
295	30x 8	750	2	94.00
315	36x 6	950	2	108.00
365	36x 7	1060	2	118.00
420	36x 8	1170	2	128.00
525	36x10	1390	2	148.00
430	42x 6	1140	2	126.00
500	42x 7	1270	2	138.00
575	42x 8	1400	2	150.00
720	42x10	1660	2	174.00
865	42x12	1940	2	198.00
1000	42x14	2200	2	222.00
750	48x 8	1600	3	178.00
940	48x10	1900	3	204.00
1130	48x12	2200	3	230.00
1300	48x14	2500	3	256.00
1500	48x16	2800	3	282.00
1700	48x18	3100	3	308.00

For extras, coils, etc., use same as used for Standard tanks.

Flanged Openings, Manholes, and Handholes

Add to List Price of Tank for Each Extra Opening

Handhole in head or shell.....	\$ 6.00	Flanges 2 or 2 1/2 in.....	\$ 5.00
Manhole in head.....	20.00	Flanges 3 or 3 1/2 in.....	6.00
Manhole in shell.....	30.00	Flanges 4 in.....	7.00

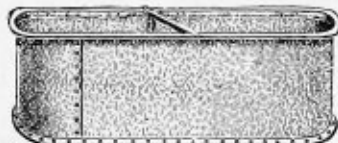
Orders for special tanks, including galvanized tanks, tanks with coils, manholes, etc., cannot be cancelled after work has been started.

Galvanized Steel Tanks

These tanks are made well in every respect, using as few pieces as possible, giving greater strength and less chance of leaking through faulty seams. All tanks are strengthened at the top and bottom by heavy steel angles and are thoroughly riveted, then soldered and carefully tested before shipping. All dimensions given are measured outside and overall.

Notice: All prices given are based on 20 gauge galvanized sheets with black trimmings unless otherwise noted. For 18 gauge advance 30%, for 16 gauge add 60% over 20 gauge price. For all galvanized trimmings add 10%. For all pipe connections add 25%.

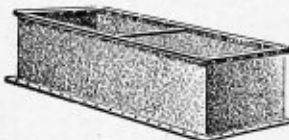
Round End Tanks



List No.	Width, Feet	Hght., Feet	Lgth., Feet	Cap., Gals.	Weight, Pounds	Price 20 Gauge
101	2	2	4	91	70	\$ 9.00
102	2	2	5	117	86	10.50
103	2	2	6	144	103	11.50
104	2	2	7	170	119	13.00
105	2	2	8	197	137	14.25
106	2	2	10	250	160	18.00
107	2	2	12	324	180	22.00
L	2	2 1/2	5	145	100	11.00
M	2	2 1/2	6	178	115	13.00
N	2	2 1/2	8	213	130	15.00
108	2	2 1/2	10	245	144	16.00
109	2	2 1/2	12	312	180	19.00
111	3	2	8	295	152	17.00
112	3	2	10	384	185	19.50
116	4	2	8	386	173	18.50
117	4	2	10	496	210	23.00
118	4	2	12	606	255	29.00
120	4	2	16	826	372	37.50
127	5	2	16	1072	412	40.00
129	6	2	8	550	240	27.50
130	6	2	10	813	285	30.50
131	6	2	16	1218	490	45.00

For heavier tanks and extras, see top of page.

Square End Tanks



List No.	Width, Feet	Hght., Feet	Lgth., Feet	Cap., Gals.	Weight, Pounds	Price 20 Gauge
201	2	2	4	101	90	\$ 9.50
202	2	2	5	126	105	10.75
203	2	2	6	152	120	11.75
205	2	2	8	202	158	16.00
208	2	2 1/2	8	262	175	17.50
211	3	2	8	318	185	18.75
212	3	2	10	397	220	22.00
216	4	2	8	424	220	23.00
217	4	2	10	530	265	25.75

Corrugated Tanks



Sheets are stamped, leaving a 2-inch margin of straight metal on both sides, so that the top and bottom angles fit snugly.

The corrugations strengthen the sides considerably and the tank will not be injured by freezing.

If corrugated tanks are ordered, add 10% to prices of plain tanks. If all galvanized corrugated tanks are ordered, add 20% to prices of plain tanks.

Round Tanks

All sizes up to No. 15 can be shipped in box car, ready for use.



List No.	Diam., Feet	Height, Feet	Capacity, Gallons	Weight, Pounds	Price 20 Gauge
1	3	2	91	75	\$ 9.00
2	4	2	166	97	11.00
3	4	2 1/2	215	112	12.50
4	4	3	254	130	14.00
5	4	4	338	160	16.50
6	4	5	423	200	19.00
7	4	6	508	225	22.00
8	4	8	688	277	28.00
9	5	2	262	135	14.50
10	5	2 1/2	342	150	16.00
11	5	3	411	170	17.50
12	5	4	548	193	21.00
13	5	5	675	245	25.50
14	5	6	810	280	29.00
15	5	8	1096	348	36.00
17	6	2	384	170	18.50
18	6	2 1/2	480	180	20.00
19	6	3	583	200	21.50
20	6	4	768	255	26.00
21	6	5	966	285	30.00
21 1/2	7	2	486	220	21.50
22	8	2	691	265	28.00
23	8	2 1/2	864	290	30.00
24	10	2	1089	375	39.00
25	10	2 1/2	1361	410	42.00

Wagon Tanks

Round Ends, Flat Top and Bottom



List No.	Width, Feet	Hght., Feet	Lgth., Feet	Cap., Gals.	Weight, Pounds	Price 20 Gauge
A	3	2	10	378	296	\$32.50
B	3	2	8	295	260	29.50
C	2 1/2	2	8	245	235	27.50
D	2	2	8	197	213	25.00
E	2	2	6	144	180	22.00

Storage Tanks

These are too large to be set up ready for use, except on a flat car, so unless otherwise specified, they are always shipped knocked down, taking a first class rate with a minimum charge of 5000 lbs.

K. D. tanks are shipped with sufficient solder and rivets to complete, and are fitted to insure their going together properly.



List No.	Diam., Feet	Height, Feet	Capacity, Gallons	Weight, Pounds	Price 20 Gauge
50	6	6	1200	340	\$40.00
51	6	8	1600	430	49.00
52	8	5	1800	475	50.00
53	8	6	2133	530	56.00
54	8	8	2854	640	72.00
55	8	10	3592	750	81.00
56	10	8	4580	875	95.00
57	10	10	5680	970	110.00

Enamel Ware for Residences

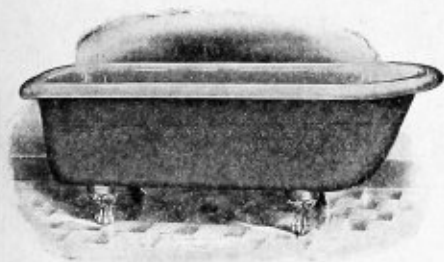


Fig. E 100

Porcelain enameled bath fitted with nickel-plated No. 4½ Fuller double bath cock with ½-inch I. P. size offset supply pipes and standing waste and overflow.

Normal sizes, feet	4	4½	5	5½	6
Price	\$34.00	\$34.00	\$36.00	\$40.00	\$45.00

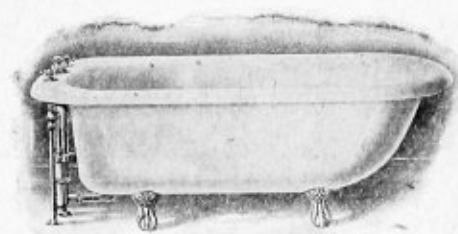


Fig. E 125

Porcelain enameled bath with 3-inch roll rim and extension end, fitted with nickel-plated compression bottom bell supply and waste fittings through rim, ½-inch nickel-plated supply pipes.

Size 5 feet.	Price	\$55.00
Size 5½ feet.	Price	\$60.00

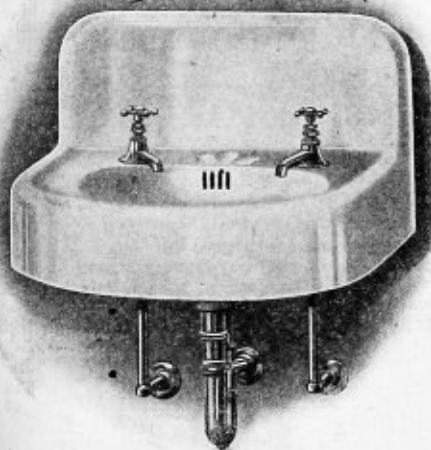


Fig. E 345

Porcelain enameled iron lavatory with slab, bowl, apron and back all in one piece. Soap cup and overflow strainer cast in. Supported on concealed wall hanger. Fitted complete with Plate E3615 compression basin faucets, vented "P" trap, supply pipes to wall, plug and chain. Furnished in two sizes.

Dimensions

Slab 16½x18½ inches. "D" bowl 11x14 inches. Apron 4 inches. Back 6 inches.	Price	\$17.00
Slab 18x21 inches. "D" bowl 11x14 inches. Apron 5 inches. Back 8 inches.	Price	\$18.00

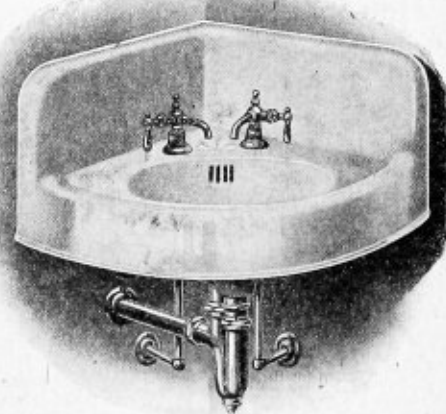
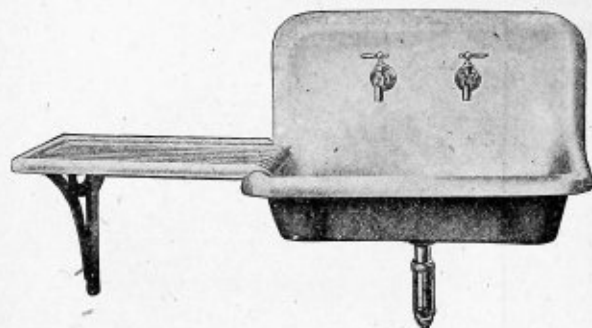


Fig. E 380

Porcelain enameled iron corner design lavatory with slab, bowl, back and apron all in one piece. Soap cup and overflow strainer cast in. Supported on concealed wall hanger. Fitted complete with Fuller basin faucets, vented "P" trap, supply pipes to wall, plug and chain. Furnished in two sizes.

Dimensions

Slab on side 16 inches. Back 8 inches. "D" bowl 11½x15½ inches. Apron 4 inches.	Price	\$19.50
Slab on side 19 inches. Back 8 inches. "D" bowl 11x14 inches. Apron 4 inches.	Price	\$20.00

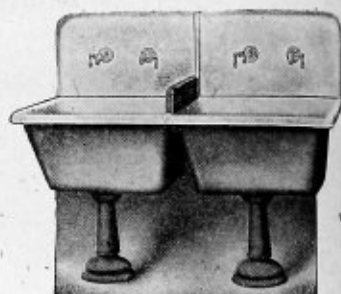


One Piece Roll Rim Kitchen Sink
Porcelain Enameled Iron

Fig. E 701

Fig. E 701 sink, with 12-inch back, supported on concealed wall hanger, with 24-inch porcelain enameled iron drain board; interchangeable. Fitted complete with N. P. Fuller adjustable flange bibbs, patent strainer and coupling with vented "P" trap, and concealed galvanized air chambers.

Sizes, inches	18x24	18x30	18x36	20x30	20x36	20x40	22x30	22x36	22x40
Prices	\$20.00	\$21.25	\$23.00	\$22.00	\$23.75	\$26.00	\$23.50	\$25.00	\$26.75



Laundry Tubs
Porcelain Enameled

Fig. D 370

Fig. D 370 porcelain enamel laundry tubs roll rim laundry tray and 15-inch porcelain enameled back, with nickel-plated union strip, hardwood wringer base, painted pedestals, waste plugs, couplings, rubber stoppers and nickel-plated Fuller adjustable flange bibbs.

Dimensions

Front to back inside, inches	22	Length over all inside, inches	24
Outside, inches	27	Depth inside, inches	15
		1 Sec.	2 Sec.
Price less fittings	\$26.25	\$48.75	\$73.00
If back is not wanted, deduct	2.25	4.50	5.75
If without wringer base, deduct from list			3.00
Extra for bibbs, per section			2.30
Extra for N. P. 1 1/4-inch continuous waste, per section			1.65
Extra for N. P. 1 1/2-inch continuous waste, per section			1.75
Extra for N. P. 2-inch continuous waste, per section			2.60
Extra for soap dishes, per section			.50

Fig. F 605 pedestal drinking fountain with porcelain enameled bowl and painted cast iron pedestal base. Fitted with vitreous China bubbler, 3/8-inch N. P. self closing stop with volume regulating screw, 3/4-inch galvanized supply pipe and 1-inch galvanized waste pipe.

Diameter of bowl, 11 inches; depth, 3 1/2 inches. Distance from floor to top of bowl, 30 or 36 inches.

	30-in. High	36-in. High
Price bowl enameled inside	\$12.00	\$12.50
Price bowl enameled all over	13.50	14.00

Pedestal Drinking Fountain

Fig. E 605

Wall Drinking Fountain

Fig. E 630

Porcelain Enameled Iron

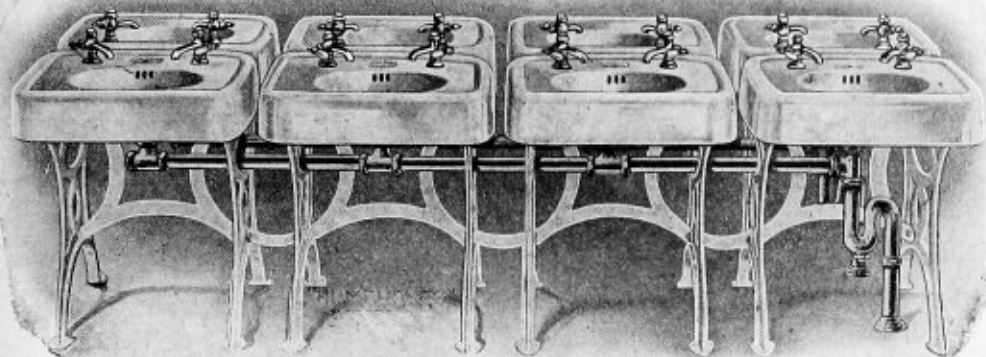
Porcelain enameled iron wall drinking fountain; fitted with vitreous china bubbler, painted iron trap, 3/8-inch N. P. self-closing stop, 3/4-inch N. P. supply pipe with volume regulating screw, 1 1/4-inch galvanized waste pipe and wall flange. Diameter of bowl, 10 inches. Depth 3 1/2 inches.

Bowl enameled inside	\$11.50
Bowl enameled all over	13.50



Fig. E 630

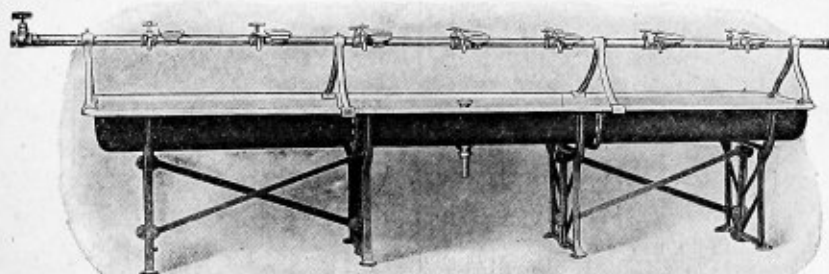
Wall Drinking Fountain



Enameled Ware for Office, Factory and Public Use

Double sectional lavatory with slab, apron and bowl of each section cast in one piece. Painted or bronze brackets to floor, nickel plated union strip and fitted with self-closing faucets, continuous waste grease trap, and nickel-plated soap dishes. Slab, 18x24 inches. Bowl, 12x15 inches.

	Enameled	
	Exterior	All Over
Price with fittings, as described, per double section	\$50.00	\$55.00



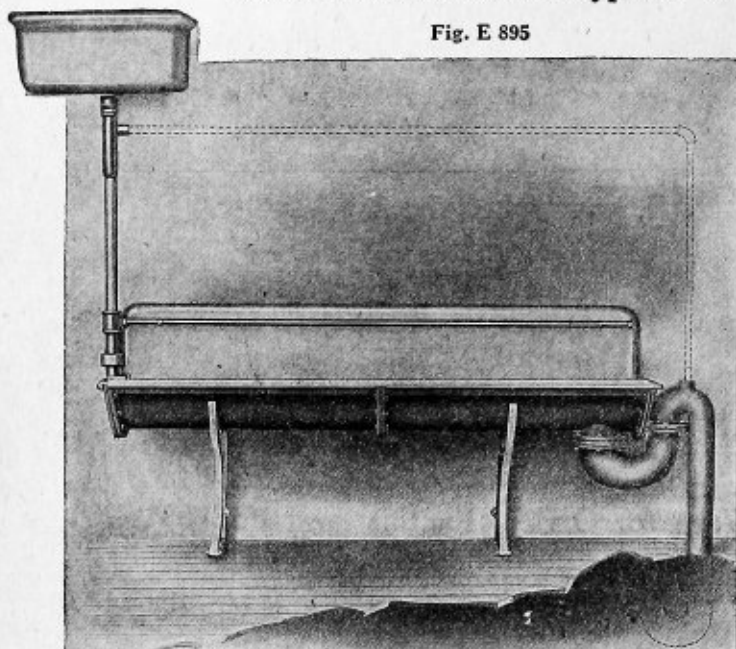
Enameled Iron Roll Edge All-around Wash Sink

Has painted cast iron legs with braces, fitted with galvanized iron supply pipe, supported on brackets, compression bibbs, compression stop, enameled iron soap cups and standing overflow. Sink has sloping sides so drain is toward center.

Price, 18 inches wide, 8 inches deep, 3 sections as described, with fittings	\$100.00
Price, 24 inches wide, 8 inches deep, 3 sections as described, with fittings	120.00

Automatic Washout Syphon Urinal

Fig. E 895



Furnished in either enameled or painted iron, and with wood or iron flush tank (iron tank regular).

Furnished with automatic syphon flushing tank, flush pipe, washdown spray pipe on back and front of urinal, capping along front, upper and lower traps, and cast iron legs.

Height from floor to top of urinal, 24 inches. Each section 3 feet long.

Prices

Two sections, 3 feet each, painted\$55.00
Two sections, 3 feet each, enameled.....\$90.00

Note.—Air pipe connection with tank and upper trap must be made as shown by dotted lines (we do not furnish the pipe), and particular care should be taken that lower trap is put in, in all cases, otherwise syphon action cannot take place.

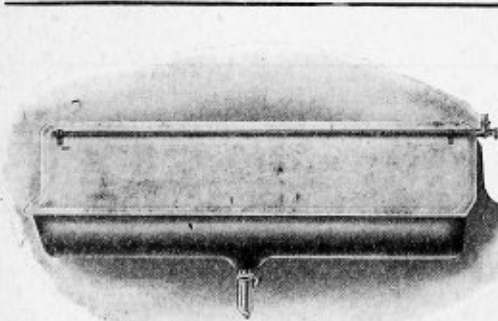


Fig. E 890

Porcelain Enameled Roll Rim Urinal

With back cast in one piece. Fitted with brass strainer, coupling, tail pieces and brass perforated wash down pipe with loose key stop.

Sizes and Prices Complete

2 feet long. Price.....	\$15.50
2 feet 6 inches long. Price.....	17.75
3 feet long. Price.....	20.00
3 feet 6 inches long. Price.....	22.25
4 feet long.....	24.50

Fig. E 825

High Grade
Low Down
Closet
Combination

With porcelain enameled iron tank. Combination consists of porcelain enameled iron tank complete with trimmings, extended lip wash down vitreous bowl, special design oak seat and lid, supply pipe with compression stop.

Price complete as shown.\$45.00

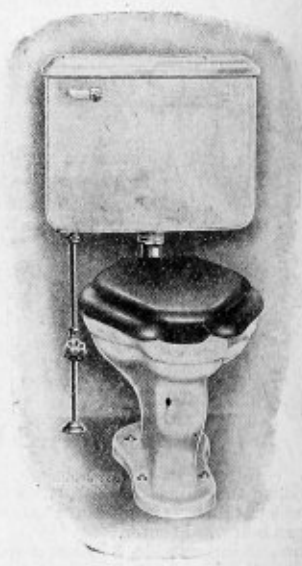
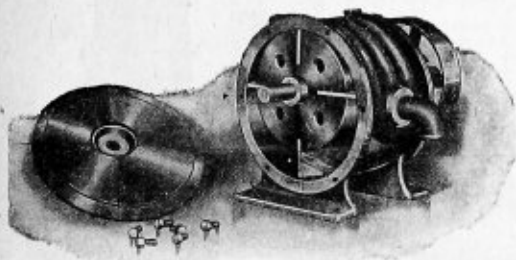
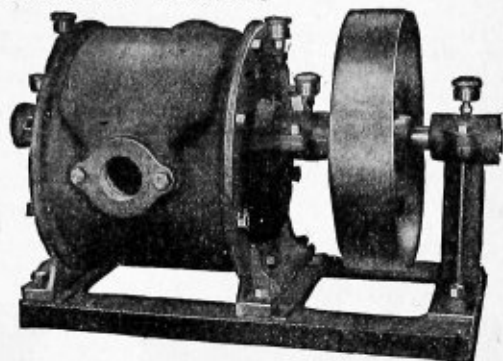


Fig. E 825

"U. S." Positive Pressure Blowers



No. 1 Interior



No. 2 Blower

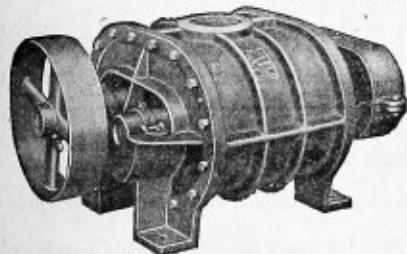
Note interior view above, showing simplicity of construction. The impellers or wings are always flush with the inner shell, therefore even, positive, pressure is supplied. There are no internal gears to get out of line, or worn or to rattle, and the impellers can be replaced by anyone capable of taking off one side of blower and slipping them in place. Pressure is 1 to 3 pounds.

Prices and Specifications

No.	Price	Cu. Ft. per Minute	Speed, R. P. M.	Outlet, Inches	Size of Pulley	Gross Weight, Pounds	Horse Power Required at		
							1 Pound Press., H. P.	2 Pounds Press., H. P.	3 Pounds Press., H. P.
1/4	\$ 25.00	22	550 to 650	1	8x2	65	1/6	3/4	1
1/4x	36.00	33	500 to 550	1	8x2 1/2	115	3/4	9/10	1
1/2	42.50	32	450 to 500	1 1/2	8x2 1/2	145	3/4	7/8	1
1	82.50	49	400 to 475	1 1/2	10x3	225	3/4	1	1 1/4
2	72.50	65	305 to 375	2	12x3	310	1 1/4	1 5/8	2
3	100.00	99	300 to 350	3	14x3 1/2	440	1 1/2	2	2 3/4

Loose pulleys extra \$2.50 for first three sizes and \$3.00 extra for others.

Connersville Rotary Positive Pressure Blowers



For Gas and Oil Furnaces, Brazing, Sand Blast, Laundries, Forge, Etc.

The casing and revolving parts are made of the best grade of soft grey iron, the shafts are of steel and pressed into place and pinned, the gears are cut from the solid blank on an improved gear cutting machine and are fitted and pinned to the shaft. The bearings are of bronze, drilled and grooved for oiling. The inlet and discharge openings are tapped for standard pipe connections. All parts are interchangeable and repairs can be furnished promptly.

Prices and Specifications

Number.....	35	40	50	60	17 1/2	20	25	30
Cubic feet per revolution.....	1	16	316	666	661	689	67	333
Size of opening, inches.....	2 1/2	2 1/2	3	4	2	2	2 1/2	3
Maximum speed.....	1000	900	600	400	1000	900	700	500
Cubic feet per minute.....	77	110	150	213	40	52	83	124
Horse power 1 pound pressure.....	.6	.9	1.2	1.4				
Horse power 2 1/2 pounds pressure.....					.9	1.2	1.7	2.1
Size of pulley.....	7x1 1/2	8x2	10x2 1/2	16x3	7x1 1/2	8x2	10x2 1/2	16x3
Weight, pounds.....	100	140	250	540	75	110	170	350
Price single pulley.....	\$45.00	\$70.00	\$120.00	\$250.00	\$45.00	\$70.00	\$120.00	\$250.00
Price T. & L. pulley.....	48.00	74.00	125.00	259.00	48.00	74.00	125.00	259.00
Price hand blower.....	48.00							

When running full speed these blowers make very little noise.

H. Channon Company Chicago

Rotary Vacuum Pumps

Air and Water Cooled

A high grade high duty pump. For use where a high, dry vacuum is required. Where high efficiency, small space, low power, low maintenance cost and minimum attention is desired, it is in a class by itself.

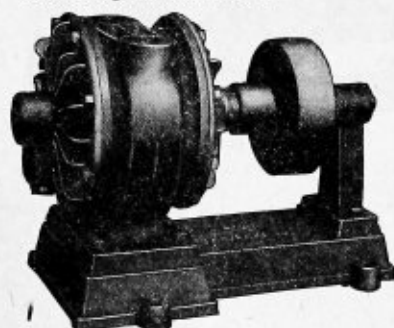
High, dry vacuum pump, such as canning, preserving, milking, etc., is dependant absolutely upon the pump.

It must give an even high vacuum with minimum attention. This pump meets the most exacting requirements fully. There are no valves, piston rings or crank connections to wear out. Its lubrication is perfect and operation noiseless.

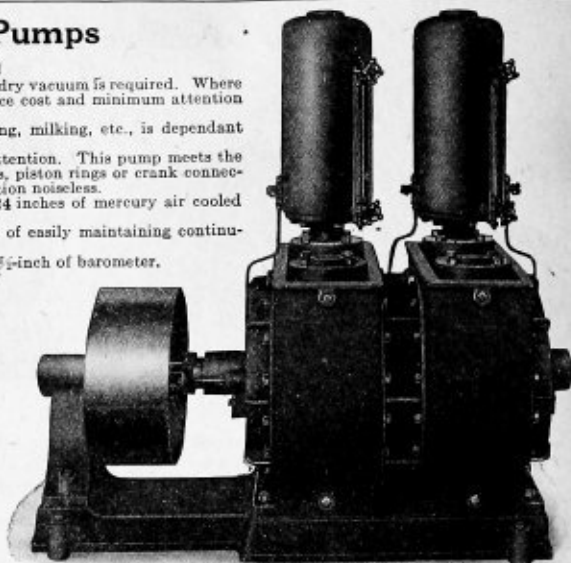
The smaller pumps will easily attain a vacuum of 24 inches of mercury air cooled and are for light or intermittent service only.

The larger pumps are water cooled and are capable of easily maintaining continuously a vacuum of 27 inches of mercury at sea level.

The two stage machine will produce vacuum within $\frac{1}{2}$ -inch of barometer.



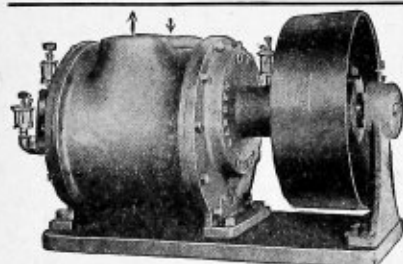
Single Stage Air Cooled



Double Stage Water Cooled

Style.....	Air Cooled Single Stage, Belt Driven			Water Cooled Single Stage, Belt Driven				Water Cooled Double Stage, High Duty, Belt Driven		
Size number.....	2	3	4	5	5½	6	7	5A	5½A	6A
Capacity, cu. ft. per minute...	7	14	24½	55	67	90	180	55	67	90
Speed, R. P. M.	400	400	350	300	300	230	230	300	300	230
Pulley size, inches.....	6x2	9x2	10x3	14x4½	14x4½	16x6	16x6	14x4	14x4½	16x6
Inlet and outlet pipe sizes, ins.	¾	1	1½	2	2	2½	2½	2	2	2½
Horse power.....	¾	1½	2	4½	5½	6½	12	5½	7	9½
Floor space, inches.....	10x15	11x17	12x20	17x28	17x30	22x37	22x50	17x39	17x42	22x50
Shipping weight, domestic, lbs.	80	90	170	525	575	1000	1700	900	975	1650
Shipping weight, export, lbs.	100	120	200	65	725	1250	2050	1050	1200	2000
Price.....	\$48.00	\$60.00	\$85.50	\$230.00	\$265.00	\$317.00	\$455.00	\$300.00	\$347.00	\$415.00

Clutch or motor driven extra. Price on application.



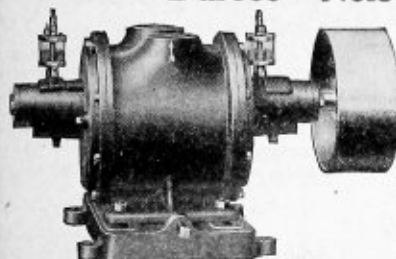
Noiseless Positive Blowers

For Foundries, Smelters, Gas Exhausters, Pneumatic Carriers, Etc.

A positive blower, free from all complication of gears and intermeshing pistons or revolvers. It will be seen at a glance that the internal mechanism of the blower is very simple and entirely devoid of pistons, revolvers or gearing, on which contact is absolutely necessary to obtain pressure, as in all other positive blowers, requiring additional power by means of the increased friction, also careful attention and frequent adjustment.

Size No.	Diam. Inlet and Outlet, Inches	Diam. & Width of Blower Inside, Inches	Discharge per Rev.	Speed	Cu. Ft. per Min.	H. P. at 3 Lbs.	H. P. at 5 Lbs.	H. P. at 10 Lbs.	Size of Driving Pulley, Inches	Wgt. of Blower, Lbs.	No. of Brassing Fires	Size of Cupola, Ins.	Floor Space, Extreme Ins.	Price
00	1	7x3	70 cu. ins.	400	16	¾	¾	1½	8x3	45	2	14x8	14x8	\$ 45.00
0	1½	9x4	170 cu. ins.	350	35	¾	1	2	10x3	115	4	18x10	18x10	55.00
x	2	10x6	¾ cu. ft.	300	75	1	2	4	12x3	170	6	20x12	20x12	80.00
½	2½	10x9	¾ cu. ft.	300	112	1½	3	6	12x4	225	8	29x12	29x12	105.00
¾	3	12x10	¾ cu. ft.	250	188	3	4½	9	14x4	350	12	26x14	26x14	150.00
1	3½	18x12	1¼ cu. ft.	200	350	4½	7½	15	20x5	650	20	36x18	36x18	225.00
1½	4	24x15	4½ cu. ft.	175	787	10	15	30	24x6	1200	.....	18x24	40x24	300.00
2	5	24x24	7 cu. ft.	175	1225	15	25	50	26x6	1700	.....	24x30	50x24	450.00
3	12	36x24	10 cu. ft.	150	1500	20	32	65	44x6	4250	.....	30x36	72x36	650.00
4	14	36x36	16 cu. ft.	150	2400	30	50	100	44x8	5480	.....	36x42	96x36	750.00

"Dureco" Noiseless Positive Pressure Blowers

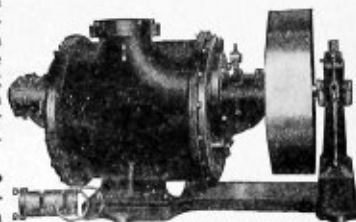


No. 6

Slow Speed Type

Also used as a dry vacuum pump. Bearings are so constructed as to form their own packing gland. Thus there is no possibility of oil being drawn into the blower when operating under a vacuum or being blown out when operating under pressure.

Operate on pressures up to 5 lbs. running continuously and on dry vacuum up to 12 inches.



No. 1 Size

Blower is of the impeller type but is so constructed that there is no friction between the impellers and the outer casing—all parts being accurately fitted—there is very slight clearance at all times, thus eliminating friction. There are no gears, so machine operates practically without noise.

The blower consists of one casing, two heads, one drum with steel shafts, three or four vanes, depending upon the size of blower and sliding shoes or rollers in each head for supporting the blades of the impellers. Equipped with ring oiling bearings. All sizes above No. 1 $\frac{1}{4}$ bearings are adjustable. Bearings are of bronze. Internal oiling is taken care of by sight feed oil cups.

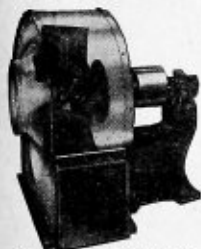
No.	Price	Weight, Pounds	Cu. Ft. of Free Air per Minute	Cu. Ft. of Free Air per Rev.	Speed, R. P. M.	T. & L. Pulleys, Inches	Diameter Inlet and Discharge	Inside Measurement, Inches
000	\$ 40.00	75	18 to 36	.09	200 to 400	8x 3	1	7 $\frac{1}{2}$ x 3
00	60.00	105	39 to 52	.13	200 to 400	8x 3	1 $\frac{1}{2}$	7 $\frac{1}{2}$ x 6 $\frac{3}{4}$
0	75.00	125	56 to 112	.28	200 to 400	10x 3	2	7 $\frac{1}{2}$ x 9
X	110.00	215	137 to 175	.55	230 to 325	12x 4	2 $\frac{1}{2}$	10 $\frac{1}{4}$ x 9
1 $\frac{1}{4}$	140.00	230	165 to 210	.66	250 to 325	12x 4	3	10 $\frac{1}{4}$ x 12
1 $\frac{1}{2}$	200.00	420	210 to 325	1.2	175 to 275	14x 4	4	12 x 15
2	300.00	900	525 to 675	3.	175 to 225	24x 6	6	20 x 14
1	400.00	1400	780 to 990	4.5	175 to 225	24x 6	8	20 x 20
2	600.00	1900	1300 to 1500	7.5	175 to 200	30x 8	10	24 x 20
3	800.00	2500	2200 to 2500	12.5	175 to 200	30x 10	12	24 x 40

Cycloidal Shavings Exhausters

Steel Plate Construction

These Fans when properly piped require less power and run nearer noiseless than other types of fans of same size. They are of the slow speed, high efficiency type with chain oiling bearings, making them light running and long lived. Size of Fan denotes height if horizontal discharge, and length if vertical discharge. Built top horizontal or vertical up discharge. All housing bolts exterior to casing and easy of access.

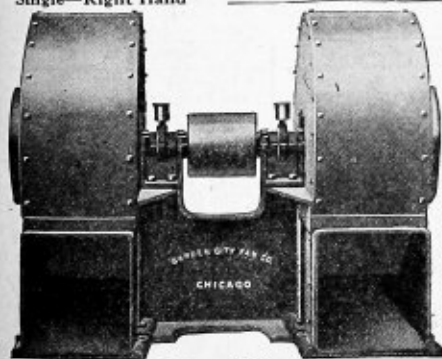
Cycloidal Single Shavings Exhausters



Single-Right Hand

Size, Inches	Price	Diameter of Inlet, Inches	Width and Height of Outlet, Inches	Size of Pulley	Revolutions per Minute	Weight in Pounds
25	\$ 55.00	10	10x10	7x 4	1550 to 2900	300
30	60.00	12	11x10	7x 4	1460 to 1700	350
35	80.00	14	12x13	8x 5	1260 to 1700	500
40	95.00	15	13x11	9x 6	1110 to 1500	700
45	120.00	17	14x16	10x 7	1030 to 1350	850
50	160.00	19	16x18	11x 7	870 to 1200	1050
55	200.00	21	17x20	13x 8	800 to 1050	1200
60	240.00	23	18x23	15x 8	730 to 950	1650
70	330.00	26	21x28	16x10	640 to 875	2600
80	420.00	30	24x36	18x12	570 to 790	2900
90	550.00	36	28x40	20x12	500 to 625	3300

Double Cycloidal Shavings Exhausters



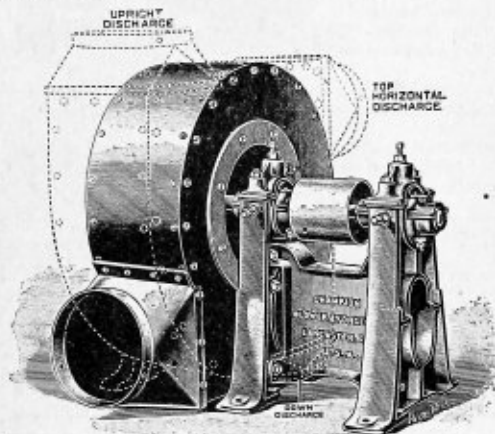
Double-With Bottom Horizontal Discharge

Size, Ins.	Price	Diameter of Inlets, Ins.	Diameter Main Discharge Pipe, Inches	Width and Height of Outlets, Inches	Size of Pulley	Revolutions per Minute	Wght. in Lbs.
30	\$110.00	12	16	11x10	7x 6	1460 to 1900	600
35	120.00	14	19	12x13	8x 7	1260 to 1700	800
40	155.00	15	22	13x14	10x 8	1110 to 1500	1100
45	200.00	17	24	14x16	10x 8	1030 to 1350	1350
50	260.00	19	27	16x18	11x10	870 to 1200	1850
55	325.00	21	30	17x20	13x10	800 to 1050	2200
60	400.00	23	32	18x23	15x12	730 to 950	2700
70	530.00	26	37	21x28	16x12	640 to 875	4700
80	725.00	30	43	24x36	18x12	570 to 790	5000

Single and Double Steel Plate Blowers and Exhausters

Exhausters are especially designed for removing shavings, chips and sawdust from wood-working machinery, and for elevating cotton, cotton seed, hulls, etc., or any other fibrous material of the same nature. The bearings are both placed on one side leaving the inlet unobstructed, so as to allow free ingress for such materials. On these exhausting fans we place our patent journal box, which automatically stays in direct line, one journal box with the other. We supply with these journal boxes self oilers.

These exhausters have housings suitable to either hand or any discharge. All changes can be made in a few minutes, and on the outside of the housings. The advantages of the adjustable exhauster are shown in the fact that one exhauster will meet any requirements regardless of the hand or discharge, avoiding all cross belts and sharp angles.



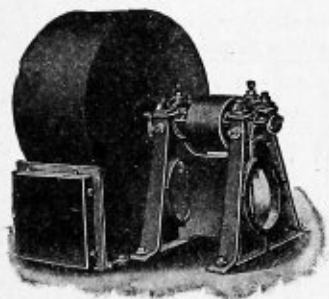
Adjustable

Planing Mill Steel Plate

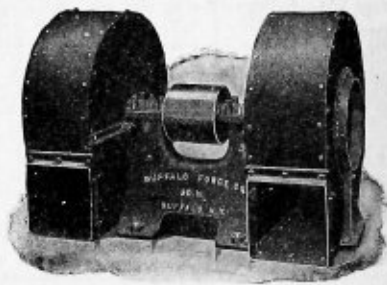
Exhaust Fan

Size, Ins.	Price	Wght. Each, Lbs.	Height of Shell	Inside Diam. of Inlet	Inside Diam. of Outlet	Diameter and Face of Pulley
25	\$ 50.00	350	26 1/2	11	11	5x 4 1/2
30	55.00	500	32 1/2	13	13	6x 5 1/2
35	70.00	600	37 1/2	15	15	7x 6 1/2
40	90.00	700	42 1/2	17	17	8x 7 1/2
45	115.00	1050	48 3/4	19	19	9x 8 1/2
50	150.00	1225	53	21	21	10x 9 1/2
55	185.00	1400	59	23	23	11x10 1/2
60	200.00	1675	66 3/4	25	25	12x11 1/2

Single Exhauster



Double Exhauster



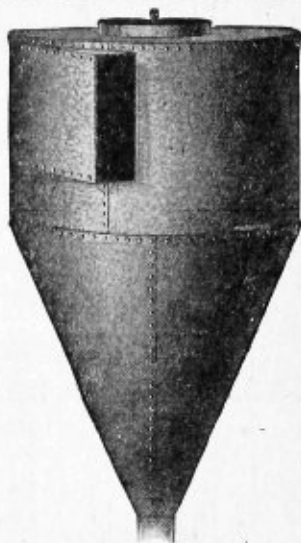
Size, Inches	Height of Shell, Inches	Inside Diameter of Inlet, Inches	Inside Diameter of Outlet, Inches	Single Exhausters		Double Exhausters	
				Diameter and Face of Pulley, Inches	Price Each	Diameter and Face of Pulley, Inches	Price Each
30	30	11	11	5 1/4 x 5	\$ 55.00	6x 6	\$ 90.00
35	35	13	13	6 x 6	70.00	7x 7	100.00
40	40	15	14 3/4	6 3/4 x 6 3/4	90.00	8x 8	130.00
45	45	17	16 1/8	8 x 7 1/2	115.00	9x 9	170.00
50	50	19	18 3/4	8 1/2 x 8 1/2	150.00	10x10 1/2	210.00
55	55	21	20 1/2	9 1/2 x 9 1/2	185.00	11x11	275.00
60	60	23	22 3/4	10 1/4 x 10	200.00	12x11 1/4	325.00

Built bottom horizontal, top horizontal and upright discharge.

Cyclone Dust Collectors

The use of the dust collector on any fan system permits the fan to work to its utmost capacity without consuming an inordinate amount of power.

No.	Size of Inlet, Inches	Diam. Air Outlet, Inches	Diam. Dust Outlet, Inches	Diam. Cylinder, Inches	Height Cylinder, Inches	Height Cone, Inches	Gauge Number	Price List
6	3x10	10	4	24	15	24	22	\$ 58.00
7	4x10	12	4	28	17	28	22	65.00
8	4x13	14	5	32	20	32	20	75.00
10	6x15	18	6	40	30	40	20	95.00
12	7x18	22	8	48	30	48	20	132.00
14	8x21	26	10	56	40	56	20	150.00
16	9x25	30	10	64	45	64	20	170.00
18	10x28	34	10	72	50	72	20	188.00
20	11x31	38	11	80	55	80	18	208.00
22	12x34	42	12	88	60	88	18	225.00
24	14x35	46	12	96	65	96	18	245.00
26	14x40	50	12	104	70	104	18	262.00
28	15x44	54	14	112	75	112	18	280.00
30	16x46	58	14	120	80	120	16	300.00
32	17x50	62	15	128	85	128	16	325.00
34	18x54	66	15	136	90	136	16	350.00
36	20x58	70	15	144	95	144	16	375.00



Motor Driven Propellor Fans



Disc Belted Fans

Diameter of Wheel, Inches	Diameter of Pulley, Inches	Faces of Pulley, Inches	Price Each
18	4	2	\$ 40.00
24	4	2	50.00
30	6	2	65.00
36	7	3	85.00
42	8	3 1/2	110.00
48	9	4	125.00
54	9	4	175.00
60	10	5	250.00
72	12	5 1/2	300.00
84	14	6	350.00



Direct Current Fans

Size Type,	Cu. Ft. Air per Minute	Watts Cons'd per Hr.	Revs. per Minute	Price		Apprx. Sh'p'g Weight
				110 Volts	220 Volts	
16	1700	95	1250	\$ 55.00	\$ 58.00	55
18	2600	115	1025	84.00	86.00	90
20	3800	210	950	144.00	150.00	190
24	6500	284	830	160.00	164.00	230
30	9100	458	690	224.00	228.00	350
36	12600	575	600	272.00	276.00	410
42	17800	875	500	368.00	374.00	630
48	24000	1330	460	456.00	460.00	875

Alternating Current Fans

Single Phase—60 Cycles

Size Type,	Cu. Ft. Air per Minute	Watts Cons'd per Hr.	Revs. per Minute	Price		Apprx. Sh'p'g Weight
				110-220 Volts	440-550 Volts	
16	1600	90	1200	\$ 67.00	\$ 69.00	58
18	2250	105	860	120.00	130.00	100
18	3300	165	1150	120.00	130.00	110
20	3440	150	860	156.00	158.00	145
20	4500	195	1150	172.00	176.00	160
24	5800	235	690	200.00	204.00	190
24	7100	285	860	216.00	220.00	190
30	7700	325	570	290.00	294.00	300
30	9100	465	690	300.00	304.00	300

2 or 3 Phase—60 Cycles

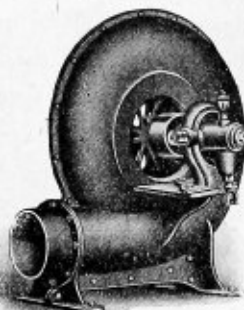
Size Type,	Cu. Ft. Air per Minute	Watts Cons'd per Hr.	Revs. per Minute	Price		Apprx. Sh'p'g Weight
				110-220 Volts	440-550 Volts	
18	3300	175	1150	\$128.00	.....	105
20	4500	195	1150	160.00	.....	158
24	5800	235	690	190.00	\$205.00	230
24	7100	285	860	196.00	208.00	230
30	7700	325	570	264.00	276.00	340
30	9100	465	690	270.00	282.00	340
36	10150	530	495	310.00	325.00	400
36	12200	615	575	320.00	342.00	400
42	17800	830	495	380.00	395.00	625
48	26450	1415	495	468.00	475.00	865

Champion Blast Gates

The Measurements Given Are Outside Measurements

Diameter Outside	Price Each	Diameter Outside	Price Each
2	\$1.00	10	\$5.00
2 1/2	1.25	12	6.50
3	1.50	14	8.00
3 1/2	2.00	16	12.00
4	2.25	18	16.00
5	2.50	20	18.00
6	3.00	24	21.00
6 1/2	3.50		

Air piping of all kinds quoted upon request.



Steel Pressure Blower

For Continuous High Pressure

For supplying blast for cupolas, furnaces, forge fires, sand blast machines, and for any work requiring the forcing of air long distances, high pressure or strong blast. The blower is right or left hand; and this is indicated by the pulley which (when facing the outlet) is on the right hand side when the blower is right hand and on the left hand side when the blower is left hand. The various discharges—bottom or top horizontal, or up or down blast—indicate the direction in which blast is taken from the blower and are self explanatory.

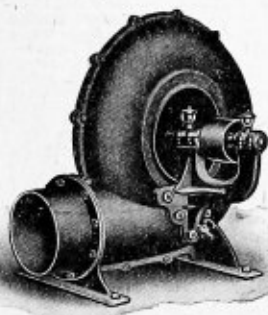
The prospective purchaser of a blower should consider carefully the desired direction of rotation of same in relation to that of his countershaft or driving pulley. All pressure blowers are furnished in the regular discharge, i. e., bottom horizontal right hand, unless otherwise specified; left hand can be had at same price but an extra 10 per cent will be charged for other discharges.

No. of Blower	Height, Inches	Diam. of Pulley, Inches	Face of Pulley, Inches	Inside Diam. of Outlet, Inches	Inside Diameter Cupola, Inches	Melting Capacity per Hr., Pounds	Speed No. of Rev. for Mtg. Iron	Pressure of Blast, Ounces	Number of Forge Fires	Revol. per Min. for Forge Fires	Price Without Counter-shaft	Price with Counter-shaft
1/2	12	1 1/2	1 3/4	2 3/4					1	4300	\$ 12.00	\$ 20.00
1	15	2 1/2	2	3 3/4					2	4200	18.00	28.00
2	20	3 1/2	2 3/4	4 1/4					4	4000	26.00	38.00
3	24	3 3/4	2 5/8	4 3/4	22	1300	4150	5	6	3725	36.00	52.00
4	26	3 3/4	2 5/8	5 1/4	26	2000	3790	6	9	3103	44.00	64.00
5	30	4 1/2	3 3/4	6 1/4	30	2900	3275	7	15	2456	55.00	80.00
6	35	4 3/4	3 3/4	7 1/2	35	4000	3050	8	18	2224	70.00	100.00
7	40	5 1/4	3 3/4	8 3/4	40	6000	2900	10	24	1814	90.00	130.00
8	45	6 1/4	3 3/4	10 1/4	46	8600	2820	12	30	1619	115.00	165.00
9	53	7 3/4	5 1/2	11 3/4	53	12300	2600	14	40	1344	160.00	235.00
10	64	9	6 1/2	13 3/4	60	16500	2270	15	52	1200	225.00	315.00

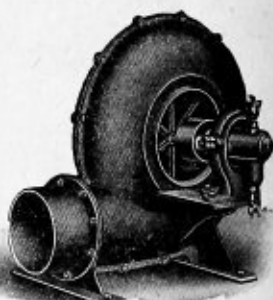
Nos. 1 to 3 have one pulley; all other sizes, two pulleys

Fan (Volume) Blowers and Exhausters

Fan blowers are built especially for use where a large volume of blast is required (instead of great pressure). They are adapted for steam boilers, puddling and heating furnaces, dry rooms, refrigerators, forge fires, ventilation. Two ounce pressure will be sufficient blast for steam boilers, for ventilating. Four ounce pressure with blast pipes in right proportion will give good results on puddling and heating furnaces. The number of forge fires given in table can only be considered as a guide, as all depends on the size of fires wanted and in what location the blower is placed. The best results are obtained when blower is close to the fires, and elbows, especially short turns, are avoided.



Volume Blower

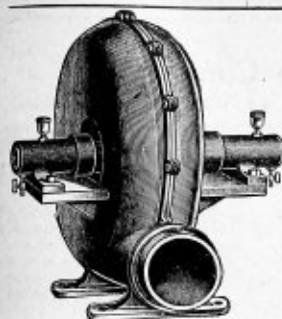


Exhaust Fan

Exhaust Fans

They are especially adapted for ventilating, refrigerating, removing dust from sand and emery wheels, rag and cotton pickers, grain elevators, buffing machines used by shoe manufactures, exhausting smoke and gas from blacksmith shops, etc.

No. of Blower	Height, Inches	Inside Diameter of Inlet, Inches	Inside Diameter of Outlet, Inches	Diameter of Pulley, Inches	Face of Pulley, Inches	Revolutions per Minute 2-oz. Blast for Boiler Fires	Revolutions per Minute 4-oz. Blast for Forge Fires	Number of Forge Fires	Price Each
1/2	12	4 1/2	3 1/2	2 1/2	1 3/4	3300	4500	1	\$ 12.00
1	15	5	4	3	2	3000	4000	2	15.00
2	18	5 1/2	4 3/4	3 1/2	2 1/2	2600	3600	4	20.00
3	21 1/2	6 1/2	5 1/4	4 1/2	2 3/4	2300	3200	6	25.00
4	25 1/2	7 1/2	6 1/4	5 1/2	3 1/2	1928	2682	9	33.00
5	29 1/2	9	7 3/4	6 3/4	4	1638	2279	15	44.00
6	34	10 1/2	8 3/4	7 3/4	4 1/2	1410	1961	18	55.00
7	40	12	10 1/2	9 1/2	5 1/4	1194	1662	24	70.00
8	45	14	12	11 1/2	6 1/2	1018	1417	30	90.00
9	50	16	14	13 1/2	8	878	1234	40	150.00
10	57	18	16	15 1/2	9	766	1065	52	200.00



Belt Driven

Champion Blowers

Belt Driven

This blower is intended for blowing fires in portable and small stationary boilers, also for forge fires and various purposes where a small current of air is desired.

- No. 0. Blower, 10 inches high, will blow one fire. Each.....\$ 8.00
 No. 00. Blower, 14 inches high, will blow two ordinary fires. Each... 10.00
 No. 000. Blower, 16½ inches high, will blow three ordinary fires. Each 12.00
 Arranged for exhaust purposes, extra..... 2.00

Electrically Driven

Direct Connected to Motors

One fire variable. Speed blowers Nos. 50 and 51 are equipped with universal motors and can be used with either direct or alternating currents of 110 or 220 volts.

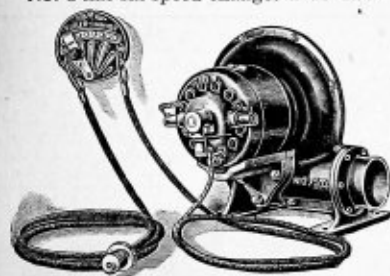
Has six speed changes and detached rheostat with cord and plug to fit any light socket.

The No. 50 is for regular blacksmithing fires.

The No. 51 is the same except that it is built ½ size larger in both motor and blower, giving ½ more blast, which especially adapts it for extra heavy blast as in railway shops, etc.

Styles No. 1 and No. 1E are also for regular fires and are equipped with motors for either direct or alternating current. When ordering for direct current state voltage, and for alternating current state voltage, phase and cycle.

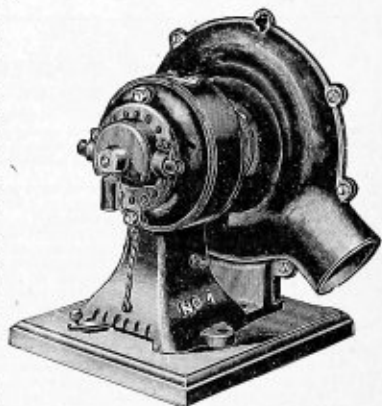
No. 1 has six speed changes with rheostat built in as shown on right.



Nos. 50 and 51

No. 1E is the same as No. 1 except that rheostat is detached as shown on left.

Nos. 1½ and 1½E are the same as Nos. 1 and 1E except that they are ½ size larger for extra heavy fires, and are equipped with universal motors for direct or alternating currents of 110 or 220 volts. The No. 1½ has built in rheostat while the No. 1½E has detached rheostat.



Nos. 1, 1E, 1½ and 1½E

These blowers are all supplied with cord and plug to fit any lamp socket and cost nothing to install.

Prices

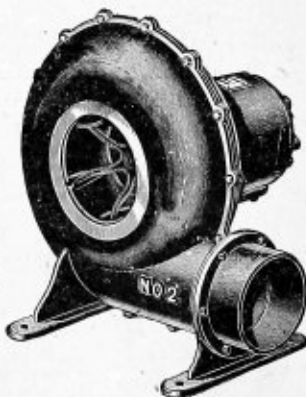
- No. 50. Blower, weight 55 pounds. Price.....\$40.00
 No. 51. Blower, weight 85 pounds. Price..... 60.00
 Nos. 1 and 1E. Blower, weight 35 pounds. Price..... 36.00
 Nos. 1½ and 1½E. Blower, weight 50 pounds. Price..... 50.00

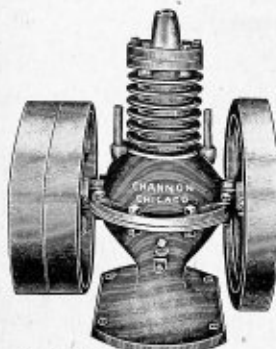
Constant Speed Direct Connected

The number of forge fires given in the table below can only be considered as a guide to go by, as it all depends on the size of the fires wanted, and in what location the blower as well as the forges are placed. The best results are obtained when the blower is close to the fires and elbows or especially short turns are avoided. To get the highest results out of a blower run by a one speed motor such as is required for a blower running more than one fire, it must be understood that there are times in electric plants in many cities when they are drawn upon practically to their limit for current, and at such times the voltage is reduced, so that the speed of the blower will be more or less reduced. In order to overcome this, it is always safe to buy the blower fully large enough for the work intended.

These blowers are equipped with motors for either direct or alternating current. When ordering for direct current give voltage or for alternating state voltage, phase and cycle.

No. of Blower	Height in Inches	Inside Diameter of Outlet, Inches	Number of Forge Fires	Price
20	15	3¼	1 to 2	\$ 48.00
2	15	3½	1 to 4	55.00
3	20	4¼	1 to 6	110.00
4	25¼	7¼	1 to 9	115.00





Perfectly balanced—no unequal wear on bearings. The T. & L. pulleys on one side (weight 40 pounds) balance the 40-pound fly-wheel on other side.

Only 1½ H. P. Required.

Air Tank—Size 16x48 inches or larger. It possible to start with system open—\$3.20

The "No. 27" Garage Compressor

Air Cooled—Balanced—Capacity 6½ Cu. Ft.—300 Pounds Pressure

A small, high pressure machine for garage or other work requiring not over 6½ cubic feet of free air per minute compressed to any pressure up to 300 pounds per square inch when used for intermittent service.

This machine will furnish plenty of air for ordinary garage work. Speed recommended, 300 R. P. M. At this speed will run continuously for half a day without overheating and maintain a pressure of 200 pounds.

On a recent test at a speed of 400 R. P. M. 100 pounds pressure was obtained from zero in 4 minutes and 20 seconds, 150 pounds in 8 minutes, 200 pounds in 11½ minutes and 250 pounds pressure in 16 minutes and 10 seconds.

Workmanship and material—All parts are made to the interchangeable parts system and machined to very close fits. The crank shaft and connecting rod are drop-forged steel and all bearings are bronze bushed. Splash oiling. Air from the crank case is utilized for cooling by forcing it through breather tubes at sides of the cylinder. Filler and drain plugs for crank case are furnished.

Piston now supplied with new style leakless piston rings.

Inlet and outlet valves at top of cylinder—away from oil and dirt. Valves are easily accessible and are guided at both ends.

Cylinder..... 3x4 inches
Capacity per minute..... 6½ cu. ft.
Pressures..... Up to 300 pounds
Air inlet..... 1½-inch
Air outlet..... 1½-inch
Shipping weight, 150 pounds Price..... \$46.75

T. & L. pulleys..... 13x2 inches
Fly-wheel..... 14x2 inches
Speeds..... 200 to 400 R. P. M.
Floor space..... 18x14 inches
Height over all..... 21 inches
Price..... \$46.75

Special Relief Valve for any pressure up to 300 pounds, \$3.50.

Special 3-way Cock—to be placed in air line between compressor and tank, making it possible to start with system open—\$3.20

The "Gee Gee" Garage Compressor

Air Cooled—Capacity 7.6 Cu. Ft.—250 Pounds Pressure

An accurately built air compressor of suitable size for the ordinary garage—specially designed for this kind of work to supply the need for a reliable, inexpensive air pump for the most exacting service.

It is extremely simple and runs very quietly—fool-proof, as it has no adjustments requiring constant attention.

Air cooled—no water connections to rust out or freeze. For intermittent service will stand a maximum pressure of 250 pounds without overheating—pressure for continuous service 125 pounds.

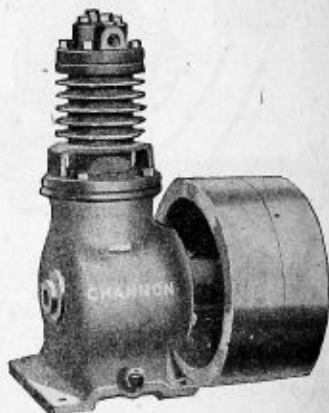
The crank-case is enclosed, making it dirt and dust proof. The lubrication is automatic through the oil splash system—no oil holes, oil cups or grease cups anywhere on the machine. Every working part is thoroughly drenched with oil, which prevents wear and insures long life to the pump—at the same time provision is made for keeping the surplus oil from being carried over with the air—so that air could be pumped directly into the tires if desired—instead of through an air tank or receiver.

Trunk or gas engine type piston is used with metallic piston rings—no leather whatever in the construction.

Valves are located in the head—away from the dusty floor, so that the compressor gets the benefit of a pure supply of air. Hardened steel ball valves are used, which require no grinding—they seat quietly—making the machine noiseless in operation and there is practically no wear on the balls.

On a test at a speed of 600 R. P. M. and 150 pounds pressure, after 30 million turns, machine was taken down and every working part found in perfect condition.

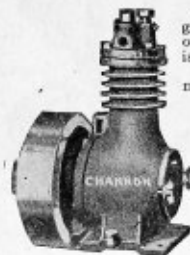
Cylinder..... 3x3 inches
Capacity per minute..... 7.6 cu. ft.
Pressure up to..... 250 pounds
H. P. required..... 2 H. P.
Weight with tight pulley, 117 pounds. Price..... \$43.00
Weight with tight and loose pulleys, 135 pounds. Price..... 48.00



With T. & L. Pulleys

Nicely finished in aluminum, making it an attractive looking machine for any garage.

"Midget" Air Pump



A small machine suitable for private garages, dental offices, motor boats and other places where a small amount of air is required.

It is a simple machine, easily dismantled and reassembled. Lubrication is by oil splash system in which every working part is thoroughly drenched with oil—but with provision made for keeping the oil from going over with the air. Pulley, 8-inch diameter. Cylinder is 2x1½ inches. Capacity 1½ cu. ft. of free air at 600 R. P. M.—good for 125 pounds pressure. Weight 30 pounds.

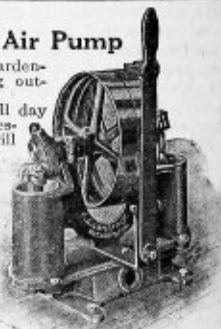
Price with tight pulley..... \$25.00
Price with T. & L. pulleys..... 27.00

No. 1 Double Air Pump

Adapted for small forges, hardening furnaces, brazers, soldering outfits, etc.

Will run at 300 R. P. M. all day without overheating against pressures up to 10 pounds, or will pump into a large tank against pressure up to 40 pounds.

Cylinders are double, 2½x2-inch stroke, speed 250 to 300 R. P. M. Tight and loose pulleys 7½ diameter for 1-inch belt with shifter lever to start and stop. Openings, ¾-inch. Weight 30 pounds. Price..... \$30.00
Floor stand, 18 pounds extra. Price..... 55.00



We supply Transmission and Power Equipment also.

"Gardner" Air Cooled Air Compressors

Enclosed—Self-Oiling

High grade machines—accurately made and good for any air pressure up to 200 pounds for intermittent service or 125 pounds continuous service.

The air-cooled compressor has been found thoroughly satisfactory for garage work, operating small air tools, for vulcanizing work, for blowing dust and other work within its capacity.

The crank case and cylinder is cast in one piece, insuring perfect alignment. Crank case is enclosed for automatic splash lubrication. The trunk style of piston is used with split metallic packing rings (no leather packing being used).

The hardened steel ball valves are in the head and seat so quietly that machine is practically noiseless in operation.

Crank shaft is furnished with renewable bearings.



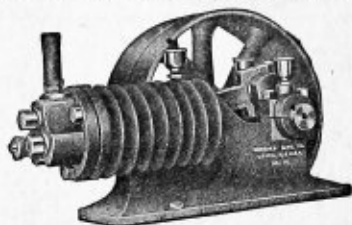
With Tight and Loose Pulleys

No.	Diam. Cylinder and Stroke	Cap. Cu. Ft. per Min.	Speed R. P. M.	H. P. for 100 Lbs. Press.	Size Pulley, Ins.	Weights		Price With	
						Tight Pulley, Lbs.	T. & L. Pulley, Lbs.	Tight Pulley	T. & L. Pulley
32	2 x 2½	2½	600	½	8x2	50	60	\$ 35.00	\$ 39.00
33	2½ x 3	5	600	1	10x2	80	90	44.00	49.00
34	3 x 3½	8	600	1½	14x2½	150	170	65.00	77.00
35	4½ x 4½	21	500	5	20x4½	380	430	120.00	141.00

No. 100 Brunner Air Compressor

An air pump of very small capacity intended for use in small garages. It is designed to operate equally well in either horizontal or vertical position. Being small and of convenient size, it is readily adaptable to a wide variety of service. Recommended for garages housing up to 10 cars and to be used in connection with air tanks not larger than 20 gallon capacity for the best service. Built for pressures up to 175 pounds but tested at the factory to 300 pounds. Equipped with adjustable safety valve. Requires ¼ H. P. for operation and delivers 1 cubic foot of free air per minute at 300 R. P. M. Should be operated at a speed of 350 to 400 R. P. M. Height 4½ inches. Floor space 8x11 inches. Cylinder 1½x2 inches. Shipping weight 30 pounds.

No. 100. With 8-inch tight and loose pulleys. Price\$18.00



No. 102 Brunner Double Cylinder Air Cooled Air Compressor

Regularly furnished with 9-inch pulley and friction clutch unless otherwise ordered. It is also furnished with 9-inch or 14-inch single pulley for straight belt drive, or 9-inch tight and loose pulleys upon order.

Cylinders—2 cast en-bloc. Bore—1½ inches. Stroke—2½ inches.

Guaranteed Pressure—175 pounds to the square inch (fitted for higher pressures upon order).

Recommended Speed—300 to 450 R. P. M.

Displacement—At 300 R. P. M., 2½ cu. ft.; at 350 R. P. M., 2½ cu. ft.; at 400 R. P. M., 3 cu. ft. free air per minute.

Outlet—Tapped for ¼-inch iron pipe.

Lubrication—Splash system.

Pulleys—9 or 14-inch as below for 2-inch belt.

Dimensions—Height, 13 inches; floor space, 6½x10 inches.

Power Required at 100 Pounds Pressure—½ H. P.

Finish—Gloss black enamel.

Net Weight—38 pounds.

With 9-inch pulley and friction clutch.....	\$40.00
With 9-inch tight pulley.....	33.50
With 14-inch tight pulley.....	34.50
With 9-inch tight and loose pulley.....	37.00



Brunner Vertical Water Cooled Air Compressors

No. 17 Twin Cylinder. Built for severe service. Drop forged crank shaft, steel connecting rods, all parts easily accessible. 3-inch bore, 6-inch stroke. Guaranteed pressure 175 pounds per square inch. Speed 250 to 400 R. P. M. for continuous service, 400 to 500 R. P. M. for intermittent service. Capacity from 6 cu. ft. at 250 R. P. M. to 12½ cu. ft. at 500 R. P. M. free air per minute. Free lubrication.

Pulley and fly wheel both 16x3 inches. Height 18 inches. Floor space 8½x15 inches over pulley. Power required at 100 pounds pressure, 300 R. P. M., 1½ H. P. Net weight with tight and loose pulleys, 200 pounds. Finish, gloss black enamel.

No. 15 Single Cylinder. Same as No. 17, except bore 4-inch, stroke 4½-inch, speed 250 to 400 R. P. M. for continuous service, 450 to 500 R. P. M. for intermittent service. Capacity from 8.1 cu. ft. at 250 R. P. M. to 17 cu. ft. at 500 R. P. M. Pulley 1-inch diameter. Fly-wheel for 100 pounds pressure. Height 30 inches. Floor space 9x18 inches. 1½ H. P. required at 100 pounds pressure 300 R. P. M.

No. 17 Twin Cylinder

No. 15 Single Cylinder

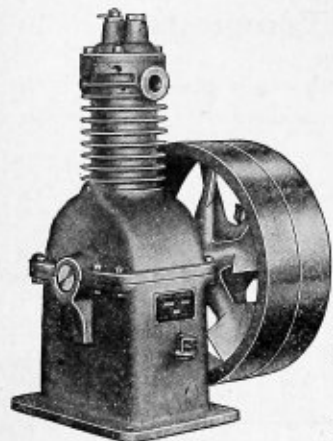
Without pulley.....	\$ 90.00	With one flywheel.....	\$100.00
With tight pulley.....	97.00	With two flywheels.....	110.00
With T. & L. pulley.....	102.00	With T. & L. pulleys and 1 flywheel.....	112.00



No. 17 Twin Cylinders

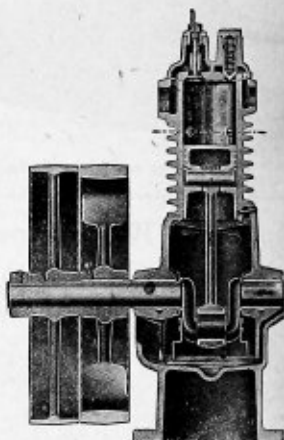
Curtis Air Compressors

Air Free From Oil



- 1—Controlled-splash self-oiling system, no excess in cylinder, no external leakage nor waste, no oil gets to tires. Closed crank case, keeps out dust.
- 2—One-half pint of oil ample for 100 hours.
- 3—High and low level oil filling gauge.
- 4—Fan fly-wheel assists in cooling.
- 5—Valves of light weight, large area.
- 6—Safety cage under valves.
- 7—Hand unloader permits starting against pressure.
- 8—Adjustable renewable die cast bearings.
- 9—Dropped forged steel crank shaft.
- 10—Head removable without breaking pipe connections or bending pipe. Only one gasket.

Size	1	2	3	4	5
Bore and stroke	1½x2	2½x2½	3x3	3x3½	4½x4½
Standard speed	500	400	350	300	250
Cu. Ft. capacity	1.2	1.8	2.99	4.32	10.4
H. P. at 100 lbs	.24	.36	.60	.87	2.09
H. P. at 200 lbs	.31	.47	.78	1.14	2.75
Maximum speed	700	600	550	500	400
Cu. Ft. capacity	1.68	2.70	4.7	7.20	16.5
H. P. at 100 lbs	.34	.54	.95	1.45	3.34
Size pulley	9x1½	11x2½	12x2½	14x2½	22x4½
Shipping weight	40	60	100	120	385
With tight pulley only	\$34.20	\$37.80	\$47.70	\$50.40	\$108.00
With T. & L. pulley	37.80	41.40	51.30	54.00	126.00
Automatic unloader	16.20	16.20	16.20	16.20	19.80

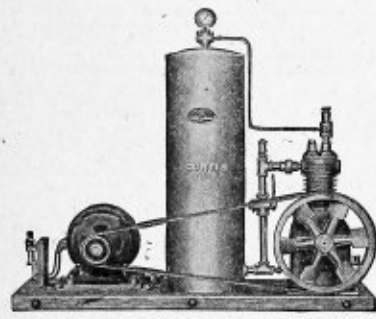


Style "Z" Belted Only

This type of outfit is no advantage over the separate mounting, excepting the self-contained feature which allows it to be moved from place to place, as desired, without disturbing any connections whatever. This is an inexpensive outfit, simple, complete and made in the belted type only.

Belted Only

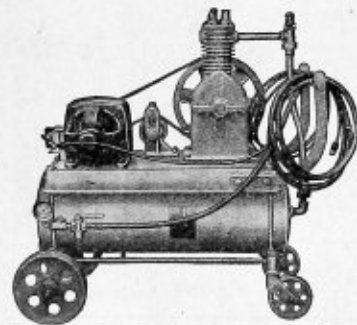
Style and Number	Size Com.	Motor, HP	Pres.		Size Tank In. See Note	No Motor no Starter, no Belt, nor Motor Pul'y.	Complete with Motor				
			Cont.	Inter.			D. C. 110-220	A. C. 60 eye. 2or3Ph. 110-220	A. C. 60 eye. 2or3Ph. 110-220	Wt.	
						Price	Wt				
Z-1	1½x2	1	100	150	10x30	\$75.60	130	\$142.20	\$171.00	\$171.00	240
Z-2	2½x2½	1	100	150	10x30	\$84.60	160	\$192.60	\$210.60	\$192.60	290
Z-3	3x3	1	100	150	12x36	\$95.40	200	\$212.40	\$268.20	\$217.80	360
Z-4	3x3½	1	100	150	12x36	\$99.00	225	\$248.40	\$279.00	\$228.60	410
Z-5	4½x4½	3	100	150	14x48	\$169.20	645	\$468.00	\$507.60	\$361.80	920



Style "X" Belted or Geared

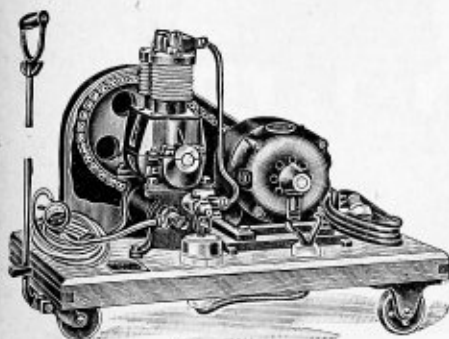
Portable outfits, complete with tank, give the advantage of storage in addition to portability.

Style and No.	Size Com.	Motor, H. P.	Max. Pressure	Size Tank	No Motor, no Starter, no Pinion, nor Belt	Complete with Motor			
						D. C. 110-220	A. C. 60 eye. 2or3Ph. 110-220	A. C. 60 eye. 2or3Ph. 110-220	Wt.
X-1	1½x2	1	150	10x30	\$115.20	215	\$187.20	\$207.00	290
X-1a	1½x2	1	150	12x36	\$118.80	240	\$190.80	\$210.60	315
X-2	2½x2½	1	150	10x30	\$127.80	235	\$228.60	\$246.60	365
X-2a	2½x2½	1	150	12x36	\$131.40	260	\$232.20	\$250.20	385
X-3	3x3	1	150	10x30	\$138.60	245	\$244.80	\$300.60	375
X-3a	3x3	1	150	12x36	\$140.40	270	\$248.40	\$304.20	395
X-4	3x3½	1	150	12x36	\$147.60	250	\$306.00	\$336.60	385
X-4a	3x3½	1	150	14x48	\$183.60	465	\$342.00	\$372.60	670
X-5	4½x4½	3	150	14x48	\$264.60	785	\$513.00	\$552.60	1105
X-5a	4½x4½	3	150	16x60	\$273.60	890	\$541.80	\$581.40	1210



No. 60 Electric Garage Air Pump

Air Cooled—Mounted on Truck



A small compact, portable unit for small garages, private garages, filling stations, etc.

For inflating tires direct (without use of air tank).

$\frac{1}{4}$ H. P. motor, silent chain drive, complete.

Inflates a 35x1 $\frac{1}{2}$ tire from flat to 90 pounds in about three minutes. Consumes one-third of a K. W. hour per hour.

Double cylinders are 1 $\frac{1}{4}$ x2 $\frac{1}{4}$. Pistons have ground metal rings. Crank shaft and connecting rods are drop forged. Die cast bearings.

Ring oiling splash system of exclusive design. No oil can enter casing. Double set of valves for each cylinder preventing leakage.

Neutral air chamber between pump and motor.

Prices Complete

110-220 V. direct current..... \$ 90.00

110-220 V. 60 cycle alternating current..... 100.00

25 and 40 cycle, $\frac{1}{4}$ H. P..... 110.00

Prices include hose and all connections ready to attach.

Binks Electric Tire Pump

An efficient, simple and inexpensive portable air pump, suitable for public or private garages. It will inflate a tire as quickly as larger machines as the tire valve opening will not permit faster inflation.

It is made of the best grade of iron, neatly enameled. The cylinder is two inches in diameter, 3 $\frac{1}{2}$ -inch stroke, accurately bored and finished. Metal piston rings of the same grade as in the highest priced compressors. Running parts fitted with spring grease cups and valves of special construction which need no attention and will last indefinitely.

Motor $\frac{1}{4}$ horse power. Operated from ordinary lamp socket.

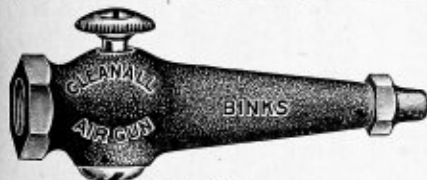
It is mounted on a 2x12x30-inch platform with swivel castors and is built to withstand hard usage.

The equipment, as illustrated, includes 110-volt direct or 110-volt 60 cycle alternating current motor, 10 feet of discharge tubing, 200 pound pressure gauge and 15 feet of lamp cord.



Price.....\$80.00

Motors for currents other than specified charged extra.

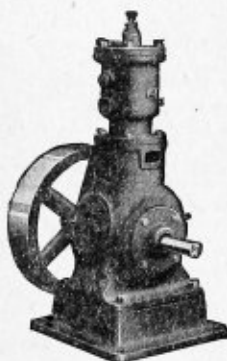


Price List

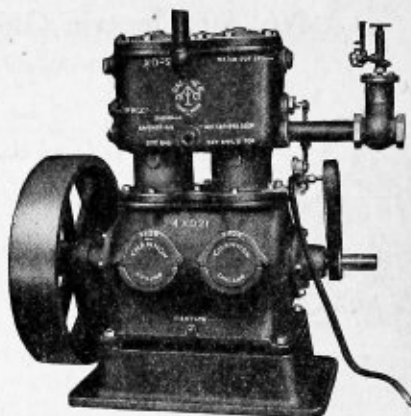
Pipe Connection, Inch	Orifice Air Discharge, Inch	List Price
$\frac{1}{4}$	$\frac{1}{8}$	\$2.00
$\frac{3}{8}$	$\frac{1}{4}$	2.20
$\frac{1}{2}$	$\frac{3}{8}$	2.55
$\frac{3}{4}$	$\frac{1}{2}$	3.35
$1\frac{1}{4}$	$\frac{3}{4}$	4.35

Cleanall Air Gun

Used in foundries, machine shops, mills, garages, etc., wherever compressed air is available. The air is under perfect control at all times, and the desired volume can be obtained by simply pressing button. It is absolutely tight and there is no leakage of air when not in use. Indispensable for blowing dust from motors, machinery, automobile cushions, etc. Used to equal advantage by bench and machine hands for removing chips and filings where it is impossible to reach with a brush. For cleaning molds in foundries it is decidedly more convenient and practical than the hand bellows.



Class G—Single with Sub-base.



Class H—Duplex with Sub-base.

Gardner-Rix Vertical High Speed Air Compressors

Enclosed Automatic Self-Oiling—Water Cooled—High Pressure

The excellent design and construction of these machines makes high speeds possible, economical and perfectly safe. They are of the enclosed type, dirt and dust proof. Friction has been reduced to a minimum by making all moving parts light, and as these parts are copiously oiled the bearings run cool and do not wear rapidly. The speed ratings given below represent every day service without excessive wear.

Light steel valves insure quiet seating and noiseless running. Easy to understand and install. No stuffing boxes to pack or crossheads to key up. Require little floor space. Light weight, making machines valuable for portable use. Owing to the high speeds can be operated direct from motor. Piston is of the trunk pattern, eliminating crossheads and stuffing boxes.

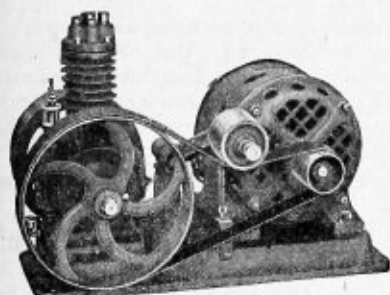
Price List and Specifications

Type	Class "G" Single Cylinder				Class "H" Duplex		
Size of cylinder, inches	3x3½	4½x4½	6x6	8x6	4½x4½	6x6	8x6
Capacity in cubic feet of free air per minute	5½-8	12½-21	27-40	70	25-42	50-80	95-140
Maximum pressure, pounds	250	200	200	200	150	125	125
Speed, revolutions per minute	400-600	300-500	275-400	275-400	300-500	250-400	275-400
Horse power required, 60 pounds pressure	1-1½	2½-3½	4½-6½	7-11	4-6½	7½-12	15-23
Horse power required, 80 pounds pressure	1¼-1½	2½-4	5½-8	9-13½	5-8	10-16	18-27
Horse power required, 100 pounds pressure	1½-2	3-5	6½-9	10-15	6-10	11-18	20-30
Suction and discharge openings, inches	¾	1½-1	2-1½	2½-2	1½-1	2-1½	2½-2
Diameter of belt wheel, inches	14	20	26	30	20	26½	30½
Width of belt, inches	3	4½	5	6	5½	6	7
Outside dimensions, inches	14x17	20x23	26x32	31x37	20x33	27x43	31x51
Extreme height with sub-base, inches	27	38½	46½	49½	39	48	54
Shipping weight, pounds	165	390	790	1150	700	1400	1900
Shipping weight boxed for export, pounds	230	530	1000	1500	900	1850	2400
Type of lubrication, oil splash or grease	Splash	Splash	Splash	Grease	Splash	Splash	Splash
Price with one tight pulley	\$ 87.00	\$144.00	\$250.00	\$350.00	\$270.00	\$410.00	\$610.00
Extra for unloader	17.50	19.00	31.50	35.00	19.00	44.00	49.00
Extra for sub-base	3.50	5.50	10.50	18.00	9.00	16.00	21.00
Extra for tight and loose pulley	12.00	21.00	30.00	44.00	21.00	35.00	52.00
Extra for circulating pump attached	19.00	21.00	24.00	24.00	21.00	24.00	24.00
Price—Compressor with extended base, gear, pinion, etc., for motor drive—no unloader or motor	148.00	235.00	392.00	525.00	385.00	566.00	845.00
Price—Compressor with extended base, belt, belt tightener, etc., for motor drive—no unloader and without the motor	148.00	235.00	392.00	525.00	385.00	550.00	830.00

Can also supply low pressure machines of same type—pressures 75 pounds or less—prices upon request. We recommend the sub-base, as with it pulley will clear the floor. Unloader is required where constant pressure is desired. Oil splash lubricated machines must not run slower than minimum speed. Grease lubricated machine (8x6 Class G) may be operated at any speed below the maximum shown in the table.

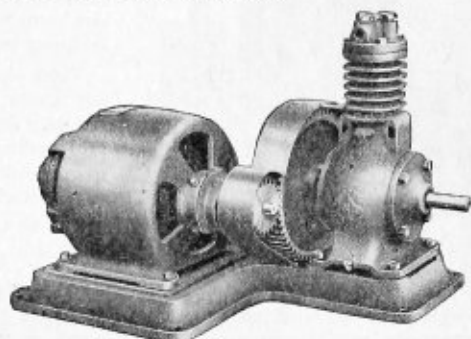
Electrically Driven Compressor Outfits

With Air Cooled, Enclosed Self-Oiling Compressors
A High Grade Unit Pumping Plant for Garage and Other Uses



Special Short Belt Drive—Quiet and Efficient
Compact and Convenient.

Maximum
Pressure
125 lbs.



Gear Driven with Rawhide Pinion.

These machines are direct-connected to standard motors either through gearing or by the special short belt drive attachment shown.

The gear driven outfit, even with the rawhide pinion, is noisier than the belted and the latter is generally preferable. The floating idler on the belt drive makes a short coupling, provides greater belt contact, prevents slippage, saves room and insures maximum power.

Both styles are mounted on substantial sub-base and are sold at the same price.

Size of Compressor, Inches	Capacity Cubic Feet Per Min.	H. P. of Motor 100 lbs. Pressure	Outside Dimensions		Extreme Height, Inches	Weight Pounds	Price, Each		
			Belt Driven	Gear Driven			D. C. 110-220 V.	A. C. 2-3 Phase	A. C. Single Phase 60 Cycle
2 x2½	2½	½	17½x25¼	16 x27	17	200	\$130.00	\$130.00	\$125.00
2½x3	5	1	18 x28	19 x27½	19	300	158.00	150.00	160.00
3 x3½	8	1½	24 x37	25 x27	26	575	200.00	195.00	195.00
4½x4½	21	5	22½x43¼	29½x33¼	37¼	825	350.00	275.00	340.00

Large Direct Connecting Garage Set

Water Cooled Compressor—Includes Receiver

This installation is for those garages requiring large quantities of air, not only for tire inflation, but for cleaning, operation of air tools, etc. It is a complete stationary outfit, consisting of a 4½x4½ Class "G" Water Cooled Gardner-Rix Compressor, capacity 21 cubic feet of free air per minute, connected by Short Belt Drive attachment to a 5 H. P. motor. Compressor and motor are mounted on one cast iron bed plate. The Receiver (18x72 inches) furnished with the set is supplied with brass safety valve, air pressure gauge, drain cock, etc. An automatic starting and stopping device is also furnished. The particular function of this apparatus is to keep the Set under automatic control and thus maintain a practically constant air pressure in the tank.

The Set is made in one size only and is a very superior outfit of sufficient capacity to supply the demands of the larger garages.

Prices

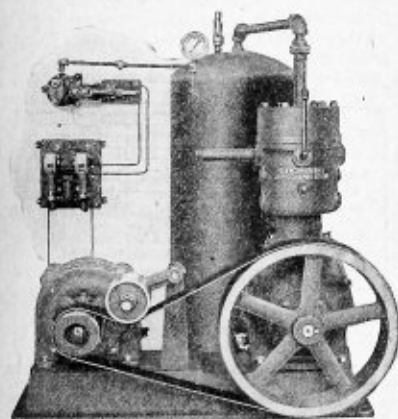
Complete but without Automatic Controlling Device.

Direct Current.....\$425.00

Alternating Current, 2 or 3 phase, 60 cycle, 110 or 220 volts 350.00

Alternating Current, single phase, 60 cycle..... 415.00

Extra for Controlling Device:—Prices on application.



Capacity, 21 cubic feet of free air per minute.

Weight, 1200 pounds.

Portable Air Compressors



The portable gasoline driven air compressors are manufactured in eight sizes ranging from 21 cu. ft. to 450 cu. ft. of free air per minute. Are complete in all details, rugged, light in weight, very economical and easy to operate.

These plants are equipped with enclosed self oiling compressors, having water cooling system separate from that of the engine. Are very simple and require little attention to keep them in good working condition. The entire freedom from intricate mechanisms, requiring delicate adjustments, makes them especially valuable for use in places where best care and attention are not always available.

The air tanks are of ample proportion and allow of a large storage of air.

The gasoline engine is of the four cylinder, four cycle, long stroke, vertical heavy duty type, specially designed for portable compressor work, and is guaranteed to stand up under the hard work that air compressor service requires. Complete with carburetor, magneto, etc. The speed is controlled by fly ball type governor, which is adjustable when running or idle, and can be sealed to prevent tampering.

The jackets of the cylinders are kept cool by specially designed radiator, or cooling tower. A safety starting coupling is provided to enable the operator to start the engine easily and to eliminate back kick. In addition to five large main bearings an outboard bearing is provided to take care of any strain that may come on the bearings when compressor unloader cuts in instantaneously against the full load.

The gasoline is drawn by a vacuum system into the engine from a supply tank located on the rear of the truck.

The engine is connected to the compressor by water proof leather belt, which is kept tight at all times by an idler located so as give the greatest possible contact to the driving and driven pulleys.

It is provided with a multiple disc clutch to insure easy starting and is mounted on a steel truck of heavy construction, having wide steel wheels, oscillating fifth wheel, tongue, neck yoke, and single and double trees. Can also be furnished semi-portable in any of the sizes listed.



Zin-Ho Portable Air Compressor

Dimensions and Prices

Size	Cap. Free Air per Min. Cu. Ft.	Dia. Air Cylinder, Ins.	Stroke of Piston, Ins.	No. of Air Cylinders	Single or Double Acting Cylinders	H. P. Required to Drive Compressor at 100 Lbs. Pressure	H. P. of Gasoline Engine	No. Cylinders on Gasoline Engine	Size of Air Tank in Ins.	No. of Air Tanks	Size of Air Discharge in Ins.	Size of Truck Platform in Ins.	Diam. and Face of Front Wheels in Ins.	Diam. and Face of Rear Wheels in Ins.	Apprx. Total Ship. Weight in pounds	Price With-out Steel Cover	Price With Steel Cover
21	21	4 1/2	4 1/2	1	Single	5	7 1/2	4	18x48	1	1	30x72	16x3	20x3	2000	\$726.65	\$833.33
42	42	4 1/2	4 1/2	2	Single	10	15	4	20x60	1	1	36x84	20x4	24x4	3000	1120.00	1263.33
80	80	6	6	2	Single	18	25	4	24x60	1	1 1/2	45x100	26x4	34x4	4000	1504.00	1666.66
140	140	8	6	2	Single	30	45	4	30x60	1	2	45x120	26x5	34x5	5800	2200.00	2400.00
165	165	9	10	1	Double	34	50	4	24x60	2	2	54x144	26x5	34x5	5800	2633.00	2886.66
200	218	10	12	1	Double	45	65	4	24x72	2	3	60x144	26x6	34x6	8000	3580.00	3846.66
300	314	12	12	1	Double	60	80	4	30x60	2	3 1/2	60x154	26x7	34x7	10800	4913.00	5180.00
400	450	14	12	1	Double	90	120	4	30x72	2	4	66x166	26x8	34x8	12800	5966.66	6300.00

The Senior Portable Combination Pneumatic Plant

For Calking Lead Joints in Gas
and Water Pipes.



This plant can also be used for any purpose where compressed air is required and where its capacity is sufficient for the purpose. The plant will give a capacity of 20 cubic feet of free air per minute and will operate a pneumatic hammer for calking lead joints; or one plug drill for drilling stone or concrete; or four hand air tools for lettering, tracing and carving marble or granite work; or will operate one riveting or chipping hammer.

The pneumatic calking tool will calk any kind of a lead joint satisfactorily, as its rapid and powerful strokes make a firm joint. The lead wool however is preferable. This plant is being used extensively by gas and water companies, also by contractors in the U. S. and Canada for calking lead in main pipe joints.

The pneumatic calking hammer does the work of several men and makes the joints more firm and perfect. It is an impossibility to calk lead into joints by hand as firmly and satisfactorily as with the pneumatic hammer; besides, the pneumatic hammer will do the work in **one-fifth** the time required by hand calking.

This machine differs from others as the engine and compressor are combined into one machine. The air-piston is connected on the same shaft with the engine piston, making what is termed a double-throw method which gives the same power to compressor-piston as to engine piston—making a very compact outfit that is self-contained. The engine is hopper-cooled, with gasoline in base, and is ready for operation upon arrival.

Another improvement is the piston-discharge valve used instead of the old style stem valve. This valve increases the efficiency about 15 per cent and is practically indestructible. Compressor is equipped with an unloader which automatically relieves the load on the engine when the proper pressure is attained; unloader can be set at any pressure up to 125 pounds.

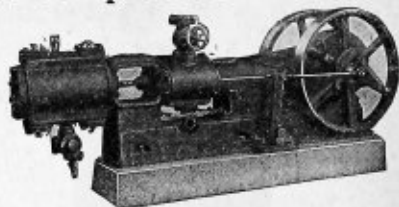
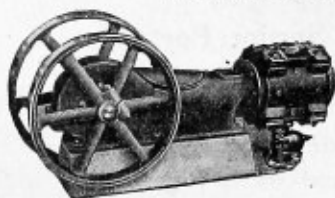
The engine is equipped with magneto for ignition and has a suction carburetor and is thoroughly up-to-date in every respect.

The "Senior" plant consisting of 5 H. P. gasoline engine, hopper cooled, compressor $4\frac{1}{2} \times 6$, air cooled, capacity 20 cubic feet of air, 20x60-inch air tank complete with fittings, truck with $12 \times 4\frac{1}{2}$ front and $16 \times 4\frac{1}{2}$ rear wheels. Weight, 1650 pounds.

Price with truck..... \$450.00

Air hose and couplings, pneumatic tools, jute packing, also oakum (plumbers' spun) are listed elsewhere in catalog.

Ingersoll-Rand Air Compressors



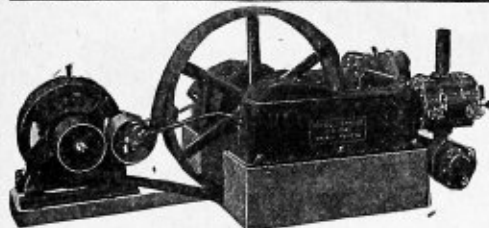
Pressures up to 125 Pounds

Class "ER-1" Belted

Class "FR-1" Steam Driven

Latest improved types—Single stage air, double acting, dust proof enclosed construction, automatic lubrication, Ingersoll-Rand inlet and discharge valves. Can be furnished with tight and loose pulleys on the 6 and 8-inch stroke sizes on special order at extra cost. The straight line steam driven machines have improved balanced piston steam valves.

Cyl. Dia. & Stroke	Rev. per Minute	Cu. Ft. Air per Minute	Air Pressures	Brake H. P.	Belt Pulley, Inches	Price F. O. B. Factory	Stm.	Air	St'k'e	Rev. per Min.	Cu.ft. Air per Min.	Air Pressures	I. H. P. in Steam Cylinder	Price With R. A. 39 Un- loader & Gov. F. O. B. Factory
6x 6	275	52	80 to 125	6.7 to 7.1	36x 5 1/2	\$415.00	7	6	6	350	#67	80 to 125	9 to 10	\$811.00
7x 6	275	72	70 to 100	9 to 10	36x 5 1/2	\$438.00	7	7	6	350	92	55 to 110	11 to 13	\$834.00
8x 6	275	94	40 to 70	10 to 12	36x 5 1/2	\$462.00	7	8	6	350	120	30 to 50	12 to 14	\$858.00
8x 8	250	113	80 to 125	18 to 21	45x 8 1/2	\$779.00	9	8	8	300	136	80 to 125	21 to 25	\$1144.00
9x 8	250	145	70 to 100	21 to 24	45x 8 1/2	\$819.00	9	9	8	300	173	65 to 100	24 to 29	\$1174.00
10x 8	250	179	30 to 70	19 to 26	45x 8 1/2	\$865.00	9	10	8	300	215	35 to 60	24 to 30	\$1211.00
12x 8	250	258	15 to 30	14 to 24	45x 8 1/2	\$936.00	9	12	8	300	311	25 to 30	26 to 31	.....
10x10	235	210	80 to 125	33 to 39	58x10 1/2	\$990.00	12	10	10	275	245	80 to 125	39 to 46	\$1608.00
12x10	235	304	50 to 100	40 to 53	58x10 1/2	\$982.00	12	12	10	275	355	60 to 100	51 to 62	\$1702.00
14x10	235	415	20 to 50	31 to 52	58x10 1/2	\$1128.00	12	14	10	275	484	30 to 55	45 to 63	.....
12x12	220	340	80 to 125	56 to 72	72x14 1/2	\$1423.00	14	12	12	250	386	80 to 125	61 to 70	\$2355.00
14x12	220	464	45 to 100	58 to 79	72x14 1/2	\$1515.00	14	14	12	250	528	45 to 100	66 to 88	\$2347.00
17x12	220	688	30 to 40	69 to 79	72x14 1/2	\$1771.00	14	17	12	250	781	25 to 40	75 to 93	.....



Imperial Type 12 Vertical Air Compressors

Self-oiling, enclosed type. Air pressures up to 150 pounds.

Single stage air, single acting of the dust proof enclosed construction with automatic constant level splash lubrication.

Ring inlet valve on the 4 1/2 x 5 size. No inlet valves on the smaller sizes. Plate discharge valves on all sizes.

Furnished with either single pulley or tight and loose pulleys as ordered.

The standard machines are water cooled for connection to pressure system. The hopper or reservoir type has the cylinder jacketed which in connection with the reservoir head forms an efficient thermo-siphon cooling system.

Smallest size air or water cooled at the same price.

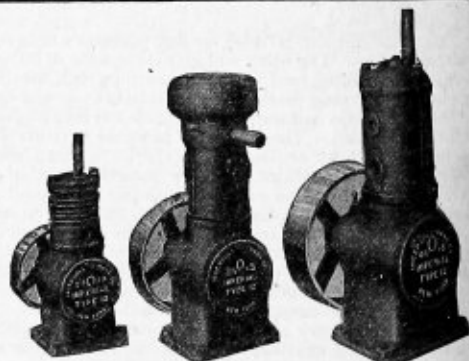
Be sure to state cooling desired.

The Short Belt Drive For Air Compressors

Has many good features. The idler pulley floats on the belt and while it is light its weight is sufficient to take up the slack and hold the belt against the driving pulley, giving greatest possible belt contact and relieving pressure on the bearings.

This style of drive makes a compact, noiseless unit, lower in first cost than a direct connected outfit because standard motors can be used.

Prices quoted upon request.



Air Cooled

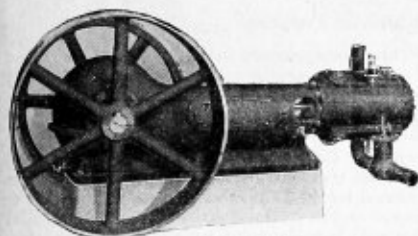
Hopper Cooled

Water Jacketed

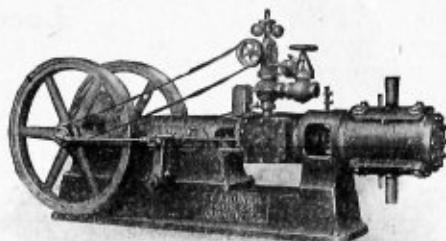
No.	Size		Speed R. P. M. Min. and Max.	Displace- ment Cu. Ft. per Minute	B. H. P. Required at Belt Wheel				Size Belt Wheel, Ins.	Approx. Sh'p'g Wght., Lbs.	Com- pressor Bare	Un- loader	Extras	
	Cyl. Bore, Ins.	St'e Ins.			60 Lbs. Air		100 Lbs. Air						For Hopper or Reserv'r Cooled	For Tight and Loose Pulleys
					Min.	Max.	Min.	Max.						
12A	2 1/2	3	450 to 700	3.8 to 6	.76	1.2	.95	1.5	12x3	225	\$ 80.00	\$24.00	\$4.00	\$10.00
12B	3 1/2	4	350 to 550	7.7 to 12.2	1.50	2.4	1.90	3	16x4	325	110.00	24.00	6.00	18.00
12C	4 1/2	5	325 to 500	14.9 to 23	2.75	4.2	3.40	5.5	20x5	550	154.00	27.00	8.00	19.00

Larger Compressors quoted upon request.

Gardner Horizontal Air Compressors



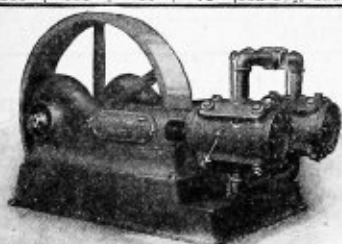
Class "B-S" Belted



Class "S-S" Steam Driven

Enclosed, automatic self-oiling type, permitting higher speeds than the older style open frame machines. Massive frames, bored guides, balanced fly-wheels, light seating valves, easy adjustments. Discharge valves, steel and cup shaped, poppet type, light and durable—inlet valve is a ground light steel disc—seating very quietly. Valves are set radially, giving good cooling—around cylinder walls also through both heads. Piston is double acting with spring rings—travels with minimum clearance, 1-32 to 1-16, giving high volumetric efficiency. First four sizes are of the open frame type.

Cyl. Diam. and Stroke	Rev. per Min.	Cu. Ft. Air per Min.	Max. Air Pressure	H. P. for Max. Pressure	Belt Pulley	Apprx. Wght.	Price With Tight Pulley	Stm.	Air	St'ke	Rev. per Min.	Cu. Ft. Air per Min.	Max. Air Pressure	H. P. for Max. Pressure	Ap-prox. Wght., Lbs.	Price With Tight Pulley
6 x 6	300	59	125	10	30x 6 1/2	1300	\$300.00	6	6	6	300	59	125	10.5	1800	\$500.00
8 x 6	300	104	50	13	30x 6 1/2	1525	340.00	6	8	6	300	104	50	13.6	1850	550.00
8 x 8	250	115	125	20	42x 8 1/2	2300	450.00	8	8	8	250	115	125	21	3400	650.00
10 x 8	250	182	60	25	42x 8 1/2	2650	515.00	8	10	8	250	182	60	26.2	3450	715.00
9x10	225	165	125	29	42x 8 1/2	2600	600.00	9	9	10	225	165	125	30.4	4150	875.00
10x12	200	218	125	39	50x11	3550	725.00	10	10	12	200	218	125	40.9	5450	1075.00
12x12	200	314	70	45	50x11	4000	800.00	10	12	12	200	314	70	47	5700	1125.00
12x12	200	314	125	55	56x12 1/2	5000	1000.00	12	12	12	200	314	125	57.5	8200	1400.00
16x12	200	558	30	51	50x 6 1/2	4800	1050.00	10	16	12	200	558	30	53.5	6100	1300.00
16x12	200	558	50	71	56x 8 1/2	5800	1150.00	12	16	12	200	558	50	74.5	8900	1575.00



Class D—Belted

Duplex Compressors

Capacity 58 cubic feet of free air per minute and larger. Belted, steam or electrically driven, also compound machines, quoted upon request.

No. 71 Contractors Portable Compressed Air Plant

For operating air tools of any kind in sewer or road work, structural steel erection railroad or general contract work.

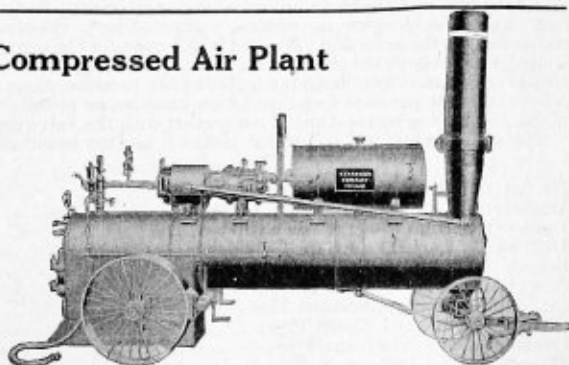
Will operate: One large size 3 1/4-inch rock drill, three Jackhammer or similar small rock drills, 10 to 15 air riveting hammers, 7 to 8 chipping hammers, one 4x7 1/4-inch sheet pile driver depending of course upon variable conditions.

The outfit is generally furnished complete mounted on trucks as shown but we can supply boiler mounted on skids if desired.

The boiler is rated at 30 horse power and built for 125 pounds steam working pressure, under normal conditions. The boiler has additional capacity for operating a steam pump or syphon for freeing the excavation of water. The stack is hinged and self-supporting.

The compressor has a rated capacity of 150 feet of free air per minute to a receiver air pressure of 100 pounds per square inch. Both steam and air ends of the compressor are compounded so that steam and fuel consumption are moderate.

Approximate weight complete, 12000 pounds. Prices upon request.



Gasoline Driven Compressors Quoted Upon Request

Buckeye Sand Blast Outfits

The Buckeye Sand Blast Outfits Are the Only Ones Which Operate Without Valves

In place of a sand valve is what we term an adjuster which only requires to be set when the nozzle size is changed. In other words, if the same size of nozzle is used all the time, no attention to the adjuster is necessary. The only valves to operate are the air valves.

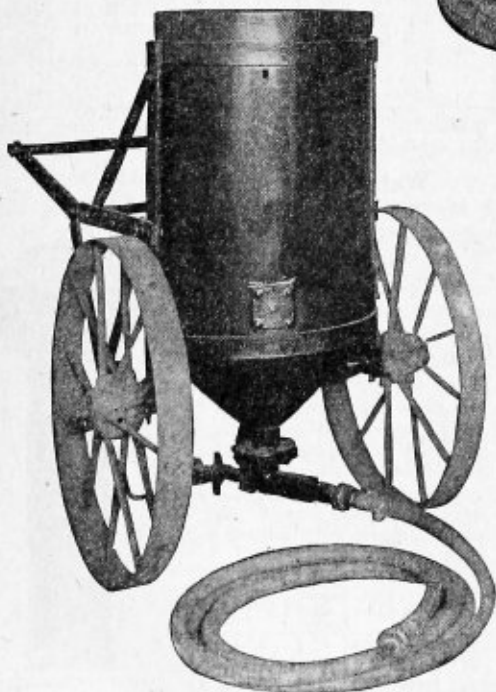
Especially valuable for removing rust, scale, old paint, etc., from the surface of exposed steel or other metal work, such as bridges, factory buildings, gas, oil and water tanks and structural work of all kinds.

The Buckeye machine is strong, light and easily portable, and is better adapted to this work than any other. The rust is rapidly cut away and the rivet heads are left clean. The greatest merit of the sand blast is that it removes every trace of dirt, scale, rust or grease from the surface, which is everywhere exposed bright and perfectly cleaned.

This is an ideal condition to secure the strong adhesion of the paint so that as far as possible it will protect the metal.

The thoroughness of the cleaning effected by the sand blast is noted especially upon metal surfaces which have been pitted by rust and corrosion to a considerable degree. The pitted portions are thus cleaned as thoroughly as the other places. It also reaches and cleans effectually every portion, angles, and on the edges of the different sections of a beam, girder or post, on and around the rivet heads, and in many other places entirely inaccessible to the wire brush or steel scraper, or on which they are used with great difficulty and little effect.

Steel exposed to the blast and gases from locomotives will wear out any paint, and the Sand Blast is able to meet all calls. The life of those structures already in existence and others that may be built in the future should be extended as long as possible by the use of the best means that can be commanded.



Sand Blast on Wheels



Machine Complete as Above

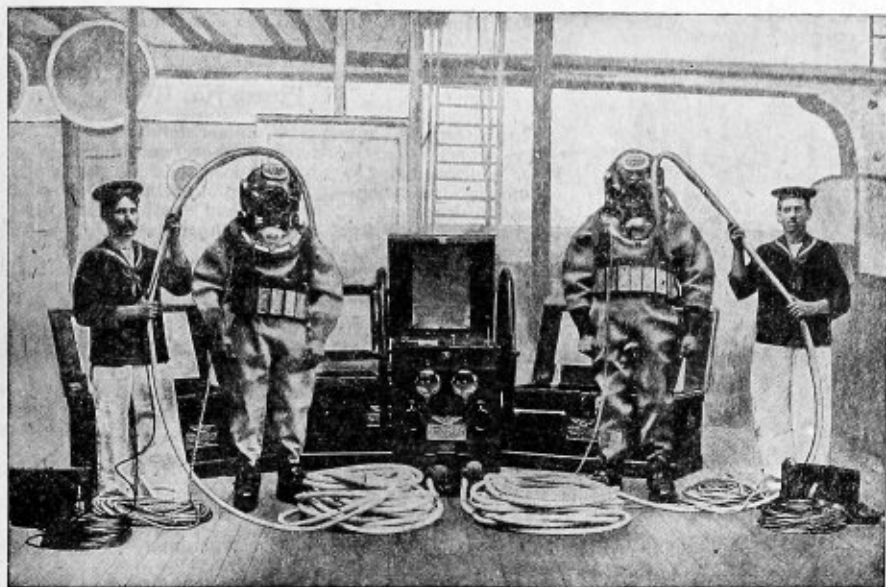
No.	Price Each	Tank Capacity of Sand in Pounds	Approximate Gross Weight in Pounds
1	\$150.00	300	250
2	240.00	600	450
3	300.00	1000	900
4	420.00	2000	1200
5	540.00	4000	1500
6	750.00	8000	3000

Machine Fitted on Two or Four Wheel Truck, as Shown at Left

No.	Price Each	Number of Wheels on Truck	Approximate Gross Weight in Pounds
1	\$210.00	2	400
2	300.00	2	600
3	360.00	4	1200
4	500.00	4	1500
5	650.00	4	2000

The prices shown above include the following equipment: Tank with all valves and fittings, special hose having a pure gum lining as follows: 12½ feet with sizes No. 1 and No. 2 and 25 feet with Nos. 3, 4, 5 and 6. Extra nozzle holder, a number of extra nozzles, head cover and various sundries necessary for a complete outfit.

"Morse" Improved Diving Apparatus



Illustrating U. S. Navy Standard Diving Outfit

We are Western Agents for A. J. Morse & Son, Sole Manufacturers of Diving Apparatus to the United States Navy and Engineer Corps

"There's nothing too good where life is at stake." Morse apparatus is the best.

Diving apparatus is used by contractors, bridge builders, mines, railroads, wrecking and towing companies, water works for examination and repairs, and by pearl, shell or sponge fishers. We furnish outfits for shallow diving as well as for deep sea work up to 200 feet.

The armor consists of helmet to protect the head; dress, of canvas and rubber, attached to the helmet; shoes, with lead or iron soles to keep the feet down, and the body upright; lead weights to sink the diver to the bottom and prevent his rising from an over-pressure of air from the pump.

The life line is used in lowering or raising the diver, and for transmission of signals between the diver and his attendant.

The diver is first dressed in the flannels, then equipped with the dress, shoes and weights; the helmet is then attached with air hose connected, the pump started, and he is slowly lowered to the bottom.

The most important and highest priced part of the equipment is the air pump. This piece of mechanism must be absolutely safe in every respect as the life of the diver depends upon its successfully supplying the air required. This air must be cool and the pressure equalized properly. There must be no oil or other fumes pumped to the diver.

These air pumps are manufactured in many different styles to supply air in a few feet of water up to depths of over 200 feet, which is considered the limit for deep sea work. Usually furnished in a strong chest or box with heavy fittings for handling and equipped with valves of special design so arranged that they can be examined, repaired and renewed without removing the pump from the chest.

Helmets are made of polished and tinned copper with gunmetal. They are made up on iron forms and are uniform in shape and designed for the diver's comfort. They do not cut the shoulders. Helmets consist of two parts—a head piece and a breast plate. All helmets are equipped with special safety valve which has prevented many accidents, as in the event of the air hose being jammed or cut, sufficient air is retained in the helmet to allow the diver to reach the surface in safety. The regulating escape valve enables the diver to control the escape of air to facilitate his going down and coming up.

Send for special illustrated catalog giving complete instructions for diving.

"Morse" Air Pumps for Diving

Each Pump is run by steam power, before shipping, to develop its capacity and test its efficiency.

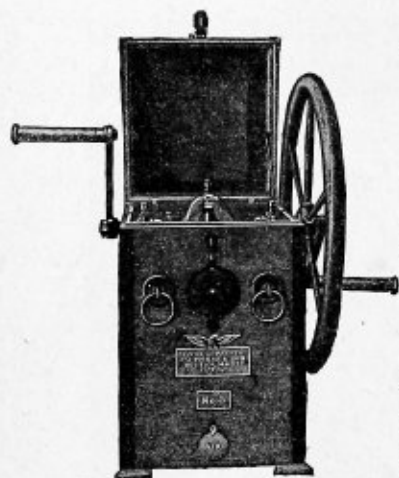


Fig. G—Shows No. 3 Air Pump

Air Pump No. 1

This is the U. S. government official standard pump.

Has capacity for two divers working simultaneously down to 100 feet, or one diver only in very deep water.

Pump has two cylinders, double action, with two patent indicating gauges to denote the air pressure and depth of each diver; with water cistern, two flywheels, in ash chest, with iron rings for lashing. Weight, 750 pounds.

Price.....\$500.00

Air Pump No. 1-A

U. S. navy standard for use on smaller ships. Will supply air for one diver to 100 feet depth.

Pump is single cylinder, double action, with patent indicating gauge to denote air pressure and depth of diver, water cistern, one flywheel, in ash chest, with iron rings for lashing. Weight, 550 pounds.

Price.....\$300.00

Air Pump No. 2

For deep-sea diving, pearl and sponge fishing, wrecking and general work. Will supply air for one diver in 150 feet of water.

Pump has three cylinders, open top, single action, with water cistern, patent indicating gauge, to denote air pressure and depth of diver, two flywheels, ash chest, polished brass corners, with iron rings for lashing. Weight 750 pounds.

Price.....\$400.00

Air Pump No. 3 (Shown Above)

For service in moderate depths, rivers, harbors, etc., for contractors, railroads, mines, etc. Will supply air for one diver in 100 feet of water. Pump has two cylinders, open top, single action, has gauge, one flywheel, two handles, ash chest, iron corners, with iron rings for lashing. Weight 690 pounds.

Price.....\$250.00

Air Pump No. 4

For examinations, and all work of brief duration in shallow water. For waterworks, sewer department and contractors. Will supply air in 50 feet of water. Pump has single cylinder, double action, in ash chest. Weight 150 pounds.

Price.....\$125.00

Air Pump No. 5

For shallow water and light service up to 30-foot depths. With folding brake mounted on plank, without case, two cylinders, single action. Weight 100 pounds.

Price.....\$75.00

Air Pump No. 6

Designed for mule back transportation. Weight complete, 270 pounds. Will supply air in 65 feet of water. Pump has extra large cylinders and special air valves. Will supply air in 200 feet of water. Pump has three cylinders, open top, single acting, water cistern, indicating gauge, two flywheels, two handles, ash chest with iron corners, iron rings and removable front. Weight 750 pounds.

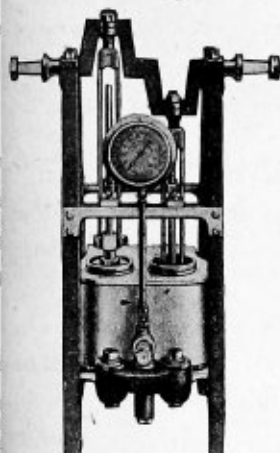
Price.....\$200.00

Continental Air Pump No. 7

Specially designed for sponge and pearl fishing and all deep-sea operations requiring an extra powerful pump. Pump has extra large cylinders and special air valves. Will supply air in 200 feet of water. Pump has three cylinders, open top, single acting, water cistern, indicating gauge, two flywheels, two handles, ash chest with iron corners, iron rings and removable front. Weight 750 pounds.

Price.....\$400.00

"Morse" Complete Diving Outfits



Showing No. 3 Pump
out of its Case

No. 3 Outfit

Complete in all respects for one Diver working
in depths to 100 feet.

This is not only the most popular diving outfit on the market, but is the one best adapted for general use.

Recommended for contractors and railroads for service in moderate depths in rivers, harbors, etc.

The No. 3 pump has two cylinders with open tops, single acting, with patent indicating gauge to denote air pressure, also depth of diver, two fly-wheels, water cistern, oil reservoir, ash chest with iron corners, two handles and ring for lashing.

This pump has a removable till fitted into the pump case containing the following spare parts:

One union joint, double, male	One 10-inch monkey wrench
One union joint, double, female	One can spare cup leathers
One overflow nozzle	One socket wrench
One oil can	One screw driver
One spare handle nut	One spare valve
Also 12 spare leather washers for air couplings.	

Price of No. 3 Outfit

1 No. 3 air pump, described above.....	\$250.00	6 feet snap tubing, at 60c.....	\$ 3.60
1 Improved diving helmet, 3 lights, sectional screw to receive air in head or air in breast plate style as desired, with recessed gasket seat, safety valve and regulating valve.....	100.00	1 Pair chafing pants.....	4.00
2 No. 2 size diving dresses, at \$50.00.....	100.00	2 Pairs diver's stockings, at \$1.25.....	2.50
3 50-ft. sections standard air hose, coupled.....	60.00	2 Woolen shirts and drawers.....	6.00
1 Set diving weights, Fig. 100.....	22.00	2 Pairs woolen mittens.....	2.50
1 Pair Fig. 103 diving shoes, lead soles.....	15.00	1 Woolen cap.....	1.25
2 Pairs rubber diving mittens, at \$5.00.....	10.00	1 Basket for helmet, hose, etc.....	18.00
1 Pair rings and clamps.....	5.00	1 Helmet cushion.....	3.00
150 Feet life or signal line.....	2.50	6 Extra bolts and nuts for helmet.....	3.00
1 Pair cuff expanders.....	5.00	1 Set of extra hose couplings.....	2.00
1 Fig. 98 knife, belt and hose holder.....	10.00	1 Yard rubber repair cloth.....	2.50
Approximate shipping weight, 1000 pounds.		1 1-lb. can rubber cement.....	.75
		1 Cutting punch.....	.75
		Total price.....	\$629.35
		Contents, 43 cubic feet.	

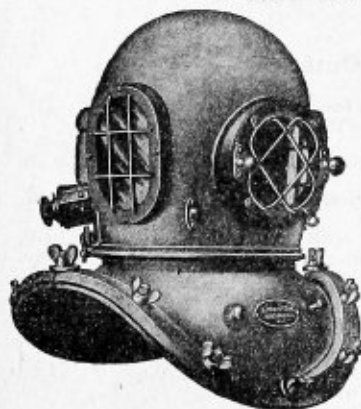
Other Complete Diving Outfits

The outfits below consist of about the same list of sundries as given for No. 3 outfit above. The air pumps, the most important item, are described on another page. These regulate the number of divers as well as the depths to which one or two divers can safely go and still have plenty of cool, clean air to do the work. The helmets are practically the same for all outfits and are also described elsewhere.

Sizes and Prices

No.	No. of Divers Supplied	Depths in Feet up to	No. of Diving Dresses	No. of Feet Air Hose	No. of Helmets	Net Weight, Pounds	Gross Weight, Pounds	Cubic Contents, Feet	Price, Complete
1	2	200	2	300	2	1260	1500	80	\$1258.70
1A	1	100	2	150	1	850	1000	48	679.35
2	1	150	2	150	1	950	1100	49	779.35
3	1	100	2	150	1	900	1000	43	629.35
4	1	50	1	100	1	360	475	27	416.45
5	1	30	1	100	1	250	350	26	339.20
6	1	65	2	150	1	600	750	32	679.35
7C	1	200	2	150	1	950	1100	49	769.35

"Morse" Improved Safety Diving Helmets



The above illustration shows No. 1, the most popular helmet in use. Fitted with 3 lights as shown and also with a top light.

No. 1 Helmet—Has sectional screw, safety valve, regulating escape valve and recessed gasket seat. Receives air in the head-piece.

Price, with 3 lights (as shown), weight boxed, 77 pounds.....\$125.00
Price, with 3 lights and top light, weight boxed, 77 pounds.... 137.50

The top light allows the diver to look upward without throwing the body back.

No. 2 Helmet—Is exactly the same as No. 1 except that it receives air in the breast plate instead of head-piece. Same prices as No. 1.

No. 3 Helmet—Has flanges and five swinging bolts, receives air in head.

Bolt pattern, 3 lights, weight boxed, 80 pounds.....\$156.25

Bolt pattern, 4 lights, weight boxed, 80 pounds..... 168.75

Speaking Apparatus—Consisting of a rubber tube connected with a hearing and speaking disc inside the helmet, with a mouthpiece on other end for use of a helper.

Price, with 50 feet of speaking tube.....\$112.50

Electric Breast Lamp—Fitted with special lens and 16 candle-power incandescent lamp, also 125 feet of cable.

Price.....\$50.00

"Morse" Improved Water-Proof Diving Dresses



Fig. G. 60. Standard Dress



Fig. G. 61 Standard Dress
Distended with Air



Fig. G. 62. Laced Dress

Morse diving dresses are very carefully made from the best materials obtainable and represent many years of experiment and experience and can be relied upon to give entire satisfaction. Each dress has inside cape to pull up around the diver's neck and is reinforced in parts exposed to most wear. The standard dress is made of white cloth with gray rubber gasket and cuffs. Fig. G. 61 shows the standard dress distended with air making it difficult for the diver to rise from a kneeling or reclining position. Fig. G. 62 gives a rear view of the latest style laced dress which prevents the distending of the lower part of the dress, allowing him to move about more freely and assists him in maintaining an upright position.

Diving dresses must not be packed away when wet or damp. They should be well dried inside and out or they will mildew and rot.

Sizes: Always give height of diver or number when ordering. No. 1 for diver 5 feet 6 inches. No. 2 for diver 5 feet 8 inches. No. 3 for diver 5 feet 10 inches. No. 4 for diver 6 feet to 6 feet 2 inches.

Price of standard dress, same as Fig. G. 60.....\$60.00

Price of laced dress, same as Fig. G. 62..... 70.00

Canvas dress overall to be worn over dress to prevent chafing. Price..... 6.25

Net weight of each dress is 16 pounds; packed, about 26 pounds.

"Morse" Wading Trousers and Suits



Fig. G. 65
Wading Trousers
With Boots

Made of strong waterproof material with rubber boots attached and have buttons and straps for lacing and leather belt.

Price.....\$27.00



Fig. G. 66
Wading Suit
Fastens Around Neck

Made of same material as Morse diving dresses and is fitted with brass eyelets and cord for securing it around the neck.

Price.....\$65.00



Fig. G. 67
Wading Trousers
Without Boots

Same as Fig. 65 but without the rubber boots. To be used with heavy leather shoes.

Price without leather shoes.....\$55.00

Price with leather shoes.....65.00

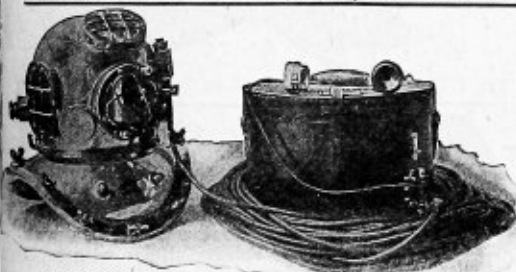


Fig. G. 60

Telephones for Divers

To make this style compact as possible, we place the battery in strong ash case, with space for receiver and transmitter when not in use.

Combines our latest improvements and is found most desirable for general service.

Complete with battery, 120 feet cable, receiver, and transmitter for attendant.

Receiver and transmitter for helmet.....\$125.00

Price does not include helmet.



Fig. G. 99

Morse Patented Graduating Diving Weights

As each weight can be instantly removed, the diver can adjust the amount to any desired depth.

Lead weights in gun metal pockets, broad waist belt, and two shoulder straps.

Price, per set,.....\$37.50



Fig. G. 100.

Diving Weights

Belt Pattern

A series of lead weights riveted to broad waist belt with two shoulder straps.

Price, per set,.....\$27.50



Fig. G. 101

Diving Weights Strap Pattern

The small belts pass through the weights which can be removed as desired.

Price, per set,.....\$35.00

Fig. 102, old style horse shoe pattern diving weights, not shown.....\$18.00



Standard Diving Shoes

Fig. 103

With brass toe-caps.
Will not bend up at the toe.

Price with lead soles, pair, \$18.00
Price with iron soles, pair, 18.00



Diving Shoes

Fig. 104

Lead soles secured
by brass screws.
Heavy grain leather.
For rough work.

Pair, \$18.00



Diving Shoes

Fig. 105

With iron toe caps.

Price with iron soles and toe caps, \$18.00
Price with brass soles and toe caps, 21.00



Chafing Shoes

Fig. 72

Made of canvas and
rubber, useful to pro-
tect feet of diving dress
from wear.

Price pair, \$7.50



No. 93 Rubber Snap Tubing

Made in 36-inch
lengths.
Inch per Ft.
2 gray rubber \$0.75
2 1/4 red rubber .75
2 1/2 gray rubber .75

Sundries

Rubber repair cloth, regular, per yard, \$ 3.00
Rubber repair cement, regular, per pound, 1.00
Diving cuffs, gray or red, per pair, 6.00
Knife, belt and air hose holder, screw joint, 12.00
Knife, belt and air hose holder, spring lock, 12.00
Rubber urinals, with straps, 4.50
Brass urinals, to be inserted in dress, 6.00



Rings and Clamps Polished Brass

Fig. G. 81

For securing rubber
mittens to cuff of diving
dress.
Price, pair, \$6.00



Standard Rubber Diving Mittens

Fig. G76

For protecting diver's hands on rough work or in
very cold weather.

Price, pair, \$6.00

Rubber Gloves

For work requiring the use of each finger.
Fig. G79, not shown. Price per pair, \$6.00

Two-Finger Rubber Mittens

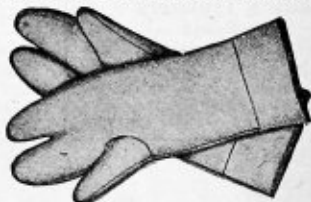


Fig. G77. Price per pair, \$7.50



Cuff Expanders

Fig. G80

For expanding the
cuff or diving dress,
that diver may with-
draw his hand easily. Polished brass with wood
handles.

Price per pair, \$6.00

Odorless Standard Air Hose for Divers

White rubber, capped ends, 1/2-inch, 5-ply.
Price per foot, coupled, \$0.50
Price per foot, not coupled,46

Floating Air Hose

Black rubber, capped ends, 1/2-inch, 7-ply.
Price per foot, coupled, \$1.25
Price per foot, without couplings, 1.20

Air Hose Coupling

Gun metal, per set, \$3.00
Four clamps,75

Crinoline

To be worn under dress in deep water. Heavy
rattan, canvas covered, with shoulder straps.

No. 71. Price, \$10.00

Helmet Cushion

To be worn under the dress for ease of diver's
shoulders, breast and back. Canvas, filled with
horsehair.

No. 70. Price, \$4.00

Channon 20-Inch Double Back Geared Upright Power Drill

Cut Gears—Ball Bearings—
Eight Speeds—Three Feeds

The Channon 20-inch Double Back Geared Upright Power Drill is a strictly high class machine tool, fit for the finest shop, with all the modern improvements and automatic features usually found only on the most expensive drills. Offered at a very reasonable price.

The gears are accurately cut from solid metal, insuring easy running and minimum wear. Spindle is furnished with graduated and automatic features, found on the most expensive drills. Spindle is counterbalanced by a weight in the hollow column. It has automatic stop attachment with quick return lever, giving rapid movement to the spindle. Has screw for raising and lowering the table. The change from a plain drill to a double back geared drill is accomplished instantly by sliding the gears.

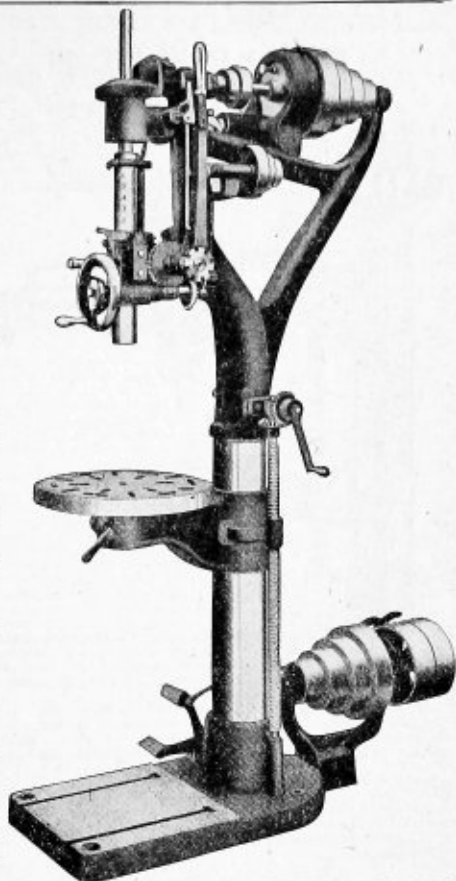
All adjusting features are close to the operator's hand and so arranged that the various operations, such as starting, stopping spindle, changing speeds, engaging and disengaging from self-feed to lever-feed, lowering and raising table, etc., are under practically instantaneous control by the operator.

Special Features. Double Back Gears—machine cut; ball bearings; square base; eight speeds; instantaneous control; three complete feeds; power, screw and hand lever; graduated spindle, counter-balanced; automatic stop attachment with quick return.

Capacity and Speeds. Drills holes, 0 to $1\frac{1}{2}$ inch, to center of 20-inch circle. Spindle $1\frac{1}{4}$ -inch diameter. Bored for No. 4 Morse Taper. Four step cone pulleys for 2-inch belt; tight and loose pulleys 8 x $2\frac{1}{2}$ inches.

Speed for ordinary work 300 R. P. M. Weight 800 pounds. With square base, complete as described above.

Price with back gears.....\$130.00
Price, without back gears.....100.00



Channon Power Bench Drill No. 0

A Strictly High Grade Powerful and Well Built Bench Drill.
Complete in Every Way

The top of the drill base is planed off to use as a table when the regular drill table is turned to one side. This gives a distance of 16 inches between spindle and base table. The counter shaft has a belt shift on the tight and loose pulleys and the feed lever is operated with a spring arrangement which automatically keeps the lever in its place at all times.

It will bore any hole up to $\frac{3}{8}$ inch with ease. Particularly adapted for garages, pattern and machine shops, or wherever rapid and accurate drilling is done.

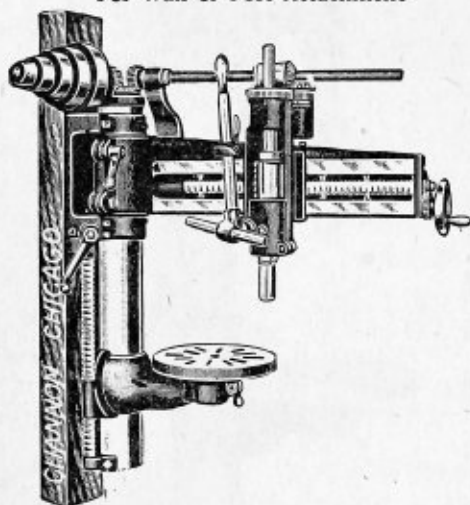
Price.....\$30.00

Dimensions. Drills to center of 9-inch circle. Bores holes to $\frac{3}{8}$ inch diameter. Vertical movement of spindle $3\frac{1}{4}$ inches, of table 9 inches. Maximum distance spindle to table 10 inches, to planed base 16 inches. Diameter of column $2\frac{1}{2}$ inches. Size tight and loose pulleys 4 inches x $1\frac{3}{4}$ inches. Cone pulleys $4\frac{1}{2}$ inches x $1\frac{1}{2}$ inches and 3 inches x $1\frac{1}{4}$ inches. Spindle bored to No. 1 Morse Taper Hole. Height 32 inches. Weight 100 pounds.



No. 50 Radial Drill

For Wall or Post Attachment



A new drill adapted for work in shops where a drill of this kind is a necessity, but the price has heretofore been prohibitive. It combines several drills in one and covers a wide range of work. Spindle has quick return hand lever in addition to regular hand feed. Height of drill, 56 inches.

Drills to center of circle outside column, 64 inches. Greatest distance of center of spindle to column, 7 inches. Smallest distance of spindle to column, 7 inches. Greatest distance of spindle to table, 18 inches. Traverse of spindle up and down, 9 inches. Diameter of spindle inside of sleeve, 1 5/16 inches. Diameter of column, 5 1/2 inches. Size of cone pulleys, 8 3/4, 7 3/4, 5 3/4, 4 x 2 1/4-inch face. Diameter of tight and loose pulleys 8 x 2 1/4-inch face. Speed of countershaft about 380 R. P. M. Spindle, No. 3 Morse, will carry 1 1/4-inch drill. Equipped with gear guards (not shown) and countershaft, but no post. Weight, 800 pounds.

Price.....\$250.00

Channon 14-Inch Upright Power Drill

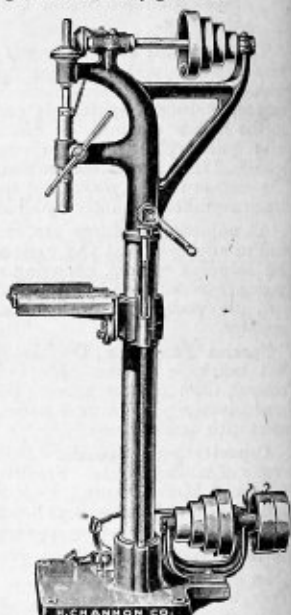
The Channon 14-inch upright power drill is a gear-driven drill of the best and most improved construction. It combines the simplicity, speed and ease of operation of a sensitive drill with extreme power not usually found on drills of this kind.

All beveled gears are planed, guaranteeing a perfect and smooth running drill. The bearings are large and powerful, the upper bearing being split to take up wear when necessary.

The table is tilting and can be clamped permanently at any angle, and with the angular bracket makes it very convenient for complicated work. It has a screw for raising and lowering the table, which is quick acting, the table remaining firmly where it is placed. All gears are carefully guarded.

Height of drill, 69 inches. Distance between table and spindle, 34 inches. Distance between spindle and base, 45 inches. Distance from column to center of spindle, 7 1/4 inches. Diameter of column, 4 inches. Traverse of table on column 27 inches. Size of table, 11x11 inches. Diameter of spindle, 3/8 inches. Traverse of spindle, 6 1/2 inches. Size of tight and loose pulleys, 7x2 1/2 inches. Size of cone pulley (four steps), 7 1/4-6 1/4-5 1/4-3 1/4 x 1 1/4 face. Speed of driving pulleys, 225 R. P. M. Floor space, 16 x 18 inches. Capacity, 3/8 inch. Horsepower required, 1 H. P. Hole in the spindle bored to fit No. 2 Morse Taper. Weight crated, 490 pounds.

Price.....\$70.00

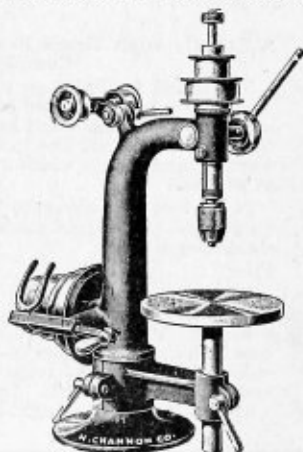


Channon Sensitive Bench Drill No. 50

For Light and Rapid Drilling

The Channon Sensitive Bench Drill is exceedingly substantial, strong and well built, and is particularly adapted for light, accurate and rapid drilling, in garages, pattern and machine shops.

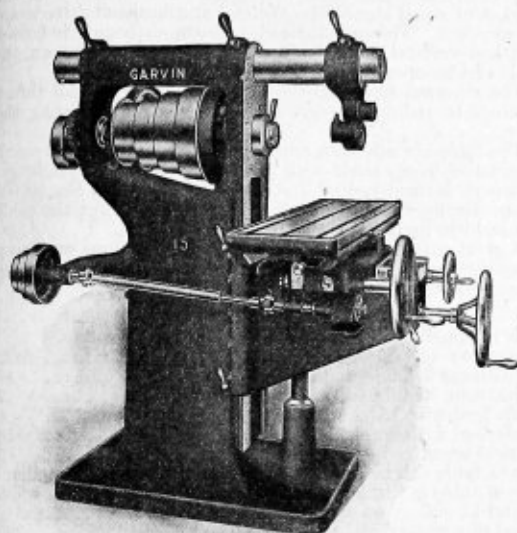
This drill is driven exclusively by belt and with the aid of cone pulleys, two separate and distinct speeds can be furnished. The countershaft is furnished with a belt shifter on the tight and loose pulley, and the feed lever can be returned without affecting the position of the bit by a patented automatic device in the feed lever hub. This drill is made in the best possible manner and guaranteed in every respect.



SPECIFICATIONS

Table swinging 180 degrees horizontally.
End thrust ball bearing.
Adjustable spindle stop.
Greatest distance from spindle to table, 7 1/4 inches.
Up and down movement of the spindle 2 1/2 inches.
Up and down movement of table 7 inches.
Diameter of table 8 inches.
Drills to center of 10-inch circle.
Drilling capacity 3/8-inch.
Size of tight and loose pulley 4x1 1/4 inches.
Speed of driving pulley 550 R. P. M.
Extreme height, 27 1/2 inches.
Weight 65 pounds.
Price complete with Star Chuck.....\$20.00
Price without chuck.....19.50

No. 15 Plain Milling Machine



A practical jobbing machine, on account of its extreme range, and suitable for every kind of plain milling. The knee has been made solid on top with an extended bearing on the column, adding very materially to the already solid character of the machine and its capacity for table work. It is equipped as follows:

Movement of table by large hand wheel.
Quick return to table, 2 inches per turn.
Feed changes by cone pulley and change gears.
Feed trip and reverse. Saddle fitted with taper gib.
Micrometer adjustments for knee and saddle.
Oil-groove base. Two-speed friction countershaft.

Length of automatic feed table, inches	42
Adjustment in line with spindle, inches	10 1/2
Vertical adjustment under spindle, inches	21
Dimensions of table, inches	42x12
Number of T-slots in table	3
Size of T-slots in table, inch	3/4
Greatest capacity for work between column and arm braces, inches	21 1/2
Swing under arm, inches	13 1/2
Arbor hole in spindle, B. & S. taper, No.	10
Thread on nose of spindle, 2 1/2-inch diameter, 8 pitch, L. H. V.	12 1/2
Largest diameter of cone, inches	3
Width of belt required, inches	4
Number of steps on cone	9-476
Range of speeds, R. P. M., geometrical progression	16
Changes of speed by cone, back-gears and countershaft	12
Number of feed changes	005-2
Range of feeds in geometrical progression, inch	6x3 1/2
Capacity of vise furnished, inches	14x4 1/2
Friction pulleys on countershaft, inches	110-320
Speed of friction pulleys, R. P. M.	75x58
Floor space required, inches	2700
Domestic shipment, crated, weight, pounds	94
Foreign shipment, tight-boxed, size, cubic feet	3200
Foreign shipment, tight-boxed, weight, pounds	

Price.....\$725.00

No. 1 Universal Milling Machine

A very popular machine where a universal miller is required. Equipped with solid top knee, square locked, and is practically chatter proof.

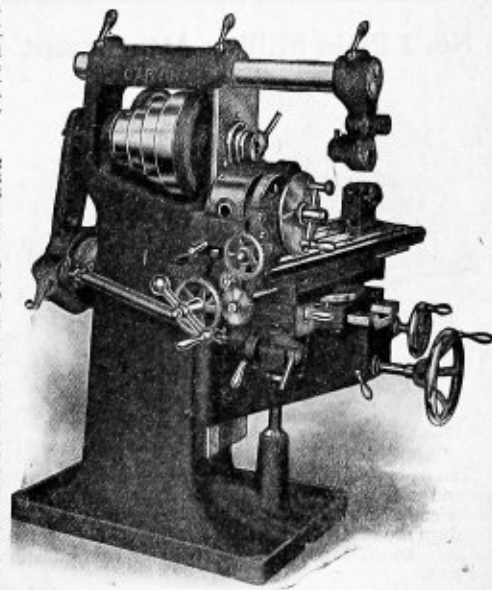
Equipment

Double geared dividing head and elevating tail stock; 3 extra dials; No. 13 swivel vise and crank; 1 supporting jack; 1 extension plate; 1 6-inch three-jaw universal chuck; 1 10x7 B. & S. taper socket; 1 No. 1-C milling machine arbor; 1 arbor draw-in rod; 1 oil pot and swinging arm; 2 chip pans; 1 micrometer table stop; 1 table trip screw and nut; 9 gears; 12 bolts; 1 index board; 5 wrenches—1/4-inch hexagon, 1 1/4-inch hexagon, 1 1/2-inch hexagon, 3/8-inch hexagon x 1/2-inch square, and No. 3 spanner; 1 triple friction countershaft; 2 arm braces and knee yoke.

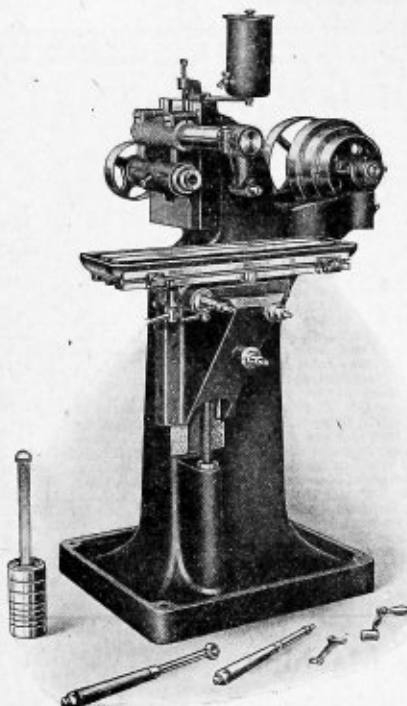
Dimensions

Length of automatic feed of table, inches	22
Adjustment in line with spindle, inches	8
Vertical adjustment under spindle, inches	18
Dimensions of table over all, inches	41x11 1/2
Dimensions of table inside oil pockets, inches	37x7 1/2
Number of T-slots in table	3
Size of T-slots in table, inch	3/4
Greatest capacity for work between column and arm braces, ins.	19
Swing under arm, inches	13
Arbor hole in spindle, B. & S. taper No.	10
Thread on nose of spindle, 2 1/2-inch diameter, 4 pitch, L. H. V.	12
Largest diameter of cone, inches	2 1/2
Width of belt required, inches	16
Number of speed changes	10-327
Range of speed, R. P. M., geometrical progression	8
Changes of speed by cone and back gear	16
Increased by countershaft to	12
Number of positive feed changes	002-08
Range of feeds in geometrical progression, inch	No
Automatic feeds in all directions	10
Swing of centers, inches	20
Distance between centers, inches	1 1/2
Diameter of hole through dividing head, inches	5x2 1/2
Capacity of vise furnished, inches	14x3 1/2
Friction pulleys on countershaft, inches	120-160
Speed of friction pulleys, R. P. M.	52x60
Floor space required, inches	2575
Domestic shipment, crated, weight, pounds	60
Foreign shipment, tight-boxed, size, cubic feet	2725
Foreign shipment, tight-boxed, weight, pounds	

Price.....\$910.00



U. S. Hand Milling Machine



This machine has more power than any machine on the market of equal size. The vertical and horizontal feeds are independent. The spindle head is accurately counterbalanced and has vertical lever feed. The hand lever feed on the table can be operated on either side of the table.

The elevated screw on the knee is fitted with ball thrust bearings to reduce the friction in raising and lowering the knee.

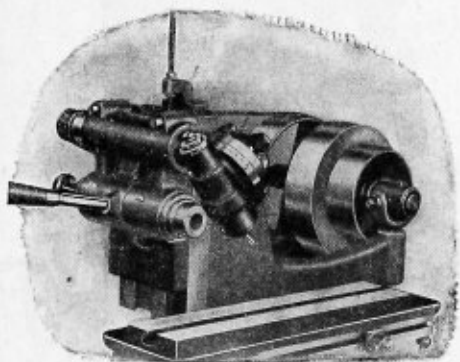
The table is made with a hand lever feed, also with a crank feed, which is operated with rack and pinion. A weight attachment is furnished so that the head and table can be fed automatically. Adjustable stops are furnished for the table and head to limit the travel in either direction.

A great many milling operations are being done on heavy expensive machines that could be done on this machine easier and faster.

Specifications

Hole in spindle is No. 9 B. & S. taper.	
Dimensions of table, inches	5x22
Adjustment of table under spindle, inches	16
Adjustment of table in line with spindle, inches	7
Table feed with hand lever	6
Table feed with crank	16
Vertical lever feed on spindle head	5
Top of table can be brought on level with center of spindle.	
Top of table is furnished with standard T-slot $\frac{3}{8}$ -inch wide.	
T. and L. pulleys on countershaft, inches	8x3 $\frac{1}{4}$
Speed of countershaft, R. P. M.	230
The grade cone 7-inch and 10-inch give four spindle speeds,	
96, 197, 268, 547 R. P. M.	
Back shaft pulley, diameter inches	6
Size of foot of base, inches	23x26
Floor space over all, inches	27x37
Net weight, pounds	900
Weight boxed for export, pounds	1200
Contents of box, cubic feet	40
Price	\$225.00

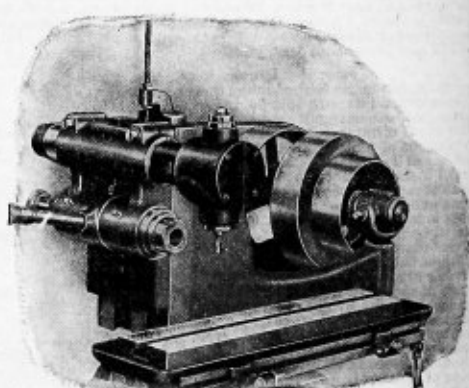
No. 1 Plain Milling Attachment



The spindles are of crucible steel, hardened and ground and have No. 7 B. & S. taper hole in the lower end and a hole clear through for draw-bolt. The bearings are of extra bronze and are carefully scraped to fit. Adequate provision is made for compensation for wear.

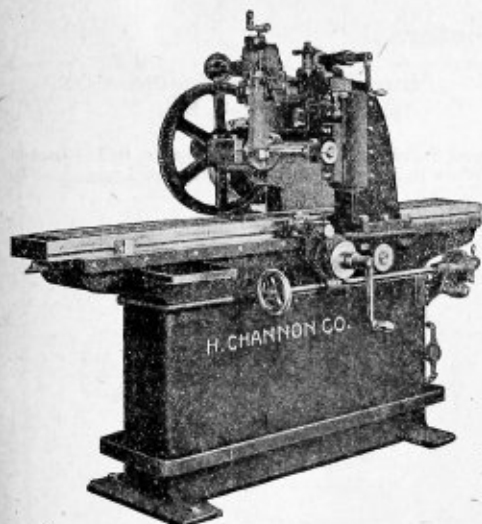
Price.....\$61.50

No. 2 Universal Milling Attachment



It especially adapts the U. S. hand miller for die sinking, profiling and all classes of light milling, where small cutters are used. It is graduated and can be quickly adjusted to any angle or position required, making it universal.

Price.....\$86.50



No. 5 Keyseat Milling Machine

Counter shaft pulley, plain machine 14x4 $\frac{1}{2}$ inches. Speed 165 R. P. M. for router machine 14x4 $\frac{1}{4}$ inches. Two speeds, 165 and 285 R. P. M.

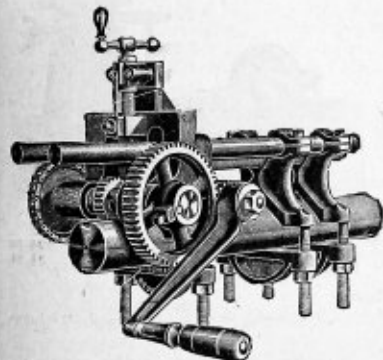
Router spindle has 3 $\frac{3}{4}$ -inch independent vertical adjustment and No. 7 B. & S. taper hole.

Weight, 48-inch plain machine, 2,500 pounds. Weight, 48-inch complete machine, 2,700 pounds.

The Routing Attachment has independent vertical and horizontal adjustments, and is driven, through change gears, from the main driving gear. When this attachment is furnished the machine is provided with two speed countershaft, giving in addition to proper speed for horizontal cutters, speeds for Routing Cutters varying from 135 to 350 R. P. M. The operation of squaring up the ends of a keyseat is performed immediately after keyseat has been milled, without disturbing the horizontal adjustment of either cutter, or unchucking the shaft. After the keyseat has been milled the saddle is lifted until the horizontal cutter clears the shaft, the router spindle is lowered with its own adjustment until its cutter bottoms in the keyseat, and first one end, then the other, is routed. The attachment if not in use may be removed from the machine with little effort. Its use simplifies the production of keyseats for leathers or drop-keys.

Number	Feed Inches	Price	Number	Feed Inches	Price	Number	Feed Inches	Price	Number	Feed Inches	Price
3	36	\$467.00	5	48	\$609.00	6	48	\$667.00	7	72	\$1100.00
3	48	500.00	5	60	667.00	6	60	734.00	7	84	1328.00
3	60	534.00	5	72	734.00	6	72	800.00	Router Extra		234.00
Router Extra		134.00	Router Extra		167.00	Router Extra		167.00			

Portable Key Seater



Will Mill Keyseats in middle or end of shaft from 1 $\frac{1}{4}$ to 5 inches diameter without removing from its hangers. Will mill up to 1 $\frac{3}{4}$ x $\frac{3}{8}$ inches full width, at one cut and 12-inch length without resetting. A set of 5 cutters is furnished with each machine by using one or more of which on the spindle, keyseats of any of the following sizes may be cut with one operation:

No. 1. Price each, \$50.00
Weight, net, 76 pounds.

No. 2.

Will mill keyseats in the middle or on the ends of shafting from 1 $\frac{1}{2}$ inches to 8 inches in diameter, without removing it from its hangers.

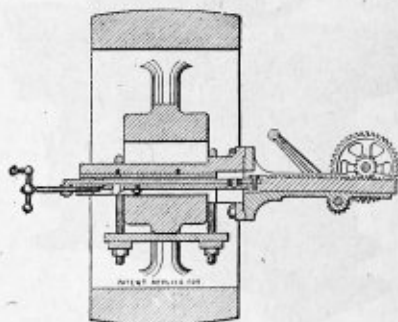
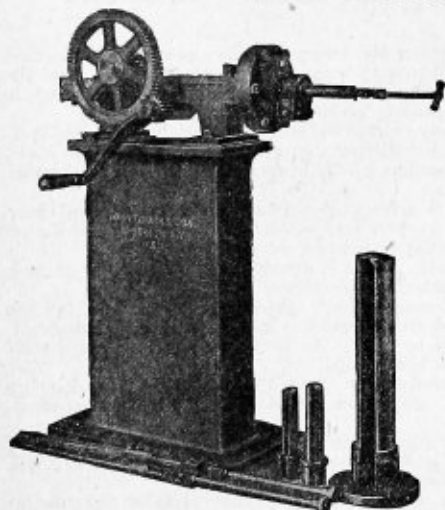
Five milling cutters are furnished with each machine. Will cut with one operation the same sizes as No. 1.

No. 2. Price each, \$100.00
Weight, net, 200 pounds.

Hub Keyseaters

"Burr" Hand Key Seater
For Hubs of Wheels, Etc.

For Cutting Straight or Taper Keyways up to $1\frac{1}{2}$ Inches
Wide in Bores Not Over 12 Inches Long



Portable

Will cut keyways in work of any size, weight or shape. On heavy work it is advantageous to remove the machine from the pedestal and use it as a portable tool as shown above.

Work in all cases is chucked to the bore and hubs need not be faced. The method of chucking is extremely simple, suitable stirrups and binders being furnished with each cutterbar outfit. Keyways cut on this machine come central with the bore and are ready for keys.

The machine is well built throughout, the first pinion and rack being of machinery steel and all gears have machine-cut teeth. Its efficiency, general usefulness and ease of operation will commend it to any one having keyways to cut.

Prices

Size of Cutter, In.	Will Cut Keyway		Diameter of Guide Bush, Min. Bore of Hub, Inches; Diameter	Machine Complete Without Tools	Machine Without Tools or Base	Cutter Bars (Extra) With Guide Bush and One Cutter	Cutters (Extra) Each
	Sizes, Inches	Length, Inches					
$\frac{1}{2}$	$\frac{1}{4}$ to $\frac{7}{8}$	6	1	\$112.50	\$100.50	\$15.00	\$3.25
$\frac{3}{4}$	$\frac{1}{2}$ to $1\frac{1}{4}$	12	$1\frac{1}{2}$	112.50	100.50	15.75	3.00
$1\frac{1}{2}$	$\frac{3}{4}$ to $1\frac{1}{2}$	12	$2\frac{1}{2}$	112.50	100.50	22.50	3.75

Giant Power Hub Keyseater

No Facing of Hubs Required

To keyseat large pulleys no extension bars or outside supports are needed. As any piece requiring a keyseat is supported solely by its hub. A distinctive feature is the grooved post which holds the work and forms the guide for the tools. This enables you to obtain perfectly true, straight keyways, whether the hole is straight or taper or whether the hub is faced true, or left rough as it came from the foundry. Every job is quickly set and fastened by its bore only.

No.	Adj. Stroke, Inches	Capacity Width of Keyseat, Inches	Will Take Posts	T. & L. Pulleys	Gross Weight, Pounds	Price
0	0 to 7	$\frac{1}{2}$	$\frac{1}{2}$ to $1\frac{1}{2}$	18x3	650	\$150.00
2	13	$1\frac{1}{2}$	$\frac{1}{2}$ to $2\frac{1}{2}$	10x3	1500	250.00
3	16	2	$\frac{1}{2}$ to $3\frac{1}{2}$	10x3	1900	315.00
3A	25	2	$\frac{1}{2}$ to $3\frac{1}{2}$	10x3	2000	450.00
4	19	$2\frac{1}{2}$	$\frac{1}{2}$ to $3\frac{1}{2}$	10x3	2100	375.00
5	25	$3\frac{1}{2}$	Up to $4\frac{1}{2}$	14x5	4300	575.00
6	31	4	Up to $5\frac{1}{2}$	14x5	4800	700.00

Prices do not include tool post, cutters, countershaft, key vise or power feed.
Countershaft Nos. 2, 3, 3A and 4. Price.....\$18.75
Countershaft Nos. 5 and 6. Price.....31.25
Automatic power feed for all machines. Price.....31.25

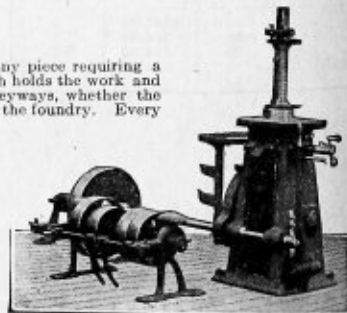
Key vise 11 inches long. Price.....\$25.00
Key vise 15 inches long. Price.....31.25
Prices of Cutters on request.

Nos. 2, 3 and 4 Are the Popular Sizes

In ordering or writing for prices, give diameter of holes, especially those sizes most used, length of hole of hub, especially the longest, width of keyseat, diameter of largest wheel to be keyseated.

Will the countershaft be overhead?

For shafting keyseaters, see next page.



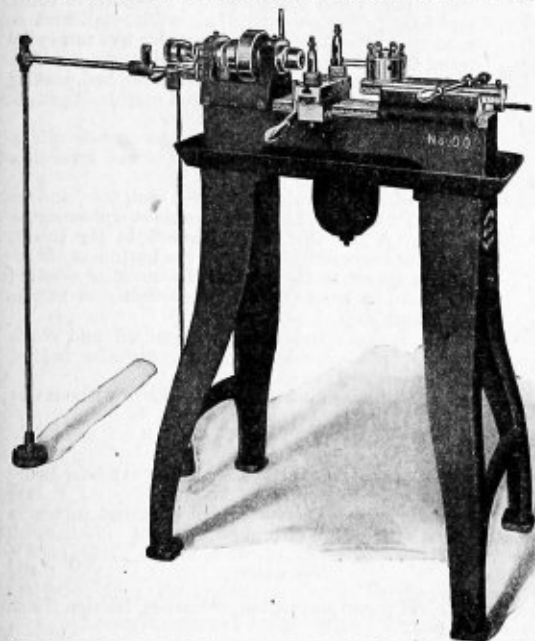
No. 2 Keyseater and Countershaft

No. 00 Screw Machine

Capacity $\frac{1}{4}$ x 2-inch

A well built substantial machine of moderate size containing all the features of the large machines. Spindle hardened and ground. Solid steel turret rotator.

A. W. T. Co. collet No. 3 used. Suitable for the smallest size of rod work.



Lightness of working parts gives the requisite sensitiveness for small tools, making it a convenient machine for high grade work and large production.

Equipment: One $\frac{1}{8}$ No. 106 $\frac{1}{2}$ W collet; 2 tool posts; 4 tool post collars; 2 tool post blocks; 1 oil pot and cover; 1 stock feed collar; 2 wire guide bushings; 1 stop plug; 4 wrenches; 1 double friction countershaft.

Dimensions

Capacity of spindle with wire feed, ins.	$\frac{1}{4}$
Length that can be turned, inches	2
Capacity of spindle without wire feed, inches	$\frac{3}{8}$
Swing over bed, inches	6
Diameter of holes in turret, inches	$\frac{3}{8}$
Number of holes in turret	6
Largest size rod passing clear through turret, inches	$\frac{3}{8}$
Largest diameter of cone, inches	4
Width of belt required, inches	11 $\frac{1}{4}$
Diameter of turret, inches	2 $\frac{3}{8}$
Center of holes to turret slide, inches	1 $\frac{1}{8}$
Length of bed, inches	20 $\frac{1}{4}$
Friction pulleys on countershaft, ins.	6x2
Speed of countershaft, R. P. M.	400
Floor space required, inches	30x17
Domestic shipment, crated, weight, lbs.	300
Foreign shipment, tight-boxed, weight, lbs.	400
Size of boxing, cubic feet	9
Standard collet, No.	106 $\frac{1}{2}$ W
Price plain	\$285.00
Price plain with automatic collet	305.00

"Steno" 1" x 7" Turret Hand Screw Machine

Fitted with plain three-step, giving great power for all spindle speeds. Guard well covers the lower half of the cone, ties the front and rear bearings rigidly together and assists in maintaining the rigidity of the spindle.

The automatic chuck and bar feed, operated by the long lever at the left of the machine, grip the bar instantly and release completely. One movement opens the chuck and feeds the bar without stopping the machine. A stepped wedge, operating the fingers automatically, compensates for slightly varying diameters of stock.

Collets can be changed quickly by unscrewing collet hood. Collets and hood are hardened and ground to great accuracy. Chucks or fixtures for extra size pieces can readily be attached to spindle nose in place of collet hood.

All parts are made from jigs and fixtures and are carefully inspected and gauged before assembling, insuring interchangeability and close, accurate work.

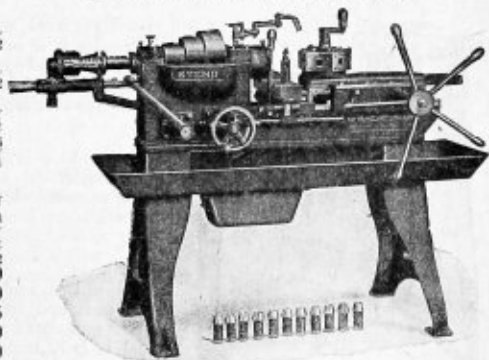
Collets supplied from stock in the following sizes at extra cost: $\frac{3}{8}$, $\frac{7}{8}$, $\frac{1}{2}$, $\frac{3}{4}$, $\frac{5}{8}$, $\frac{1}{4}$, $\frac{3}{16}$, $\frac{1}{8}$, $\frac{5}{16}$, 1-inch.

Specifications

Bar stock capacity through automatic chuck, ins.	1
Swing over bed, inches	13 $\frac{1}{2}$
Swing over cut-off, inches	6
Cut-off travel, cross feed	5 $\frac{1}{2}$
Cut-off travel, longitudinal, inches	9
Diameter of holes in turret, inches	1 $\frac{1}{4}$
Center of holes in turret to top of slide, inches	2 $\frac{3}{8}$
Diameter of hexagon across flats, inches	7 $\frac{1}{4}$
Greatest distance end of spindle to turret, inches	15
Hole in spindle, inches	1 $\frac{3}{8}$
Thread of nose	3 $\frac{1}{4}$ -inch diameter x 8 pitch
Width of drive belt, inches	2 $\frac{3}{4}$
Friction pulleys on counter shaft, inches	10x4 $\frac{1}{2}$
Speed of counter shaft for steel, R. P. M.	230
Speed of counter shaft for brass, R. P. M.	560
Weight, net, pounds	1375
Weight crated, pounds	1550
Weight boxed for export, pounds	1750
Measurement, boxed, cubic feet	72

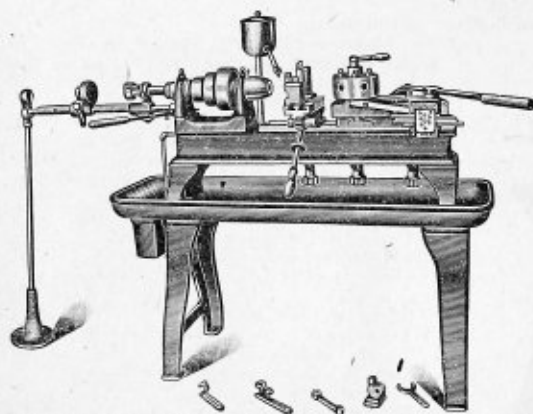
Complete with oil pump and adjustable oil piping, two-speed countershaft, wire feed and automatic chuck, and one collet of any size listed in catalogue.

Price, \$475.00 Extra collets in standard sizes, as per catalogue, each \$5.00



Write for Special Circular

Hand Screw Machine No. 140



We can furnish this machine with six hole automatic turret or with four hole hand turret and with or without wire feed.

This little screw machine is made to stand the use of high speed tools, and the operation of turret and wire feed is so quick that much small work in moderate quantities can be done for less money by using cheaper labor than on an Automatic machine.

The head stock is cast solid with the bed, making as the cut shows a strong, rugged machine throughout.

The wire feed is the quickest to operate of any on the market. The movement of one lever does everything.

Turret has individual stops for each hole, and are on the front side where they are most convenient to adjust. A movable plug attached to the base is raised or lowered by a cam on the bottom of the revolving turret, so that even if the turret is revolved backward by hand there is no possibility of getting the wrong stop.

The cap on spindle can be taken off and chuck up to 8 inches in diameter, can be fitted for holding large work such as castings, etc.

Dimensions

Swing over bed, inches.....	11
Length of bed, feet.....	3½
Size of front bearing, inches.....	1½ x 3¼
Size of back bearing, inches.....	1½ x 3¼

Hole through spindle, inches.....	1½
Capacity of Automatic Chuck, inches.....	¾
Capacity of automatic chuck with wire feed, inches.....	¾

Greatest length that can be milled, inches.....	4¾
Diameter of holes in turret, inches.....	1
Width of belt, inches.....	2
Size of cones, inches.....	3¾, 5, 6¾
Net weight.....	675

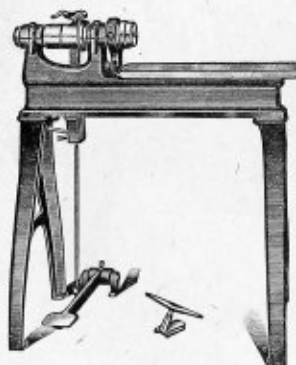
Equipment—Automatic chuck, 1 collet, turret, cross carriage, oil pump and piping, wrenches, friction clutch reversible countershaft.

Prices

No. 140 with 6-hole automatic turret and wire feed.....	\$368.00
No. 141. Same as No. 140 with rack feed and pilot wheel.....	384.00
No. 142 with 4-hole hand turret without wire feed.....	327.00

Extra collets for round stock.....	\$3.20
" " Hex. or square.....	4.67 each.
Boxing for export.....	1.00 net extra
Knocked down and boxed for export....	4.00 net extra

Polishing and Finishing Lathe No. 113



For light work where pieces can be held in a spring or collet chuck. The chuck is opened by the foot lever which also shifts the belt to the loose pulley and applies a friction brake to stop machine immediately. When the foot lever is released a spring shifts belt back and closes chuck. The operator has both hands free.

Equipment

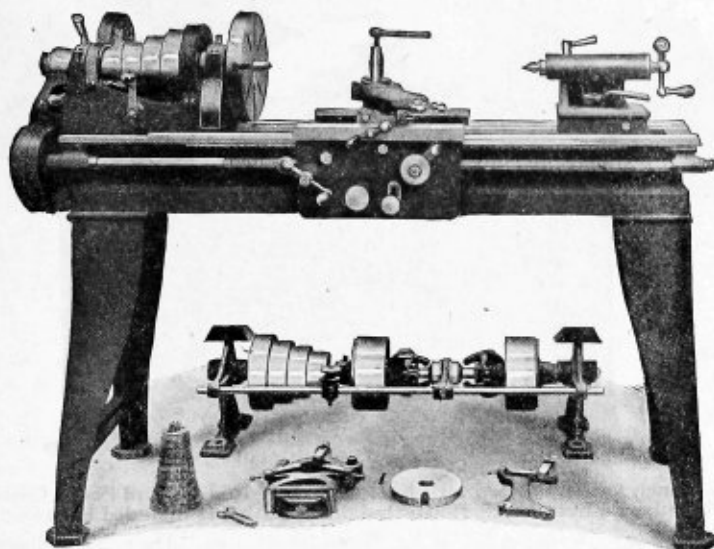
Countershaft.
Spring or collet chuck.
One collet.

Tee rest and holder.
Table on bed.

Dimensions

Length of bed, inches.....	42
Swing over bed, inches.....	11
Capacity of chuck, inches.....	1½ to 2
Width of belt, inches.....	2
Weight, pounds.....	325
Price.....	\$133.60

The Lancaster 13-Inch Engine Lathe



Fitted with Four-Step Cone Pulley, Back Gears, Positive Geared Feed, Automatic Longitudinal and Power Cross Feed, Compound Rest and Chasing Dial

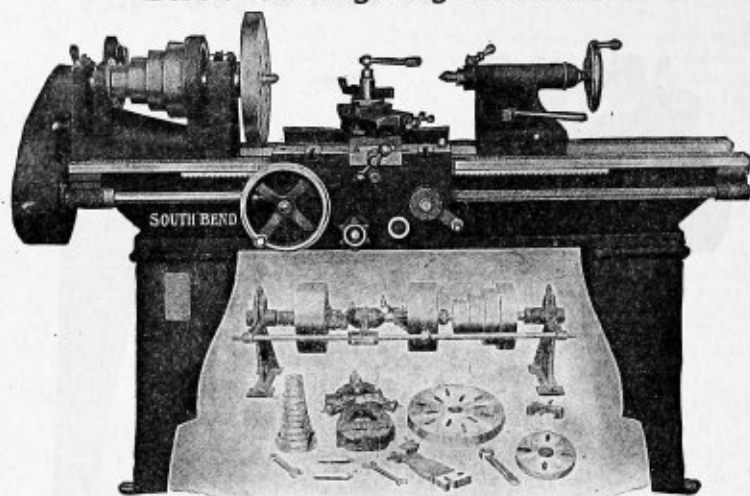
Three changes of feed are secured immediately by simply moving a handle to any one of the three locations

It is built large and heavy to withstand all strain placed on it by the use of high speed steel. It is powerful, accurate and durable—Manufactured to jigs and gauges and all parts are interchangeable. The lead screw is made of special high grade carbon steel. All sliding surfaces are accurately scraped to a bearing. The spindle and all round parts are ground for accuracy. The gears are easily changed for cutting different threads. It is indexed to cut standard threads from 4 to 40 either right or left, including 11½-inch pipe thread, and by compounding the gears furnished many other threads can be chased. It is equipped with plain or compound rest, follower and steady rests, change gears, large and small face plates, double friction countershaft and wrenches, and all gears are carefully guarded. The bed is rigid, cross ribbed by heavy boxed braces, cast in at frequent intervals its entire length, has three V's and one flat bar for the slot guide of the head and tail stock. The rack is steel and cut from a solid bar. The head stock is massive, having a bearing of 15¼ inches on the bed, the spindle is 60 point carbon crucible spindle steel accurately ground, having ¾-inch hole its entire length. The front bearing is 1¾ inches in diameter and 3¼ inches long. The spindle is bored to hold a No. 3 Morse taper. Bearings are high-grade phosphor bronze, carefully scraped to fit the spindle. The tail stock is offset to allow the compound rest to swing parallel to the bed, and is made of crucible steel. The carriage and apron are strong and with deep bridges each cast in one piece. The apron has a safety device, which prevents throwing in half nuts when either feed is connected, thus preventing breakage. The compound rest is graduated in degrees.

Swing over shear	13½ inches
Swing over compound rest	8 inches
Swing over carriage	9 inches
Distance between center—5-foot bed	30 inches
Front spindle bearing	1¾ in. in diam., 3¼ in. long
Rear spindle bearing	1½ in. in. diam., 2¾ in. long
Hole through spindle	¾ inch
Spindle nose	1½ in. in diam. (10 U.S.S. threads)
Tail spindle	1½ in. in diam. (5-in. traverse)
Taper of centers	No. 3 Morse
Threads per inch	4-80
Cone pulley diameters on lathe	7-5¼-4½-3¼ in.

Width of belt	2 inches
Ratio of back gearing	8½ to 1
Spindle speeds	16
Compound rest travel	4 inches
Length of carriage bearing on shears	15 inches
Cone pulley diam. on countershaft	8¼-7-5¼-4½ in.
Countershaft driving pulley	8x3¼ inches
Countershaft speed	150 R.P.M.
Lathe bed made in any length	
Size of tools	½ inch x 1½ inches
Weight five-foot bed	1000 lbs. on skids
Price	\$400.00

Screw Cutting Engine Lathes



No. 40—16-inch Lathe. Fitted with Automatic Longitudinal and Power Cross Feed Regular Equipment, as Illustrated under Lathe, is Included in Price

The following description applies to the No. 34, No. 37 and No. 40 lathes. The principal dimensions are shown in tabulated form below.

Bed is rigid, cross ribbed by heavy box braces cast in at short intervals its entire length; has three V's and one flat way for front bearings of head and tail stock. The rack is of steel, cut from the solid bar.

Head stock is equipped with improved reverse. Spindle is of special spindle steel accurately ground. Bearings are the best phosphor bronze with ample oiling facilities and adjustable for wear.

Tail stock is off-set to allow compound rest to swivel parallel to the bed and is provided with set over for turning taper. Tail stock center is self-ejecting.

Carriage and apron is strong with wide deep bridge; has T slots for clamping work for milling and boring. Both power cross and automatic longitudinal feeds are operated from front of apron and but one feed at a time can be engaged. Both feeds are driven by a splined screw and worm so that the thread of the lead screw is used for screw cutting only.

Thread cutting. Lathe is indexed to cut standard threads from 4 to 40, right or left including $1\frac{1}{2}$ pipe thread. Graduation. The compound rest is graduated in degrees. The cross feed screw has graduated micrometer collar reading in one thousandths of an inch.

Equipment as shown in cut includes a large and small face plate, compound rest, two steel centers, center rest, follow rest, change gears, gear guards, adjustable stop for screw cutting, necessary wrenches and double friction countershaft.

No. 34 Lathe, 13-inch Swing

No. of Lathe	Price Complete	Swing Over Bed, Inches	Length of Bed, Feet	Distance Between Centers, Inches	Swing Over Carriage, Inches	Hole Through Spindle, Inches	Opening in Tool Post, Inches	Weight on Skids, Pounds
34-5	\$450.00	13 $\frac{1}{2}$	5	32	9	$\frac{3}{4}$	$\frac{1}{2}$ x $1\frac{1}{2}$	1000
34-6	474.00	13 $\frac{1}{2}$	6	44	9	$\frac{3}{4}$	$\frac{1}{2}$ x $1\frac{1}{2}$	1050
34-7	498.00	13 $\frac{1}{2}$	7	56	9	$\frac{3}{4}$	$\frac{1}{2}$ x $1\frac{1}{2}$	1100
34-8	522.00	13 $\frac{1}{2}$	8	68	9	$\frac{3}{4}$	$\frac{1}{2}$ x $1\frac{1}{2}$	1150

No. 37 Lathe, 15-inch Swing

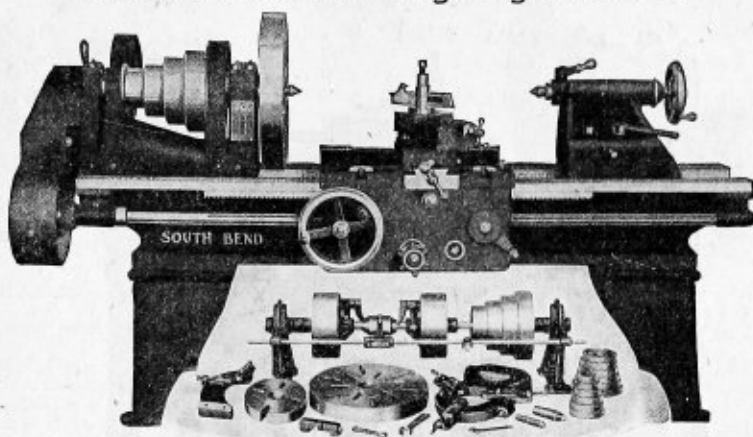
No. of Lathe	Price Complete	Swing Over Bed, Inches	Length of Bed, Feet	Distance Between Centers, Inches	Swing Over Carriage, Inches	Hole Through Spindle, Inches	Opening in Tool Post, Inches	Weight on Skids, Pounds
37-6	\$582.00	15 $\frac{1}{2}$	6	40	10 $\frac{1}{2}$	$1\frac{1}{2}$	$\frac{3}{4}$ x $1\frac{1}{2}$	1425
37-7	610.00	15 $\frac{1}{2}$	7	52	10 $\frac{1}{2}$	$1\frac{1}{2}$	$\frac{3}{4}$ x $1\frac{1}{2}$	1500
37-8	636.00	15 $\frac{1}{2}$	8	64	10 $\frac{1}{2}$	$1\frac{1}{2}$	$\frac{3}{4}$ x $1\frac{1}{2}$	1575
37-10	715.00	15 $\frac{1}{2}$	10	88	10 $\frac{1}{2}$	$1\frac{1}{2}$	$\frac{3}{4}$ x $1\frac{1}{2}$	1650

No. 40 Lathe, 16-inch Swing

No. of Lathe	Price Complete	Swing Over Bed, Inches	Length of Bed, Feet	Distance Between Centers, Inches	Swing Over Carriage, Inches	Hole Through Spindle, Inches	Opening in Tool Post, Inches	Weight on Skids, Pounds
40-6	\$714.00	16 $\frac{1}{2}$	6	36	11 $\frac{1}{2}$	$1\frac{1}{2}$	$\frac{3}{4}$ x $1\frac{1}{2}$	1700
40-7	738.00	16 $\frac{1}{2}$	7	48	11 $\frac{1}{2}$	$1\frac{1}{2}$	$\frac{3}{4}$ x $1\frac{1}{2}$	1775
40-8	766.00	16 $\frac{1}{2}$	8	60	11 $\frac{1}{2}$	$1\frac{1}{2}$	$\frac{3}{4}$ x $1\frac{1}{2}$	1850
40-10	846.00	16 $\frac{1}{2}$	10	84	11 $\frac{1}{2}$	$1\frac{1}{2}$	$\frac{3}{4}$ x $1\frac{1}{2}$	2000
40-12	924.00	16 $\frac{1}{2}$	12	108	11 $\frac{1}{2}$	$1\frac{1}{2}$	$\frac{3}{4}$ x $1\frac{1}{2}$	2250

We maintain a large stock of chucks and all lathe tools.

21-Inch Screw Cutting Engine Lathe



No. 47. 21-inch lathe. Fitted with automatic longitudinal and power cross feed.

Regular equipment, as illustrated under lathe, is included in price.

The following description applies to the No. 47, 21-inch and No. 54, 24-inch lathes. The principal dimensions are shown in tabulated form below.

Bed is rigid, cross ribbed by heavy box braces cast in at short intervals its entire length; has three V's and one flat way for front bearings of head and tail stock. The rack is of steel, cut from the solid bar.

Head Stock is equipped with improved reverse. Spindle is of special spindle steel accurately ground. Bearings are the best phosphor bronze with ample oiling facilities and adjustable for wear.

Tail Stock is off-set to allow compound rest to swivel parallel to the bed and is provided with set over for turning taper. Tail stock center is self-ejecting.

Carriage is strong with wide deep bridge; has T slots for clamping work for milling and boring. Both automatic cross feed and automatic longitudinal feed are operated from front of apron and but one feed at a time can be engaged. Both feeds are driven by a splined screw and worm so that the thread of the lead screw is used for screw cutting only.

Thread Cutting. Lathe is indexed to cut standard threads from 2 to 40, right or left, including 11½ pipe thread.

Graduation. The compound rest is graduated in degrees. The cross feed screw has graduated micrometer collar reading in one-thousandths of an inch.

Equipment as shown in cut is included in the price and consists of large and small face plates, compound rest, two steel centers, center rest, follower rest, change gears, adjustable stop for screw cutting, gear guards, necessary wrenches and double friction countershaft, also instruction book, How to Run a Lathe.

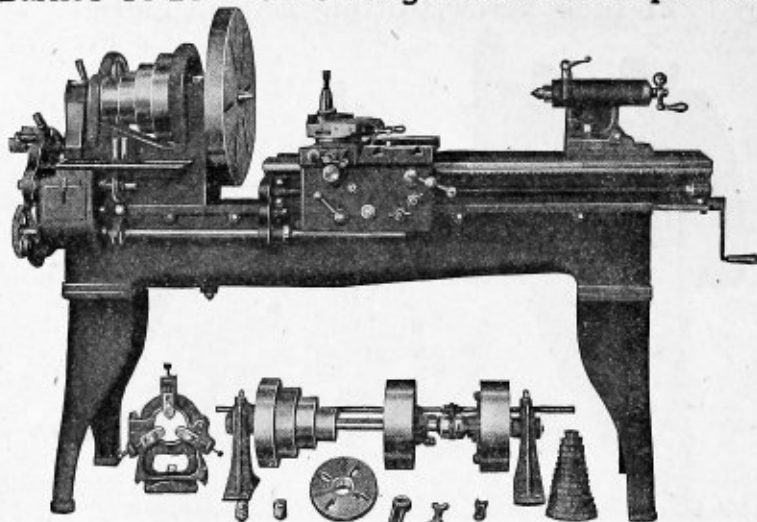
No. 47 Lathe, 21-inch Swing

No. of Lathe	Price Complete	Swing Over Bed, Inches	Length of Bed, Feet	Distance Between Centers, Inches	Swing Over Carriage, Inches	Hole Through Spindle, Inches	Opening in Tool Post, Inches	Approximate Weight on Skids, Crated
47	\$1184.00	21½	7	39	15½	1½	¾x2	2850
47	1224.00	21½	8	51	15½	1½	¾x2	3000
47	1300.00	21½	10	75	15½	1½	¾x2	3300
47	1344.00	21½	12	99	15½	1½	¾x2	3600
47	1384.00	21½	14	123	15½	1½	¾x2	3900

No. 54 Lathe, 24-inch Swing

No. of Lathe	Price Complete	Swing Over Bed, Inches	Length of Bed, Feet	Distance Between Centers, Inches	Swing Over Carriage, Inches	Hole Through Spindle, Inches	Opening in Tool Post, Inches	Approximate Weight on Skids, Crated
54	\$1704.00	24½	8	47	17½	1¾	¾x2	3880
54	1782.00	24½	10	71	17½	1¾	¾x2	4050
54	1836.00	24½	12	95	17½	1¾	¾x2	4420
54	1880.00	24½	14	119	17½	1¾	¾x2	4790
54	1924.00	24½	16	143	17½	1¾	¾x2	5160

Barnes 14-24 Inch Sliding Extension Gap Lathe



Showing gap partially extended

A high quality, wide range lathe for garage and general repair shop work also a very convenient lathe for fitting and assembling work, in factory machine shops.

This lathe has the necessary strength and power to turn full diameter of swing in the gap, and at the same time it is free from any awkward or objectionable features for use when the gap is closed.

Details

Bed is very broad, deep and well braced, and it is accurately proportioned throughout. The top and main beds are planed full length and fitted together by dove-tail construction, which permits the top bed to be firmly held at any point by means of clamp bolts transversely placed through the main bed. For extending the gap, the top bed is drawn back by means of screw and crank at rear end. Rack and pinions are cut from steel, the rack being in one piece.

Head Stock is heavy and strong. The spindle is very large, accurately ground and runs in split bronze bearings. Cone pulley has four steps and is strongly back geared, giving eight changes of speed. A push pin on the head gear allows the cone to be instantly locked or unlocked without the use of a wrench.

Tail Stock is of the off-set type, allowing the compound rest to be set parallel with the bed, and has set over adjustment for taper work.

Carriage is extended in front and it is unusually strong to provide a firm support for the turning tool when doing

work in the gap up to the limit of its swing. The carriage is fitted to the bed with long bearing on the V in front and with flat bearing at the rear, and is fed by splined screw. It is thoroughly gibbed, and can be conveniently and quickly clamped to the bed for cross feed work. The carriage is also fitted with T slots for clamping on work.

Compound Rest has graduated base, is properly gibbed and has sufficient travel for the largest capacity of the lathe.

Feeds. This lathe has six Quick Change Geared Feeds, both longitudinal and cross. Feeds are as follows: .007, .011, .017, .019, .030 and .049 inches. Cuts either right or left hand threads consecutively from 2 to 18 including 11 1/2 pipe thread, by twos from 18 to 36, and by fours from 36 to 48.

Taper Attachment is secured to back of carriage and travels with it. Turns any taper up to two and three-fourths inches per foot. Swivel guide bar is graduated in inches, and is adjusted by means of hand screw.

Specifications and Prices

Swing over bed.....	14 1/2 inches
Swing over carriage.....	10 inches
Swings through gap.....	24 inches
Cone diameters.....	10, 8, 6 and 4 inches
Width of steps on cones.....	2 1/2 inches
Width of top bed over all.....	11 3/4 inches
Hole through spindle.....	2 1/2 inches
Diameter of spindle nose (4 threads per inch).....	2 1/2 inches
Front bearing of headstock spindle.....	2 1/2 x 3 3/4 inches
Back bearing of headstock spindle.....	2 1/2 x 2 3/4 inches
Diameter of tail stock spindle.....	1 1/2 inches
Tail spindle has Morse taper.....	No. 4
Head spindle Morse taper No. 5 fitted with No. 4 sleeve.....	
Ratio of back gearing.....	11 to 1
Feed screw, 1-inch diam., 8 thread.....	Acme Standard
Slot in tool post takes.....	1/2 x 1 1/2 inch tool
Center rest takes in.....	4 inches
Angular travel of compound rest.....	3 inches

Lathe takes between centers:

Closed	5 1/2 ft.	36 in.	7 1/2 ft.	60 in.
Extended.....	5 1/2 ft.	54 in.	7 1/2 ft.	96 in.
Lathe gap opens.....	5 1/2 ft.	18 in.	7 1/2 ft.	36 in.
Size of friction pulleys on countershaft.....	10 x 3 inches			

Speed of countershaft.....	200 R. P. M.
Weights.....	Net Crated Boxed
5 1/2-foot machine.....	1420 lbs. 1580 lbs. 1700 lbs.
7 1/2-foot machine.....	1530 lbs. 1850 lbs. 2000 lbs.

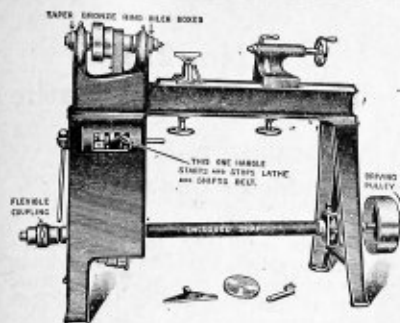
Prices

5 1/2-ft. Bed with Countershaft and all Reg. Accessories.....	\$760.00
7 1/2-ft. Bed with Countershaft and all Reg. Accessories.....	\$860.00

Extras

Milling attachment.....	\$ 80.00
Taper attachment.....	120.00
Two-inch raising blocks.....	70.00
Follow rest, \$7.00; extra center rest, \$14.00; both.....	21.00
Chuck plates, semi-finished and threaded up to 12-inch chucks.....	3.00
Mounting lathe chucks, any size up to 12 inches, if sent in prepaid.....	7.00
Mounting drill chucks with taper plugs for lathe spindles.....	4.00
Draw-in chuck attachment, including split collet, any size from 1/8 to 3/4 inch.....	60.00
Split collets 1/8 to 3/4 inch, each.....	7.00

Our stock of machinist's tools is most complete. We sell everything used in the machine shop.



No. 215 Countershaft Driven

There is no danger of getting caught, but covers for cone pulley on spindle and for motor on No. 211 lathe can be supplied if required.

Taper Bronze Ring Oiler Boxes are fitted to the head stock spindles. These will stand a speed of 4,000 R. P. M. without heating and can be adjusted for wear without affecting the fit or bearing on the spindle. Bearing surfaces are all hand scraped to an accurate fit to Brown & Sharpe standard surface plates and gauges.

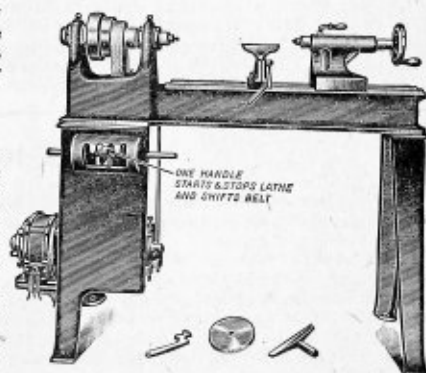
Head Stock is Cast Solid with Bed.—This makes it stiffer and ensures a perfect and permanent alignment of the spindle and the ways.

Low Installation Cost.—The self contained underdrive lathes come to you all ready to run. No extra expense for hangers, shafting, belting, pulleys or couplings. They can be set in place and connected up in a few minutes.

Equipment Furnished.—1 rest holder. 1 6-inch screw chuck. 1 each cup and spur centers. 1 each 4 and 9-inch tee rests. Belt from motor or countershaft, shaft to spindle. Set of wrenches. Shelf on back of lathe if wanted. Any other equipment will be charged extra.

General Dimensions—211 and 215 Lathes

Diameter of hole through spindle, inches.....	9/16
Size of front bearing, inches.....	1 1/2 x 3 1/4
Size of back bearing, inches.....	1 1/2 x 2 1/4
Width of belt, inches.....	1 1/2
Diameters of cones on spindle, inches.....	2 7/8, 4, 5 1/4, 6 3/8
Variations of speed, No. 215 lathe, 2504, 1660, 1157, 855 R. P. M.	
Variations of speed, No. 211 lathe, 3131, 1856, 1114, 705 R. P. M.	
Diameters of cones on shaft No. 215, inches.....	12, 11 1/2, 10 1/8, 9 1/4
Diameters of cones on motor No. 211, inches.....	5, 4, 2 3/4, 1 3/8
Speed of countershaft No. 215.....	600 R. P. M.
Size and speed of motor No. 211.....	1 1/2 H. P., 1800 R. P. M.
Motor with speed of 1200 R. P. M. can be furnished if required.	



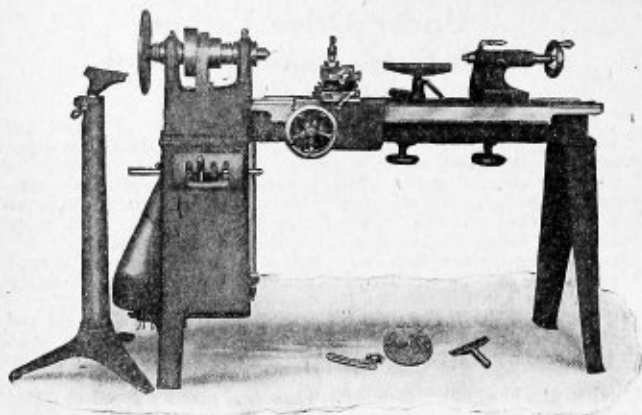
No. 211 Motor Driven

No. 215 Lathe—Special Dimensions and Price List

Sizes (swing and length of bed).....	12"x3 1/2'	12"x4'	12"x5'	12"x6'
Distance between centers, inches.....	18	24	36	48
Size and length of driving shaft.....	1 1/8"x4'3"	1 1/8"x4'9"	1 1/8"x5'9"	1 1/8"x6'9"
Height of shaft from floor, inches.....	9 1/2	9 1/2	9 1/2	9 1/2
Distance between lathes, inches.....	10	10	10	10
Net weight, pounds.....	415	435	485	535
Weight boxed for shipment, pounds.....	500	530	585	635
Price.....	\$75.20	\$76.80	\$83.25	\$89.85

No. 211 Lathe—Price List

Sizes (swing and length of bed).....	12x3 1/2	12x4	12x5	12x6
With 110 volt 1/2 H. P. Western Electric direct current motor attached.....	\$130.00	\$131.50	\$136.00	\$142.75
With 220 volt 1/2 H. P. Western Electric direct current motor attached.....	137.50	139.00	143.50	150.25
With 110 volt 1/2 H. P. Western Electric alternating current single phase 60 cycle motor attached.....	129.20	130.80	136.00	142.50
With 220 volt 1/2 H. P. Western Electric alternating current single phase 60 cycle motor attached.....	130.70	132.30	137.50	144.00
With 110, 220, 440 or 550 volt Western Electric alternating current, either 2 or 3 phase 60 cycle motor attached.....	127.20	128.80	133.90	140.50
Before ordering always find out from your power company what current they will furnish you.				



No. 218 Demonstration Lathe

Idler Type with
Motor Underdrive

Made especially for a teacher's demonstration lathe, and in addition to the regular face plate and hand rest is equipped with a 11-inch outside face plate and 15-inch T rest, mounted on tripod stand for turning large pieces; also a hand feed carriage and swivel compound slide rest, invaluable for long straight turning and pattern making.

In general construction the lathe is the same as the No. 211, shown on previous page; and the dimensions are the same. The motor cover is optional; a cover for the cone pulley can be furnished if desired, and adds greatly to the appearance.

Can furnish with shaft underdrive, if desired.

No. 218. Wells' demonstration lathe, 5-foot bed, 36 inches between centers, 12-inch swing, complete as shown above without motor cover:

With $\frac{1}{2}$ H. P. 110 V Western Elec. D. C. Motor.....	\$212.50
With $\frac{1}{2}$ H. P. 220 V Western Elec. D. C. Motor.....	220.00
With $\frac{1}{2}$ H. P. 110 V Western Elec. Single Phase 60 Cycle A. C. Motor.....	212.50
With $\frac{1}{2}$ H. P. 220 V Western Elec. Single Phase 60 Cycle A. C. Motor.....	214.00
With $\frac{1}{2}$ H. P. 110-220, 440 or 550 V Western Elec. 2 or 3 Phase A. C. Motor.....	210.40
Motor cover, extra, \$3.20. Cone cover, extra, \$1.60.	

No. 100 Speed Lathes

These lathes are thoroughly made in every way, all the boxes and bearing surfaces are hand scraped to an accurate fit to Brown & Sharpe's standard surface plates and gauges.

Head Stock is cast solid with bed, making it stiffer and insuring a perfect and permanent alignment of spindle and ways.

Head Spindle is hollow and made from high carbon selected steel, ground accurately to size, and bored out true in its own boxes. The end thrust is taken up by means of a threaded nut at the back end of spindle.

Cone Pulley is turned both inside and out to insure perfect balance when running at high speed.

Boxes are larger and longer than ordinarily used on speed lathes and are lapped to a perfect bearing.

Tail Stock has both screw and lever feed or screw feed only as ordered.

Countershaft. All loose pulleys are made with a reservoir for oil sufficient to last for four weeks.

Equipment furnished consists of countershaft, 6-inch face plate, 2 point centers, one long and one short tee rest and table on back of lathe.

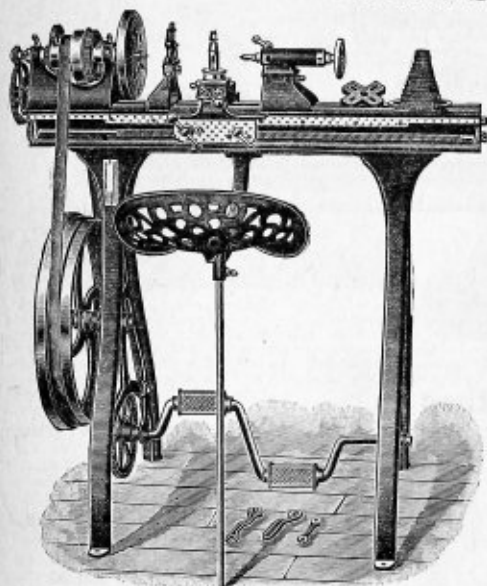
Distance between centers, 12"x3' $\frac{1}{2}$ '—12 inches, 11"x3' $\frac{1}{2}$ '—18 inches, 11"x4'—24 inches, 11"x5'—34 inches.	
Hole in spindle, inches.....	$\frac{3}{8}$ Largest diameter of cone, inches..... 6 $\frac{3}{8}$
Length of Front Bearing, inches.....	3 $\frac{1}{2}$ Width of belt, inches..... 1 $\frac{1}{2}$
Length of roller bearing, inches.....	2 $\frac{3}{8}$ Tight and loose pulleys.....
Diameter of bearings, inches.....	1 $\frac{1}{2}$ 11 inches by 3 $\frac{1}{2}$ feet, 21 $\frac{1}{2}$ inches by 5 feet



Price List

Size	No. 100 Long Legs					No. 100 $\frac{1}{2}$ Bench Legs				
	11 ins. x 6 ft.	11 ins. x 3 $\frac{1}{2}$ ft.	11 ins. x 4 ft.	11 ins. x 5 ft.	11 ins. x 6 ft.	11 ins. x 3 ft.	11 ins. x 3 $\frac{1}{2}$ ft.	11 ins. x 4 ft.	11 ins. x 5 ft.	
Price with screw and lever feed....	\$70.20	\$68.40	\$72.00	\$78.00	\$87.00	\$66.00	\$67.00	\$69.60	\$75.60	
Price with screw feed only.....	66.00	67.80	69.60	75.60	84.60	63.60	65.40	67.20	73.20	
Price without tailstock.....	50.40	52.30	54.00	60.00	69.00	49.20	49.80	51.60	57.60	
Fitted with foot power attachment.			84.00							
Weight, about, pounds.....	375	400	420	475	560	275	300	315	330	

Foot Power Screw Cutting Lathe



No. 4 1/2 Screw Cutting Lathes

The smallest back geared screw cutting lathe we offer and the best lathe of its size on the market.

It swings 9 inches, 4 1/2 inches over the tool carriage, and takes 25 inches between centers, hole through spindle.

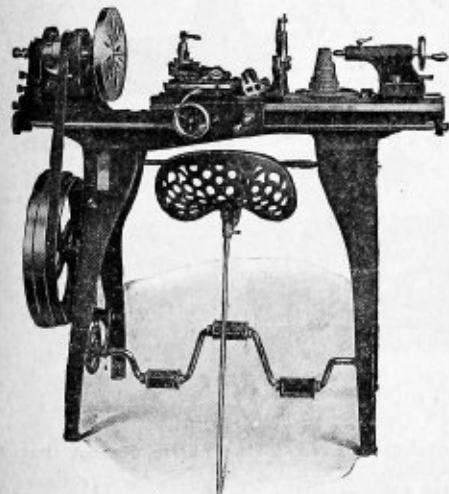
Small cone pulley, 2 1/2 inches; large, 4 1/2 inches. Weight, net 270 pounds; boxed for shipment, 340 pounds.

Price, with foot power or countershaft, \$100.00

Compound rest in place of plain rest, extra 10.00

Follow rest and hand rest extra, see next page.

Raising blocks to swing 15 inches (for turning and boring), extra 13.50



No. 5 Gap Lathe

The three lathes shown on this page are strictly high grade in design, material and workmanship.

They feed right or left and cut screws right or left without change of gearing.

The head stocks have steel spindles with holes through entire length. The boxes are accurately fitted to spindles with provision to keep them true and take up wear.

The tail stock can be readily set at any point, or taken off, leaving the table bed free for face plate or chuck work. The spindles of head and tail stocks are of steel, with true taper holes to receive centers, and the tail stock center is self-discharging.

The tool carriage is a model of convenience and accuracy and is gibbed to the bed.

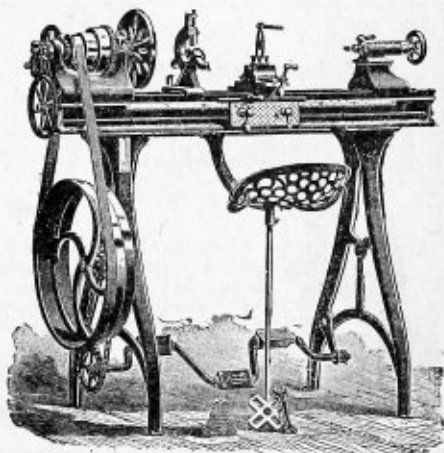
These lathes are made with automatic cross feed which has no special advantage on a small lathe with less than 13-inch swing. The tool carriage swivels to set tool at any angle and adapting the lathe for taper boring, a feature of greater value than automatic cross feed.

All working parts are protected from chips and dirt, insuring great durability.

The No. 4 1/2 lathe is indexed from 5 to 40, and both No. 5 lathes from 4 to 40 threads and the change of gears furnished can be combined for many other threads.

All gears are accurately machine cut, are true and as noiseless as is possible with metal gearing.

Furnished with foot power or countershaft in each case. If foot power, state whether velocipede or standup treadle is wanted.



No. 5 Screw Cutting Lathes

A Perfect Tool for Right or Left Hand Cutting

Swings 11 inches on face plate, 6 3/4 inches over tool, and is 34 inches between centers. Weight boxed for shipment, 500 pounds.

Price with foot power or countershaft \$134.00

Compound rest in place of plain rest, extra 13.50

Extra for hand rest and follower, see next page.

For gunsmiths and other work requiring longer centers we furnish with bed for 40-inch centers at an extra charge of \$6.75

No. 5 Gap Lathe

Made in one size and style only. It is equipped with the same head stock and gearing as regular No. 5 lathe, and extras, such as lathe tools, centers, drill pads, etc., are used on either lathe.

Swing over bed, inches 11

Swing over tool carriage, inches 6 3/4

Swing in gap, inches 15

Width of gap (from face-plate), inches 5

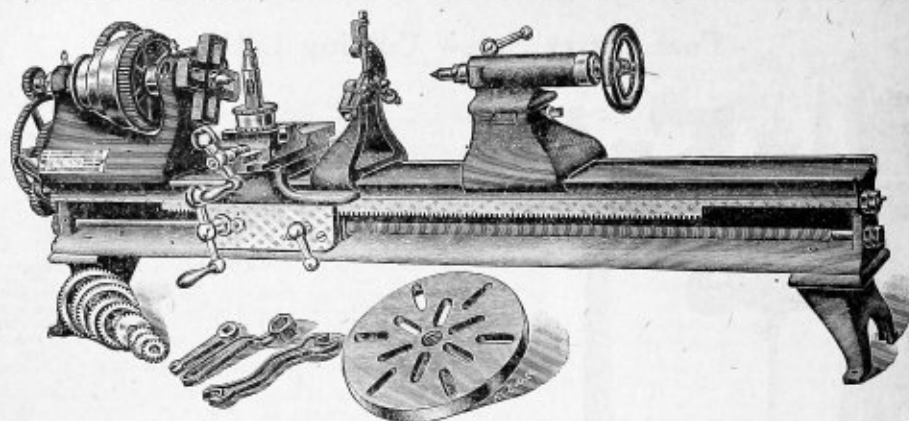
Distance between centers, inches 29

Hole through spindle, diameter, inch 1 1/2

Net weight, pounds 500

Weight (boxed for shipment), pounds 650

Price complete with foot power or countershaft \$167.00



Bench Lathes

Some customers prefer the lathes mounted on bench legs for various reasons, and we offer the smaller sizes thus mounted. We are prepared to furnish the $4\frac{1}{2}$ and 5 lathes on bench legs as follows:

	With Countershaft	Without Countershaft
No. $4\frac{1}{2}$ bench lathe.....	\$100.00	\$ 87.00
No. 5 bench lathe, regular length bed.....	134.00	120.00
No. 5 bench lathe, extra length bed.....	140.00	127.00



Follow Rest

Hand Rest

The lathes Nos. $4\frac{1}{2}$ and 5 are built for metal turning, but can be speeded high enough so that wood turning can be done to very good advantage.

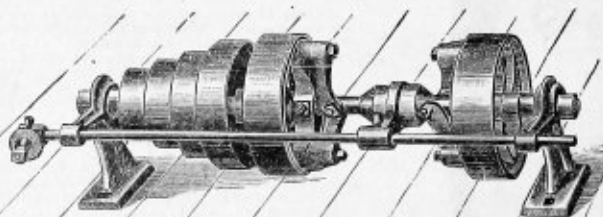
For wood turning a hand rest is required, the price of this rest for No. $4\frac{1}{2}$ lathe being \$3.00; for No. 5 lathe, \$4.00.

Follower Rest

The cut shows a follower rest, which we can furnish, the price being for No. $4\frac{1}{2}$ lathe, \$3.00; for No. 5 lathe, \$4.00.



Hand Rest



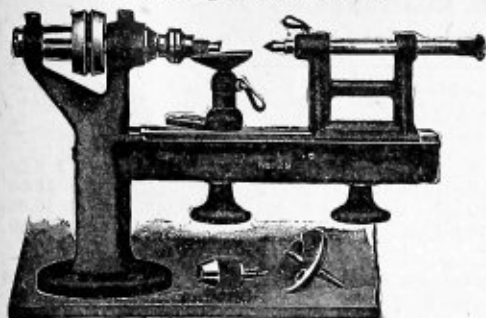
Friction Clutch Countershaft for Nos. $4\frac{1}{2}$ and 5 Screw Cutting and No. 5 Gap Lathe, Except that Cone Has Three Steps Only.

The pulleys on countershaft are 7x2 inches and should be speeded 225 revolutions.

Price of countershaft.....

\$20.00

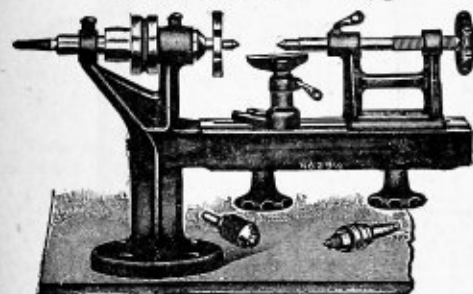
Polishing Lathe No. 29



Polishing lathe, complete with tail stock, tee rest, face plate, saw arbor, and three-jawed chuck, capacity 0 to $\frac{3}{8}$ -inch. Bed is milled. Spindle is hollow. The bed is 12 inches long and swings 5 inches with $3\frac{1}{2}$ inches extreme distance between centers. Pulley steps $\frac{3}{4}$ -inch wide and 1 $\frac{1}{2}$ -inch and 1-inch in diameter; the large step is grooved for round belt. Gross weight, 14 pounds. Net weight, 10 pounds.

Price each.....\$8.50

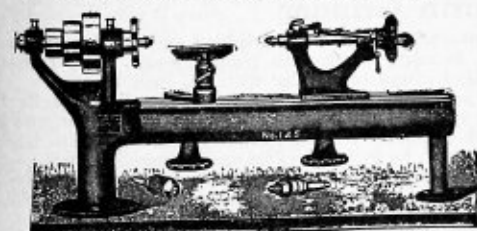
Polishing Lathe No. 29½



This polishing lathe is provided with a screw tail stock and a taper hole in both ends of the live spindle, and also provided with a special spindle for carrying buff wheels. Furnished complete with tail stock, tee rest, face plate, saw arbor, taper threaded polishing spindle, and three-jawed chuck, capacity 0 to $\frac{3}{8}$ -inch. Gross weight, 14 pounds. Net weight 10 pounds.

Price each.....\$11.00

Amateur Bench Lathe No. 125



This lathe will handle a wide range of work, making it applicable for use in laboratories, repair shops and trade schools. It has a milled bed; a hollow spindle provided with a Morse taper with a $\frac{3}{8}$ -inch hole clear through. Has both screw and socket, with a $\frac{3}{8}$ -inch hole clear through. Has both screw and lever feed in tail stock. Total length is 25 inches, with an extreme distance of 12 inches between centers. Swing, 7 inches. Diameter of pulley steps, 1½, 2½, and 3½ inches. Furnished complete with tee rest, slotted face plate, saw arbor, and three-jawed chuck, with capacity of 0 to $\frac{1}{4}$ -inch. Gross weight, 42 pounds. Net weight, 30 pounds.

Price each.....\$24.00

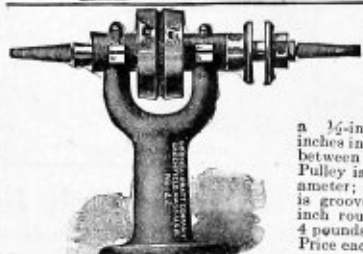
Polishing Head No. 21



No. 21 polishing head has a solid iron frame 6 inches in height; steel spindle $\frac{3}{8}$ inch in diameter and 8 inches long. Japan finish. Distance between flanges $\frac{3}{4}$ inch. The pulley is 1½ inches in diameter and grooved for $\frac{3}{4}$ -inch round belt; $\frac{3}{4}$ -inch face. Weight 2½ pounds.

Price each.....\$1.70

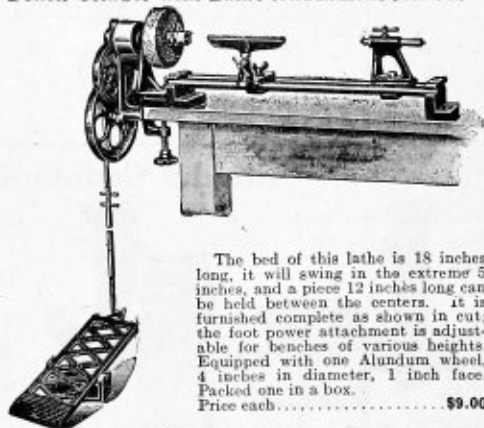
Polishing Head No. 22



No. 22 polishing head is 6¼ inches in height and is fitted with a $\frac{1}{2}$ -inch spindle, 10 inches in length. Distance between flanges, $\frac{3}{4}$ -inch. Pulley is 2¼ inches in diameter; $\frac{3}{4}$ -inch face and is grooved to take a $\frac{3}{4}$ -inch round belt. Weight 4 pounds.

Price each.....\$2.80

Bench Grinder with Lathe Attachment No. 306



The bed of this lathe is 18 inches long, it will swing in the extreme 5 inches, and a piece 12 inches long can be held between the centers. It is furnished complete as shown in cut; the foot power attachment is adjustable for benches of various heights. Equipped with one Alundum wheel, 4 inches in diameter, 1 inch face. Packed one in a box.

Price each.....\$9.00

Slide Rest No. 132



Slide rest for use with No. 125 bench lathe. It has a longitudinal motion of 3¾ inches, and a cross motion of 2¼ inches. It is made to hold lathe tools $\frac{3}{4}$ x $\frac{1}{4}$, and weighs, net, 6½ pounds. Shipping weight, 11 pounds.

Price each.....\$14.40

Lathe Tools No. 126

For use with No. 132 Slide Rest. Size $\frac{1}{4}$ x $\frac{1}{4}$ inch.



Price per set.....\$7.20
Price each......70

Fig. 131 Bench Grinders

With Adjustable Bearings and Oil Cups

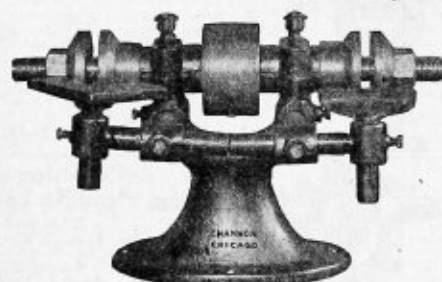


Fig. 131, Showing No. 2, 3 and 4 Grinder Head

No.	Size Wheels will Take (2 Wheels)	Size Arbor, Inches	Size Pulley, Inches	Weight, Pounds	For Counter- shaft	Price Each
1	6 x 1	1 1/2	2 x 1 1/2	10	No. 1	\$ 5.00
2	8 x 1 1/2	3/4	2 1/2 x 2	20	No. 2	10.00
3	10 x 2	1	4 x 2 1/2	40	No. 3	15.00
4	14 x 2 1/2	1 1/4	5 x 4	75	No. 4	20.00

No. 1 Grinder is plain without rests. Nos. 2, 3 and 4 Grinders are like Cut, Fig. 131.

All can be equipped with column or used as a bench grinder as desired. Grinding wheels, extra.

Columns Only for Bench Grinders

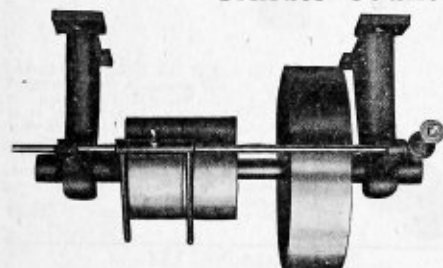
For Use with Bench Grinders Fig. 131

Number	Height, Inches	Weight, Pounds	Suitable for Grinders	Price Each Including Pan
1	32	55	No. 1	\$ 7.00
2	32	55	No. 2	7.50
3	32	70	No. 3	11.00
4	32	90	No. 4	15.00



Fig. 131
No. 2, Machine with
Column

Grinder Counter-Shafts



No.	Shaft, Inches	Pulleys, Inches		Price Each
		Tight and Loose	Drive	
1	3/8	4 x 2	8 x 2	\$ 5.00
2	1	5 x 2 1/2	10 x 2 1/2	7.50
3	1 1/4	6 x 3	12 x 3	10.00
4	1 1/2	6 x 3	12 x 3 1/2	11.00

"Chicago" Column Grinder



A stiff and substantial grinder for grinding and polishing in the machine shop, foundry, blacksmith shop, garage, etc., carries wheels up to 24x3 inches or smaller with 1 1/4-inch hole.

Has special long spindles and bearings. The bearings have unusually large space for the operator and for grinding large and irregular shaped castings. It is designed to grind or polish both large and small work, as well as bicycle and automobile work.

The bearings are adjustable and babbitted with genuine babbitt and are well provided with oilers. Each bearing has four bolts, holding them in a true line.

Supplied with rests to stand heavy work and can easily be arranged for the side or face of the wheel.

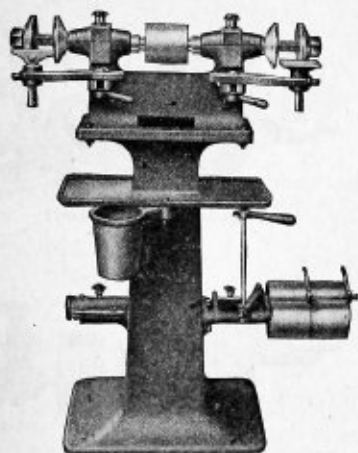
Capacity 18 inches by 3 inches, wheel with 1 1/4-inch hole, arbor to floor 34 inches, diameter of base 18 inches, length of arbor 40 inches, diameter of arbor 1 1/4 inches, size of pulleys 1 1/4 inches by 4 3/4 inches, weight complete 235 pounds.

Price.....\$25.00
Countershaft for above 16-inch drive pulley, 6-inch tight and loose pulleys, weight 85 pounds. Price.....14.00

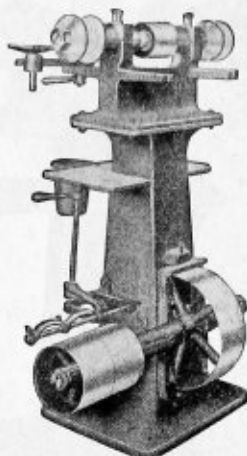
A price in line saves time.

St. Louis Grinding Machines

With Self Contained Countershaft



Front View



Rear View

These are very heavy high-grade machines, with .40 point carbon arbors, self-oiling, dust-proof bearings, and embodying a high-grade workmanship and finish throughout.

The self-contained countershaft affords several advantages over the detached type. The most apparent is the saving in erection, as it takes less belting and saves the labor of attaching the countershaft to the ceiling. It permits setting the machines under the line-shaft and away from the higher priced machines.

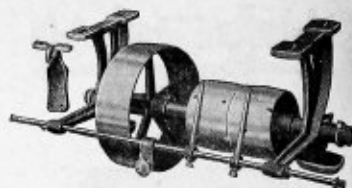
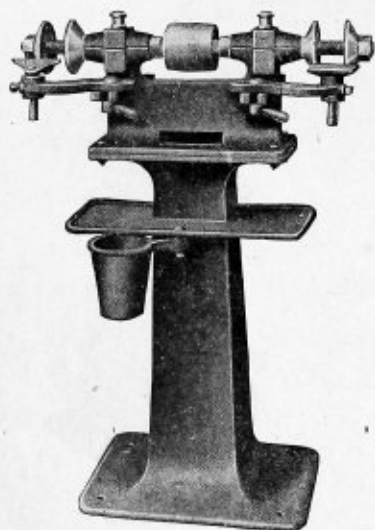
The belt tightening device will keep the belt at proper tension until worn out. It consists of the countershaft frame attached to the column by square gibs and adjusted by screw, as shown.

Specifications

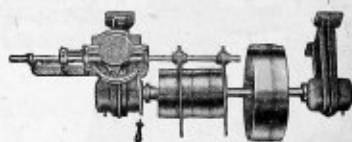
Machine Nos.	1	2	3	4	5	6	21	22	23	24
Wheels recommended, inches	6 x 1 1/2	8 x 1 1/2	10 x 2	12 x 2	14 x 2 1/2	16 x 3	6 x 1 1/2	8 x 1 1/2	10 x 1 1/2	12 x 2
Diameter of arbor in collars, inches	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2
Diameter of arbor in bearings, in.	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2
Length of arbor, inches	16	19 1/2	22	27	30	34	20	25	27 1/2	34
Distance between wheels, inches	10 1/2	12	14 1/2	18	21	23 1/2	15	17	19 1/2	25
Length of bearings, inches	3	3 1/2	4 1/2	4 1/2	5 1/2	6	3	3 1/2	4 1/2	4 1/2
Height to center of arbor, inches	4 1/2	5 1/2	6 1/2	7 1/2	8 1/2	9	4 1/2	5 1/2	6 1/2	7 1/2
Size of base of head, inches	4 x 8	4 1/2 x 9	6 x 10 1/2	6 1/2 x 14	8 x 16	10 x 19 1/2	4 x 8	4 1/2 x 9	6 x 10 1/2	6 1/2 x 14
Size of base of column, inches	10 x 14	11 x 15 1/2	12 x 16	13 1/2 x 17 1/2	15 x 20	18 x 25	10 x 14	11 x 15 1/2	12 x 16	13 1/2 x 17 1/2
Size plain pulley, inches	2 x 2	2 1/2 x 2 1/2	3 x 3	3 1/2 x 3 1/2	4 x 4	5 x 4 1/2	2 x 2	2 1/2 x 2 1/2	3 x 3	3 1/2 x 3 1/2
Size cone pulley, inches						6 & 5 x 4 1/2				
Size T. & L. pulley, inches	2 1/2 x 2	3 x 2	3 1/2 x 2 1/2	3 1/2 x 3 1/2	4 x 4	6 x 4	2 1/2 x 2	3 x 2	3 1/2 x 2 1/2	3 1/2 x 3 1/2
Speed C. shaft, plain pulley	531	497	478	465	455	427	531	497	478	465
Speed C. shaft, cone pulley						512				
Size C. S. drive plain pulley, inches	12 x 2	12 x 2 1/2	12 x 3	12 x 3 1/2	12 x 4	14 x 4 1/2	12 x 2	12 x 2 1/2	12 x 3	12 x 3 1/2
Size C. S. drive cone pulley, inches						14 & 15 x 4 1/2				
Size C. S. T. & L. pulley, inches	4 x 2 1/2	4 x 3	6 x 3	6 x 3 1/2	6 x 4	8 x 5	4 x 2 1/2	4 x 3	6 x 3	6 x 3 1/2
Drop of countershaft, inches	6	6	6	8	8	8	6	6	6	8
Size of shaft, inches	22 x 1 1/2	24 x 1 1/2	24 x 1 1/2	26 x 1 1/2	30 x 1 1/2	40 x 1 1/2	21 x 1 1/2	24 x 1 1/2	24 x 1 1/2	26 x 1 1/2
Weight of head, lbs.	22	33	52	75	100	150	25	35	55	80
Weight of column, lbs.	75	95	105	120	160	220	75	95	105	120
Weight of countershaft, lbs.	50	55	60	70	85	150	50	55	60	70
Weight complete, lbs.	147	183	217	265	345	520	150	185	220	270

For Price List, see next page.

St. Louis Grinding Machines—Continued



Regular Countershaft



Pull Countershaft

For Detached Countershaft

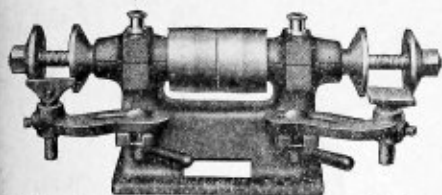
On the preceding page we show the St. Louis grinding machine with self contained countershaft, while on this page we illustrate the same machine for Detached Countershaft, also a plain shifter countershaft and a Pull Countershaft.

The Pull Countershaft is operated by pulling the handle shown, to start, and pulling the same handle to stop.

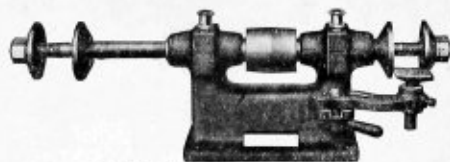
Price List St. Louis Grinding Machines

No. machine.....	1	2	3	4	5	6	21	22	23	24
Head.....	\$12.00	\$14.00	\$16.00	\$20.00	\$25.00	\$33.00	\$14.00	\$16.50	\$19.00	\$23.00
Column.....	11.00	13.00	15.00	18.00	21.00	27.00	11.00	13.00	15.00	18.00
Countershaft.....	10.00	11.00	13.00	15.00	17.00	22.00	10.00	11.00	13.00	15.00
C. S. with Pull shift.....	15.00	17.00	18.00	20.00	22.00	30.00	15.00	17.00	18.00	20.00
Com. Mach. Det. C. S.....	33.00	38.00	44.00	53.00	63.00	82.00	35.00	40.50	47.00	56.00
Com. with Pull C. S.....	38.00	44.00	49.00	58.00	68.00	90.00	40.00	46.50	52.00	61.00
Com. Mach. S. C. C. S.....	37.00	44.00	50.00	60.00	70.00	92.00	39.00	46.50	53.00	63.00
Ex. T. & L. Pulley on H.....	2.50	2.50	2.50	4.00	4.00	5.00	2.50	2.50	2.50	4.00
Ex. Cone Pul. on H.....						5.00				
Ex. Cone Pul. on C. S.....						7.00				
Ex. Randall Graphite Bronze or Cast Iron Shell Bearings.....	2.50	2.50	3.00	4.00	5.00	6.00	2.50	2.50	3.00	4.00
Surface Att.....			20.00	20.00						
W. G. per pair for 2-inch wheels open type	5.00	6.00	7.00	8.00	10.00	12.00	These sizes only take one guard, which is half price of Nos. 1, 2, 3, 4, re- spectively.			
18-inch W. G. for No. 6.....						14.00				
W. G. p. p. Exhaust T. Arbor Covers, P. P.....	.65	.75	.90	1.10	1.25	1.65				

St. Louis Grinding Machines—Continued



St. Louis Grinders with tight and loose pulley made in all sizes.



21, 22, 23 and 24 Machines.

Description of Parts

The illustration shows the type of bearing used on all St. Louis grinding and polishing machines. The body of machine is milled with a recess. The cap is milled with a corresponding tang, which fits into the recess, taking all side strain off screws, making rigid, dust-proof bearing.

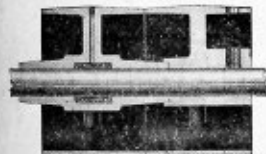
Tang on cap is milled longer than depth of recess. As bearing wears, this tang can be dressed down, thus eliminating the necessity of liners.

These bearings are reamed on solid reamer bars between centers, the caps being brought down metal to metal. This insures an equal bearing full length of the box.

This cut illustrates a tight and loose pulley of most approved design. The hub of loose pulley is 2-inches longer than the face of pulley, projecting equally on each side. This gives an extra long bearing and corresponding durability.

There is an ample oil chamber in the center, in which is placed a soft absorbent felt, producing a very effective self-oiling feature.

Bearings



T. & L. Pulleys

A recess is bored into the hub of the tight pulley, into which the loose pulley hub projects, which fully protects the bearing from dust. On the self-contained machine the countershaft bearing is also chambered.

This pulley is used on both St. Louis and Western Countershafts.

Cut to the right illustrates the most effective open type guard that has ever been produced. It consists of a steel channel rolled to a segment of a circle. This is very stiff and unbreakable, and is further reinforced by a heavy cast iron bracket riveted to the inside flange of the channel.

This bracket is attached to the back rest shown on the machine by a bolt which slides in the slot, allowing the guard to be adjusted backward as the wheel wears. The lips of the guard can be kept close to the wheel, where they are not in the operator's way, and eliminates danger of dropping material between wheel and guard.

This guard effectively prevents fragments from striking the operator, and if the wheel should break would strike inside the flanges of the channel and be prevented from flying.

The cut herewith shows a Surface Grinding Attachment, for use on Nos. 3 and 4 St. Louis Grinders.

It attaches to back rest in place of Wheel Guard at left end, or to front rest in place of rest arm at right end. It can be removed very quickly.

It has fine adjustment with hand wheel and screw.



With Arbor Core
Open Type Wheel Guard

The arbor cover does not come with the guard unless ordered at a small additional price.

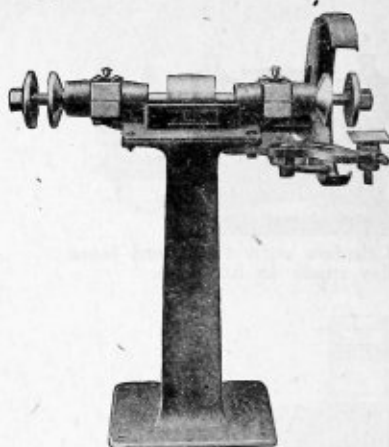


Surface Attachment

Western Grinding Machines



Nos. 1, 2, 3



No. 4

On this and the following page we illustrate our line of Western grinding machines.

While moderate in price, and comparing very favorably with other machines of their class in specifications, they contain several improved features.

Machines are well painted with oil-proof paint.

Nos. 1, 2 and 3 machines are fitted with back rest to receive wheel guards. The No. 4 rest bracket, which is furnished as an extra, is arranged to receive wheel guards for this machine.

The No. 4 head is not sold separate from the column.

The No. 4 machine is quoted regularly without rests, which can be furnished as an extra. The illustration shows one end with rest and wheel guard, the other without.

Specifications

Machine number	0	1	2	3	4	10	21	22	23
Wheels recommended	6 x 1 $\frac{1}{2}$ 8 x 1	6 x 1 $\frac{1}{2}$ 8 x 1	10 x 1 $\frac{1}{2}$	12 x 2	16 x 2	10 x 2	6 x 1 $\frac{1}{2}$ 8 x 1	10 x 1 $\frac{1}{2}$	12 x 2
Dia. of arbor in collars	3 $\frac{1}{2}$	3 $\frac{1}{2}$	3 $\frac{1}{2}$	1	1 $\frac{1}{2}$	1 $\frac{1}{2}$	3 $\frac{1}{2}$	3 $\frac{1}{2}$	1
Dia. of arbor in bearings	3 $\frac{1}{2}$	3 $\frac{1}{2}$	3 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	3 $\frac{1}{2}$	3 $\frac{1}{2}$	1 $\frac{1}{2}$
Length of arbor	13	13	17	23	37	14	17	22	30
Distance between wheels	7 $\frac{1}{2}$	7 $\frac{1}{2}$	10 $\frac{1}{2}$	15	28	3	11 $\frac{1}{2}$	15 $\frac{1}{2}$	22
Length of bearings	1 $\frac{1}{2}$	1 $\frac{1}{2}$	2	3	7	3	1 $\frac{1}{2}$	2	3
Height to center of arbor	4 $\frac{1}{2}$	4 $\frac{1}{2}$	6	9	35 $\frac{1}{2}$	7	4 $\frac{1}{2}$	6	9
Size of base of head	3 x 6	3 x 6	4 x 8	6 x 10 $\frac{1}{2}$	6 x 10 $\frac{1}{2}$	6 x 10 $\frac{1}{2}$	3 x 6	4 x 8	6 x 10 $\frac{1}{2}$
Size plain pulley head	2 $\frac{1}{2}$ x 1 $\frac{1}{2}$	2 $\frac{1}{2}$ x 1 $\frac{1}{2}$	3 x 2	4 x 3	4 x 4	4 x 2 $\frac{1}{2}$	2 $\frac{1}{2}$ x 1 $\frac{1}{2}$	3 x 2	4 x 3
Size T. & L. pulley head	2 $\frac{1}{2}$ x 1 $\frac{1}{2}$	2 $\frac{1}{2}$ x 1 $\frac{1}{2}$	3 x 2	4 x 3	4 x 4	4 x 2 $\frac{1}{2}$	2 $\frac{1}{2}$ x 1 $\frac{1}{2}$	3 x 2	4 x 3
Speed of countershaft	498	498	478	531	298	531	498	478	531
Size drive pulley	12 x 1 $\frac{1}{2}$	12 x 1 $\frac{1}{2}$	12 x 2	12 x 3	12 x 4	12 x 2 $\frac{1}{2}$	12 x 1 $\frac{1}{2}$	12 x 2	12 x 3
Size T. & L. pulley	4 x 2	4 x 2	4 x 2 $\frac{1}{2}$	6 x 3	6 x 4	4 x 3	4 x 2	4 x 2 $\frac{1}{2}$	6 x 3
Drop of countershaft	6	6	6	6	8	6	6	6	6
Size of shaft	18 x $\frac{3}{8}$	18 x $\frac{3}{8}$	22 x 1 $\frac{1}{2}$	24 x 1 $\frac{1}{2}$	30 x 1 $\frac{1}{2}$	24 x 1 $\frac{1}{2}$	18 x $\frac{3}{8}$	22 x 1 $\frac{1}{2}$	24 x 1 $\frac{1}{2}$
Weight of head	12	16	25	45	90	25	18	27	47
Weight of column	45	45	65	95	105	95	45	65	95
Weight of countershaft	35	35	45	55	85	35	35	45	55
Weight complete	92	96	135	195	280	175	98	137	197

When 6-inch wheels are used on Nos. 0, 1, 21, countershaft speed should be 663.

Price List

No. machine	0	1	2	3	4	10	21	22	23
Head	\$ 6.00	\$ 7.00	\$ 9.50	\$ 14.00	\$26.00	\$7.00	\$9.00	\$12.00	\$17.00
Column	7.00	7.00	9.00	12.00		12.00	7.00	9.00	12.00
Countershaft	6.00	6.00	8.00	10.00	13.00	8.00	6.00	8.00	10.00
Complete	19.00	20.00	26.50	36.00	39.00	27.00	23.00	29.00	39.00
Extra T. & L. pulley on head	2.00	2.00	2.50	2.50	4.00	2.50	2.00	2.50	2.50
Extra for wheel guards, per pair, open type	5.00	5.00	7.00	8.00	12.00				
Specials with back rests to receive guards	6.50								
Specials, 8 inch wheel guards for Nos.	6.00	6.00	7.00						

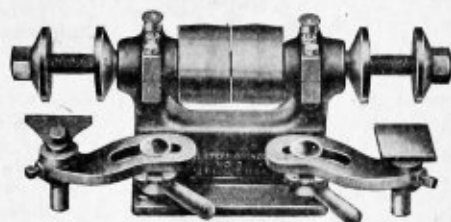
These sizes only take one guard, which is half price of pair for Nos. 1, 2, 3, respectively.

Rests are regularly furnished on Nos. 1, 2 and 3, but are extra on No. 4. No. 4 rest bracket and rest, each, \$4.00.

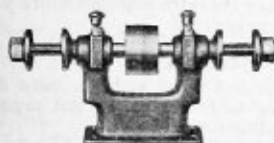
Western Grinding Machines—Continued



Nos. 1, 2, 3—Plain Pulley

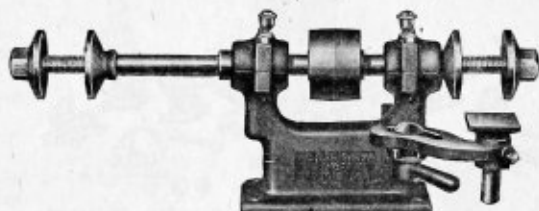


Nos. 1, 2, 3—Tight and Loose Pulley



No. 0 as a Special.

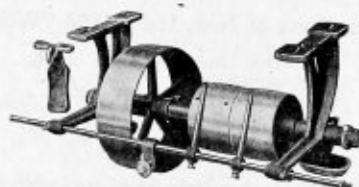
Furnished with a back rest to receive wheel guard.



Nos. 21, 22, 23



Nos. 10, 11



Countershaft



Open Wheel Guard
Can furnish with arbor cover
at small additional charge,
see preceding page.

Specifications and Prices

of Western Grinding Machine No. 11 Illustrated Above

Machine number.....	11	Size drive pulley.....	12x 3
Wheels recommended.....	12x2	Size T. & L. pulley.....	6x 3
Diameter of arbor in collars.....	1	Drop of countershaft.....	6
Diameter of arbor in bearings.....	1 1/2	Size of shaft.....	24x 1 1/2
Length of arbor.....	17	Weight of head.....	40
Distance between wheels.....		Weight of column.....	95
Length of bearings.....	4	Weight of countershaft.....	55
Height to center of arbor.....	8	Weight complete.....	190
Size of base of head.....	6x10 1/2	Price of head.....	\$12.00
Size plain pulley head.....	4x 3	Price of column.....	12.00
Size T. & L. pulley head.....	4x 3	Price of countershaft.....	10.00
Speed of countershaft.....	475	Price complete.....	34.00

Universal Grinder No. 190

The only low-priced tool grinder having Swivel Table with vertical adjustment so that Cup Wheels can be used as easily as any other form.

Description

Back Feed for longitudinal movement of table (or slide) gives a steady, even feed.

Table revolves entirely around the Head, enabling the work to be presented at any angle to the wheel.

Slides have both Horizontal and Transverse movement and the top slide swivels for grinding taper work.

Hand Wheel shown on side of base raises and lowers table.

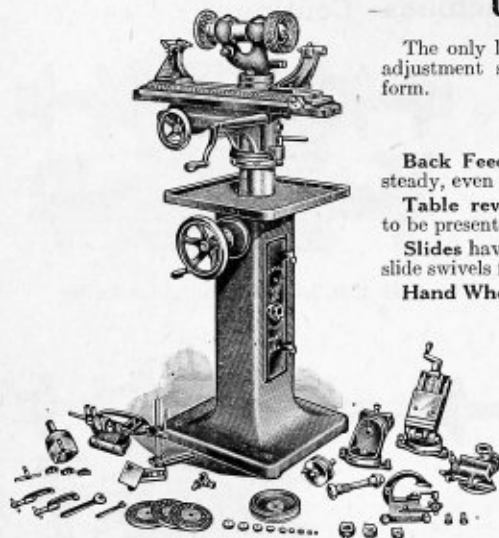
Swivel Boxes ensure perfect alignment of spindle bearings essential to a grinding machine.

For about all the requirements for tool sharpening and grinding in the average shop these grinders are large enough and rigid enough.

Why pay big money for extra capacity which you do not need and would never use!

Accuracy

All parts are made and fitted with the same degree of care and accuracy as is applied to the larger and more expensive grinding machines.



Above Illustration shows "No. 190 Complete Universal Grinder with all Attachments"

The **Spindle** is ground and thoroughly protected by dust-caps. All slides are hand-scraped to an accurate fit. All **Slides** are fitted with gibs for taking up the wear, and the spindle has a spring take-up for taking up the end-thrust.

General Dimensions of Nos. 184 to 190 "Wells" Grinders

Swings 8 inches diameter on centers.	Transverse movement of table, 5 1/4 inches.	Measurements, boxed, 55 x 28 x 28 inches.
Distance between centers, 16 inches.	Vertical movement of table, 6 inches.	Speed of countershaft, 700 R.P.M.
Longitudinal movement of table, 16 1/2 inches.	Speed of main spindle, 3780 R.P.M.	Length of table, 26 inches.
		Floor space required, 50-inch circle.

"Wells" Cutter and Reamer Grinders are regularly furnished with different combinations of equipment, as noted below:

No. 184

Plain countershaft.
Head and tail centers.
Universal tooth rest.
Hand rest.
Bevel mill holder.
Split arbor for 1-inch hole.
Adjustable stops for long slide.
Clamps for top slide.
Net weight, 360 lbs.
Boxed for export, 480 lbs.
Price, \$115.

No. 185

No. 184 equipment.
Formed cutter attachment.
Price, \$121.

No. 186

No. 184 equipment.
Circular grinding attachment.
Double countershaft.
Price, \$135.

No. 187

No. 184 equipment.
Formed cutter attachment.
Circular grinding attachment.
Double countershaft.
Price, \$141.

No. 188

No. 184 equipment.
Formed cutter attachment.
Taper shank and mill holder.
Universal vise.
Price, \$151.

No. 189

No. 184 equipment.
Formed cutter attachment.
Circular grinding attachment.
Double countershaft.
Taper shank end mill holder.
Universal vise.
Price, \$171.

No. 190

Complete Universal Grinder

Double countershaft.
Head and tail centers.
Universal tooth rest.
Hand rest.
Bevel mill holder.
Split arbor for 1-inch holder.
Formed cutter attachment.
Adjustable stop for long slide.
Clamps for top slide.
Three indexes for formed cutters.
Three Dogs, 1/2 inch, 3/4 inch and 1 inch.
Circular grinding attachment.
Taper shank end mill holder.
Universal vise.
Internal grinding attachment.
3-inch chuck.
Fifteen emery wheels.
Weight, 480 lbs.
Boxed for export, 620 lbs.
Price, \$200.



Style W. P. L. Overhead Countershaft

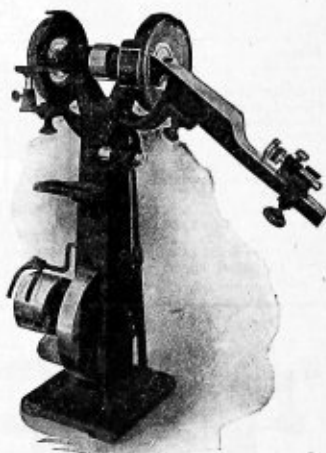
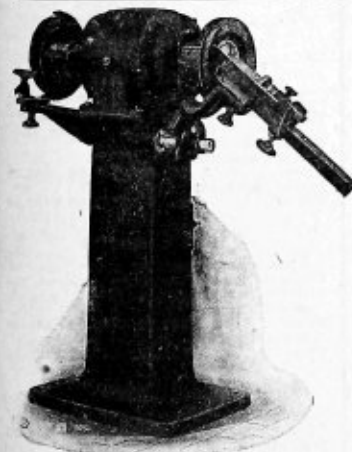
When a drill is ground by the "New Yankee" drill grinder its point is accurately centered. Each lip is ground at the same angle, the same length and at the same clearance. Each cuts the same amount and the holes are round and accurate to size.

The only drill grinder which does not require a series of time consuming adjustments for each size of drill. No caliper of drills and no adjustments are necessary except that of the tail stock for length of drill.

All New Yankee drill grinders are equipped with high grade adjustable bronze bearings.

Specifications

Style	W. P. L.	A	D
Capacity, diameter of drill, inches	No. 60 to 2½	¾ to 2½	¾ to 2½
Diameter emery wheel, inches	9½	9½	9½
Speed emery wheel, R. P. M.	1600	1600	1275
Speed countershaft, R. P. M.	530	425	
Tight and loose pulley on countershaft, inches	6x2½	7¼x2½	
Motor, volts	43	43	110 or 220
Height to center of spindle, inches	43	43	43
Floor space occupied, feet	1½x4	1½x3	1½x3
Weight, net, pounds	390	235	505
Weight, crated, pounds	455	270	565
Weight, boxed, pounds	530	325	650
Cubic feet, boxed	17	12	14

Style A
Countershaft in Base

Style B. Motor-Driven

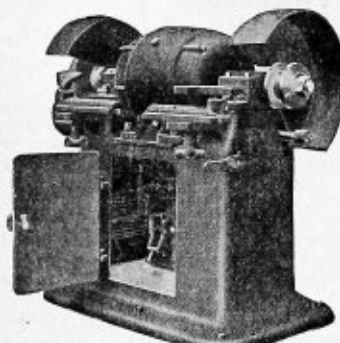
Style W. P. L.	Price	\$214.00
Style W. P. L. Same as style W. P. L., except cap. ¾ to 2½-in. drills.	Price	217.00
Style A.	Price	113.50
Style J. A. Same as style A, except capacity ¾ to 1¼-in. drills.	Price	110.00
Style D. With 110 or 220 D. C. motor.	Price	233.50
Style J. D. Same as style D, except capacity ¾ to 1¼-in. drills.	Price	230.00
Style L. D. Same as style D, except capacity No. 60 to ¾-in. drills.	Price	240.00
Point thinning attachment will be furnished with Styles A. and J. A. grinders for \$5.50 extra, and for Styles D., J. D. and L. D. for \$10.50 extra.		
We can also furnish the New Yankee drill grinders on bench bases with overhead countershafts as follows:		
Style M. Single end type for ¾ to 2½-inch drills.	Price	\$99.50
Style K. Double end type for ¾ to 1¼-inch drills.	Price	87.00
Style L. Double end type for No. 60 to ¾-inch drills.	Price	84.00
Point thinning attachment for Styles M. & K., \$4.00 extra; Style L., \$2.75 extra.		

Point Thinning Attachment

An extended spindle, point thinning wheel, tool rest, etc., for thinning the points of drills. It can be furnished on any single end machine. The trifling additional cost makes it a profitable investment. The size of wheels are as follows: 12x5½-inch with 12-inch drill wheel, 10x1½-inch with 9½-inch, 7x5½-inch with 7-inch, and 5x1½-inch with 5-inch. A 10x1-inch or 7x¾-inch plain tool grinding wheel can be furnished instead, for use with their respective sized drill wheels, when desired, at the additional price named above.

No matter what your conditions may be, there is a New Yankee grinder to suit them.

Motor Driven Dry Grinding Machines



For Direct Current

These machines are of massive construction and of sufficient floor area to keep the motor from vibrating when the grinding wheels get out of true.

Safety shape wheels and flanges can be used.

Arbor is of high grade carbon steel, accurately ground and runs in ring oiling, dust proof bearings.

Motors are totally enclosed and ratings are based on intermittent duty. All motor parts are furnished by the General Electric Co.

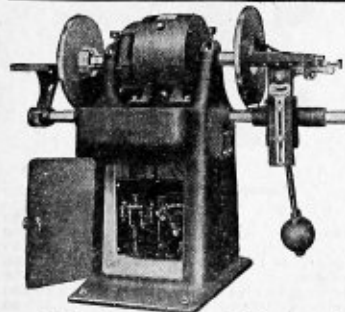
Direct current motors can be furnished with patent speed controller by which a 75 to 100 per cent speed variation is obtained by means of external field control, and a constant periphery speed maintained until the wheel is practically worn out. If one wheel wears down faster than the other the speed is regulated by the larger. **It is impossible to speed the wheels too fast.**

Only certain fixed speed can be gotten with alternating current motors for grinding machinery, and we have adopted such sizes of wheels as can be operated economically at the speeds indicated for each machine.

Starting box, switch and non-arcing fuses are placed inside the frame on a slate panel.

Specifications and Prices

Motor.....	Direct Current						Alternating Current—60 Cycles					
Number of machine.....	35	45	46	47	48	65	30	31	40	41	42	60
Size of wheels, inches.....	18x3	24x4	24x4	24x4	24x4	30x4	18x3	24x4	24x4	24x4	24x4	30x4
Horse power of motor.....	5	5	7½	10	15	10	5	5	5	7½	7½	7½
Speed.....	1050	800	800	800	960	700	1200	1200	900	900	900	720
Journals.....	11x2 ½	11x2 ½	12x2 ½	13x2 ½	14x3 ½	13x2 ½	9 ½ x 1 ½	11x2 ½	13x2 ½	13x2 ½	15x3 ½	13x2 ½
Arbor where wheels fit.....	2	2	2	2 ½	3	2 ½	1 ½	2	2 ½	2 ½	3	2 ½
Weight without guards.....	1500	1600	2000	3000	4000	3000	1100	1600	2000	2300	4000	2400
Price without R. P. S. controller or guards.....	\$534.00	\$554.00	\$747.00	\$1014.00	\$1067.00	\$1054.00	\$390.00	\$460.00	\$580.00	\$730.00	\$934.00	\$827.00
Price with open type steel wheel guards.....	567.00	600.00	794.00	1060.00	1114.00	1150.00	427.00	494.00	627.00	767.00	956.00	894.00
Price with Style D wheel guards. For patented speed controller, add.....	614.00	687.00	890.00	1147.00	1200.00	1254.00	474.00	540.00	714.00	854.00	1067.00	927.00
	35.00	35.00	35.00	35.00	35.00	50.00						



14-inch Disc Grinding Machine
Motor Driven

Spindle is of high grade steel, babbit bearings with compression grease cups.

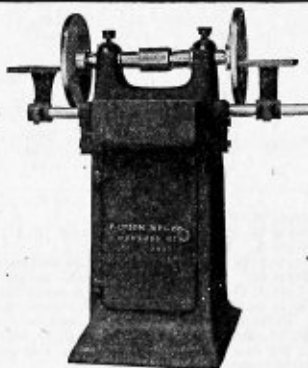
The lever feed table shown at right can be adjusted to any angle up to 45 degrees to disc. Oscillates forward and backward. Has a vertical adjustment of 4 ½ inches, two T slots and an adjustable stop graduated in thousandths of an inch.

Price as shown above with 5 H. P. motor, 1200 r. p. m. plain cementing clamp, two steel discs and supplies, D. C. motor.....\$894.00

A. C. motor, 60 cycle, 2 or 3 phase.....\$734.00

With lever feed table both ends, no plain table, add.....\$107.00

With plain table both ends, no lever feed table, deduct.....\$107.00



14-inch Disc Grinding Machine
Belt Driven

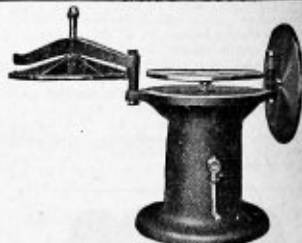
All wearing surfaces exposed to grit are protected. Base is provided with door for tools, etc. Discs are of steel turned true to .001-inch.

Counter shaft has self oiling hangers and loose pulley.

Price as shown above, with plain cementing clamps, countershaft, two steel discs and supplies.....\$300.00

With lever feed table one end as shown in left hand cut, add.....\$50.00

With lever feed table both ends, add.....\$160.00



Universal Clamps

These are furnished in 18-inch and larger sizes only, and are provided with a lifting device that enables one man to do all the work.

Size of clamp, ins. 18 20 23

Price.....\$67.00 \$67.00 \$94.00

Size of clamp, ins. 27 30

Price.....\$117.00 \$154.00

Plain Clamps

Plain clamps same as above, only no lifting device and no yoke over bend, but with top part arranged to lift off by hand.

Size of clamp, ins. 14 18 20

Price.....\$27.00 \$40.00 \$40.00

Size of clamp, ins. 23 27 30

Price.....\$54.00 \$67.00 \$100.00

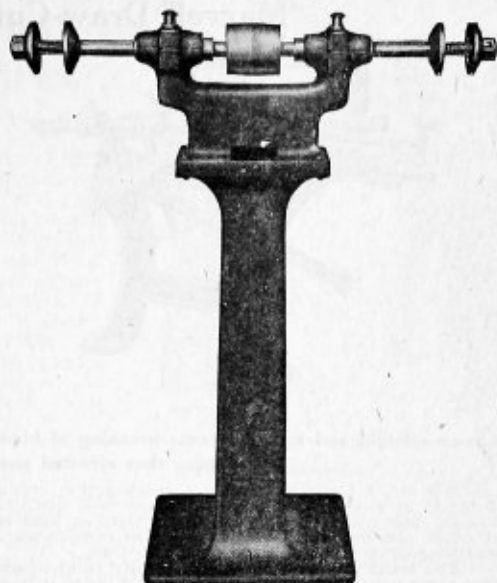
Steel Discs

Size, inches. 12 14 16 18

Price.....\$8.70 \$9.50 \$11.35 \$16.00

Size, inches. 20 23 27 30

Price.....\$20.00 \$33.40 \$46.70 \$60.00



St. Louis Polishing Machines

These machines are the same high-grade design, workmanship, and finish as the St. Louis grinders, have the same type of bearing, and are designed to be the most efficient babbitt-bearing machine possible to build. We are also prepared to furnish Randall graphite, bronze or cast iron shell bearings.

These machines are adapted to belt from overhead, from a shaft on the floor at the back, or from beneath the floor.

The Nos. 7 and 8 machines are floor machines of the most substantial character.

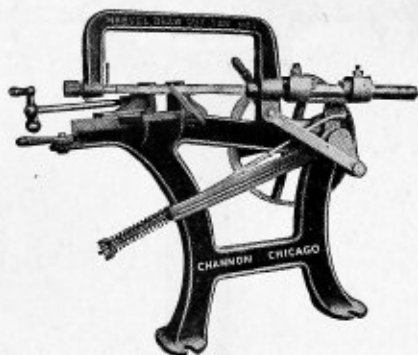
Specifications

Machine	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8
Diameter of arbor in collars, inches	3 1/2	3 1/2	3 1/2	1	1	1 1/4	1 1/4	1 1/4
Diameter of arbor in bearings, inches	3 1/2	3 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2
Length of arbor, inches	27	30	33	36	42	48	56	56
Distance between wheels, inches	22	24	27	29	34	40	48	48
Length of bearings, inches	3	3 1/2	4 1/4	4 3/4	5 1/4	6	15	15
Height of center of arbor, on bench, inches	6	7	8	9	5 1/4	6	15	15
Height to center of arbor, on column, inches	42	42	42	42	42	42	42	42
Size of base of head, inches	4 x 8	4 1/2 x 9	6 x 10 1/2	6 3/4 x 14	8 x 16 1/2	10 x 19 1/2		
Size of base of column, inches	10 x 14	11 x 15 1/2	12 x 16	13 1/2 x 17 1/2	15 x 20	18 x 25		
Size pulley, inches	2 1/2 x 2 1/2	3 x 3	3 1/2 x 3 1/2	4 x 4	4 1/2 x 4 1/2	5 x 5	5 1/2 x 5 1/2	6 x 6
Size C. S. drive pulley, inches	12 x 2 1/2	12 x 3	12 x 3 1/2	12 x 4	14 x 4 1/2	14 x 5	16 x 5 1/2	16 x 6
Size C. S. T. & L. pulley, inches	4 x 3	6 x 3	6 x 3 1/2	6 x 4	8 x 5	8 x 5	10 x 6	10 x 6
Drop of countershaft, inches	6	6	6	8	8	8	8	8
Size of shaft, inches	24 x 1 1/2	24 x 1 1/2	26 x 1 1/2	30 x 1 1/2	40 x 1 1/2	40 x 1 1/2	40 x 1 1/2	44 x 1 1/2
Weight of head, pounds	22	33	52	75	100	150	450	500
Weight of column, pounds	65	85	90	105	145	200		
Weight of countershaft, pounds	55	60	70	85	150	160	190	200
Weight complete, pounds	142	178	217	265	395	510	640	700

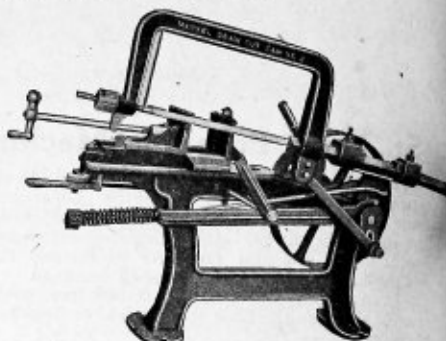
Price List

Machine	No. 1	No. 2	No. 3	No. 4
Head	\$12.00	\$14.00	\$16.00	\$20.00
Column	10.00	12.00	14.00	16.00
Countershaft	11.00	13.00	15.00	17.00
Complete	33.00	39.00	45.00	53.00
Extra T. & L. pulley on head	2.50	2.50	4.00	4.00
Extra for pull shifter	7.00	7.00	8.00	9.00
Screw taper on all sizes			2.00	
Special bearings same as on corresponding size grinder				
Machine	No. 5	No. 6	No. 7	No. 8
Head	\$25.00	\$33.00	\$100.00	\$125.00
Column	18.50	23.50		
Countershaft, plain	22.00	26.70	33.50	41.70
Countershaft, pull	30.00	36.70		
Complete, plain countershaft	65.50	83.00		
Complete, pull countershaft	73.50	92.00		
Extra T. & L. pulley on head	6.70	6.70	8.50	8.50
Screw taper	2.00	2.00	5.00	5.00

"Marvel" Draw-Cut Hack Saw Machines



No. 1 Machine



No. 2 Machine

Saws straight and fast—prevents breaking of blades and is instantly adjustable. The saving in time and blades thus effected soon repays cost of the machine

The No. 1 has a draw cut; a quick action vise that saves time; a device that raises or lowers saw and holds it at any desired angle allowing free use of both hands in measuring material. It saws close to vise, has an extension to table so material rests on both sides of saw. The wear can be taken up to any extent in the two saw bearings, which have also receptacles for oily waste. Drive shaft has bronze bearing. Starter and automatic stop are at front of machine.

The No. 2 is heavy and exceptionally rigid in construction. Feed lever at top carries tension thumb screw. The same lever raises or lowers saw and holds it in any position, a great convenience in measuring. The quick action, heavy vise swivels both ways so that material can be inserted to cut on an angle either way. The wear can be taken up to any extent in the two saw bearings, which have also receptacles for oily waste. The drive shaft has bronze bearing. Starter and automatic stop are at front of machine. Has adjustable stroke, longest 6 1/2 inches, shortest 4 inches. The entire vise can be instantly removed (leaving a T-slotted table for holding irregular shapes) and makes an excellent tool for clamping work on drill press, etc.

Number	Capacity inches	Length of Blade	Speed R. P. M.	Size of Pulley, inches	Size of Belt, inches	Shipping weight	Price
No. 1	4x4	12 in.	60 to 90	13x2 3/4	2 1/2	120	\$33.50
No. 2 with swivel vise	6x6 long stroke 8x8 short stroke	12 to 17 in.	50 to 70	17x3 1/4	3	285	70.00

No. 30 Steel Traveling Stand for Nos. 1 and 2, weight 25 lbs. Extra \$3.25.

The "Marvel" High Speed Saw No. 4.

Great cutting speed, accuracy and high grade, reliable workmanship are embodied in this machine. It cuts down the cost of cutting to such a degree that users will find it the most valuable addition to their equipment.

Repeated tests of the cutting speed under extreme feed pressure show the following results: 6-in. Round Cold Rolled Steel 10 minutes; 5-in. Round Cold Rolled Steel, 8 minutes. Smaller sizes in proportion.

The saw cuts on the **draw stroke** and lifts free of the cut on the return.

Any desired pressure on saw blade during cutting stroke may be obtained by means of graduated feed wheel on side near top of machine.

The entire blade can be used up by shifting the saw frame by means of a right and left screw on the connecting rod while running.

The saw frame always moves in a horizontal position, is actuated by a crank lever which imparts a smooth, even cutting stroke to the saw blade, and gives a quick return.

Both ends of saw frame are fitted with fastener for blade so arranged that blade can be tilted to right or left at either end.

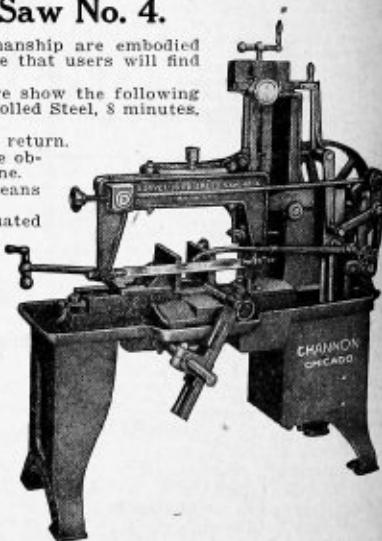
The stroke can be changed from four to six and one-half inches by means of shifting bolt in the crank.

The vise has liberal dimensions with jaws which extend out flush with saw blade. It can also be shifted forward or back and will **swivel to either right or left** for cutting on an angle.

Machine stops automatically when piece is cut off and can also be set to stop at any desired depth in the cut.

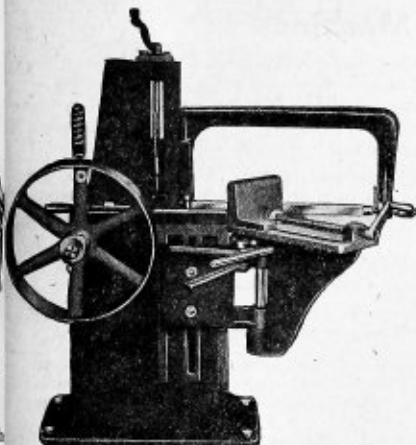
This machine is provided with reliable plunger pump with ball valves and overflow tank which gives a steady stream of compound on the saw blade. It can also be shifted forward or back and will swivel to either right or left for cutting on an angle. Pump and all connections may be removed in five minutes by removal of the two cap screws in outer wall of large tank.

Capacity 6 in. by 6 in. Takes 3-inch belt. Speed, 135 R. P. M. for varied carbon steel (using short stroke on high carbon), 145 R. P. M. when all cutting is low carbon. Size of Pulley, 16x3 1/4 inches. Net weight, 475 lbs. Weight, crated, 540 lbs. Price \$260.00.



"Q and C" Shop Saws

The machines are started by a clutch on the driving shaft, thus rendering a counter-shaft unnecessary. A handle can be attached to the pulleys so that it may be run by hand, if desired. It is provided with double saw guides, and will cut perfectly square if properly handled. All rods, guides and shafts are steel, and the machine is well and substantially built.



No. 4, Swivel-Vise and Power Feed



No. 3, Gravity Feed

On Numbers 1 and 3 the ratchet feed has been eliminated and the saws are now furnished with gravity feed only—as better and more accurate cutting can be done with the gravity feed alone.

Number	Cutting Capacity Inches	Size of Saw Blade Inches	Stroke of Blade Inches	Size of Pulleys Inches	Speed R. P. M.	Floor Space Inches	Shipping Weight Lbs.	Price including six blades
No. 1.....	4x4	12x $\frac{1}{2}$	6	14x2 $\frac{1}{2}$	50	18x30	160	\$ 37.00
No. 2—Swivel Vise.....	5x6	14x $\frac{3}{4}$	6	14x2 $\frac{1}{2}$	50	18x30	225	52.00
No. 4—Swivel Vise.....	7x8	17x1	6	14x3	50	12x32	335	105.00

"Kwik-Kut" Power Hack Saw Machines

Patented construction—utilizing practically full length of blade at each stroke. Length of stroke is automatically regulated by the size of the stock held in the vise.

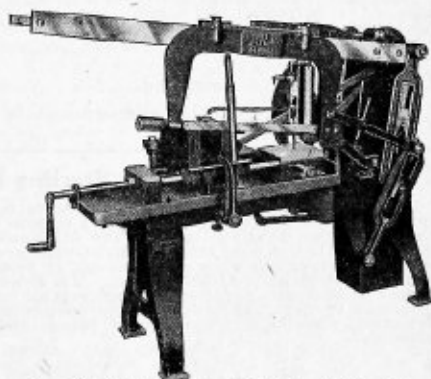
Using the full cutting length of the blade at each stroke, instead of 6 inches or less, effects a great saving in blades, which is further increased by employing a simple device by which the blade is slightly raised on the return stroke.

The No. 7 machine has lubricating system to avoid burning the blade—consisting of pump, tank, piping and catch basin to avoid loss of cutting compound.

No. 7 has two speed cone pulleys for a minimum of 50 strokes per minute for cutting hard tool steel and for a high speed of 80 strokes for large sizes of iron and soft steel. Solid vise is furnished unless otherwise specified, though a swivel vise may be had at the same price.

Driving mechanism—a beveled rim friction wheel fastened to the shaft so that when the rod is pulled to start machine it forces the pulley against this wheel, furnishing a durable and reliable driving power.

The No. 14 machine embodies the features of the No. 7 except that it is a dry-cutting machine and is not furnished with lubricating system. No. 12 is also a dry-cut machine, similar to No. 14, except that it does not have the patented saw guide.



No. 7. The Popular High Speed Machine

Number	Capacity on Straight Cut Inches	Capacity at 45 Degrees Inches	Length of Blade Inches	Strokes per Minute	Size of Pulley Inches	Height Floor to Vise Inches	Floor Space Inches	Approx. Shipping Weight	Price Each
7	See Note below	See Note below	18	80 or 50	18 or 20x3	23	18x40	600 lbs.	\$170.00
12	6x6	See Note below	14	50	16x3	22	17x37	400 lbs.	100.00
14	4x4	4x2 $\frac{1}{2}$	12	70	16x3	23	13x36	280 lbs.	70.00

Capacity of solid vise for No. 7 is 8" for round stock and 7"x8" for square edge stock and the swivel vise with guide capacity is 7"x7" straight or 4 $\frac{1}{2}$ "x8" at 45° or takes 8" round by removing guide, changing jaws and shortening reach rod. Capacity of No. 14 is swivel vise at 90° 5"x6", at 45° is 3 $\frac{1}{2}$ "x6". For ordinary cutting use 18x1-16 Ga. blades, 10 teeth per inch, for pipe and tubing use 12 teeth per inch.

If you cannot find exactly what you require in this Catalog, write us.

Sterling Power Hack-Saw Machines

Nos. 1A and 2A



Machine No. 1A

Length of blades, 10 inches to 12 inches. Stroke 6 inches. Cutting capacity, 5 by 5 inches. Tight and loose pulleys, 10 inches in diameter, 1 1/4-inch face. Geared 3 to 1. Swivel vise adjustable to 45 degrees angle. Vise jaws, 2 3/4 inches high, 4 1/2 inches wide, 6-inch opening. Floor space, 17 by 30 inches. Net weight, 150 pounds. Crated 200 pounds. Knocked down and boxed, 250 pounds.

Half-dozen 12-inch by 5/8-inch blades free with each machine.

Price Machine No. 1A, complete.....\$60.00

Machine No. 1, as above, but without automatic lift.

Price.....\$50.00

Machine No. 2A

Length of blade, 12 by 14 inches. Stroke, 6 inches. Cutting capacity, 5 by 5 inches. Tight and loose pulleys, 10 inches diameter, 2 1/4-inch face. Geared 3 to 1. Swivel vise adjustable to 45 degrees angle. Vise jaws, 3 1/2 inches high, 4 1/2 inches wide, 6 1/2-inch opening. Floor space, 17 by 30 inches. Net weight, 155 pounds. Crated, 200 pounds. Knocked down and boxed, 250 pounds.

Half-dozen 14-inch by 3/4-inch blades free with each machine. Fourteen-inch blades measure 13 1/2 inches between center of holes.

Price Machine No. 2A, complete.....\$63.00

Machine No. 2, as above, but without automatic lift.

Price.....\$57.00

Sterling High Speed Machines

The Sterling High-Speed Machine can safely be run at 100 strokes per minute with lubricant, or at an even higher speed if necessary. Front cabinet leg is a tank to which pump can be attached for supplying lubricant to keep blade cool when running at high speed. The adjustable frame permits of using any length of blade from 17 to 21 inches, inclusive. The gears are milled, being of wide face and strong to stand hard wear. The bearings are large and heavy, specially made to stand the strain entailed by running at high speed. Gear bearings are adjustable so that when parts wear the lost motion can be taken up. Has swivel vise cutting any length to 45 degrees angle, also gravity feed and automatic shut-off. Automatic lift which is an important feature lifts blade on return stroke. Cam is constructed so that blade of saw is gradually placed in contact with work on cutting stroke, minimizing breakage of blades and also increasing efficiency.

Machine No. 3A

Length of blades, 17 to 21 inches. Stroke, 6 inches. Cutting capacity, 8 by 12 inches. Tight and loose pulleys, 10-inch diameter, 2 1/4-inch face. Geared 2 1/2 to 1. Swivel vise adjustable to 45 degrees angle. Vise jaws, 4 3/4 inches high, 5 1/4 inches wide, 12-inch opening. Bed of machine, 2 feet from floor. Floor space, 18 by 44 inches. Weights, net 520 lbs.; crated, 600 lbs.; knocked down and boxed, 750 lbs.

One-third dozen 17-inch blades free with each machine. 17-inch blade measures 16 1/2 inches between center of holes.

Price Machine No. 3A, complete.....\$195.00

Machine No. 3, without automatic lift. Price.....175.00

Duplicate parts should be ordered from number on casting.

Sterling High-Speed Machines, if desired, may be equipped with electric motors, either direct or alternating current.



No better hack-saw blades are made than "Sterling." That is why we sell them.

"Racine" High Speed Metal Cutting Machines



Fig. G. No. 1 Machine. Capacity 6x6 Inches

The Racine is the original, automatic, positive lift machine with the draw cut. This is accomplished by using a patented, return stroke, automatic lifting device (no dragging back) and thereby increasing the output and endurance of the blade.

Machine cuts rapidly, truly and economically. The No. 1 will cut a 6-inch bar of machinery steel in 28 minutes.

Blade holders are made from flat bar fitted into a milled slot which holds the blade square with the work, and the blade tightener enables the operator to give the blade sufficient tension without the use of a wrench.

The saw frame holds itself automatically at any height and is adjustable to take up wear.

Machine stops automatically when through cut. Depth and length gauge and geared circulating pump furnished. Pump applies a cooling compound on the blade.

Size No.	Description	Capacity, Inches	Standard Machine		With 3-speed Attach.		With Electric Motor	
			Weight, Pounds	Price	Weight, Pounds	Price	Weight, Pounds	Price
1	Regular High Speed	6x 6	400	\$ 93.75	500	\$137.50	550	\$181.25
10	Regular High Speed	8x 8	550	137.50	650	187.50	700	237.50
7	Heavy Duty	12x12	800	218.75	900	281.25	950	325.00
9	Heavy Duty	12x15	850	250.00	950	312.50	1000	356.25

Price with motor does not include single phase A. C. current. Machines can be furnished with both 3 speed attachment and motor drive at extra cost. Three speed transmission (three machines in one), enables you to cut annealed high speed steel, unannealed tool steel and all mild or soft steel at the proper speed.

Clem Tilting Metal Band Saw

Economical. Rapid. Accurate.

Simple in Adjustments. Easy to Operate.

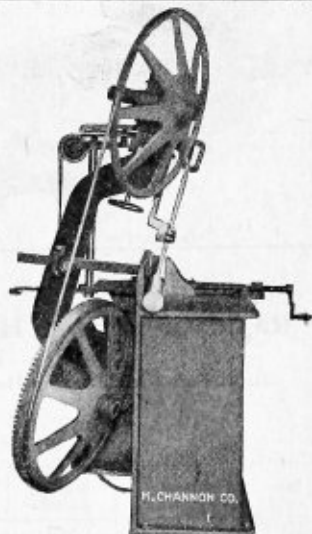
The thin blade removes only $\frac{1}{8}$ -inch of metal, and while the points of carbon affects its speed it cuts an average of 1 inch of area per minute.

It consumes from $\frac{1}{4}$ to $\frac{1}{2}$ horse power. Size of table 45x17 inches.

It will cut up to 12-inch round and will cut squares, flats, pipes, tubing, angles, beams, rails, etc., to any mitre or angle. It will split collars, bushings, bearings, etc., and will give perfect satisfaction. No cutting fluids—no special operator.

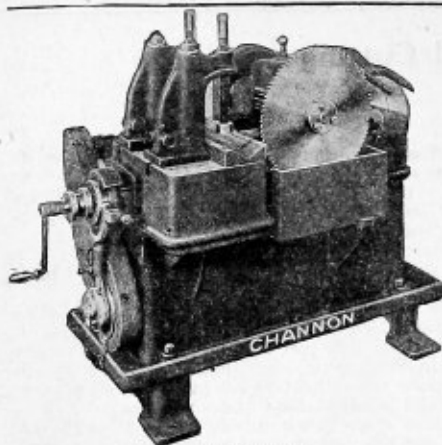
Easy adjustments for raising and lowering head, tightening bands and controlling tilting head. Balance weights adjust themselves to the carbon of steel and condition of saw band.

The operation is simple. Clamp steel up against the back plate—start the machine—pull the head forward until the band rests against the steel and the saw does the rest.



Price of saw for belt drive as shown on left, including 6 bands of any tooth desired, crated for shipment. \$225.00

Price of saw with motor attached, starter and six bands, crated for shipment. \$300.00



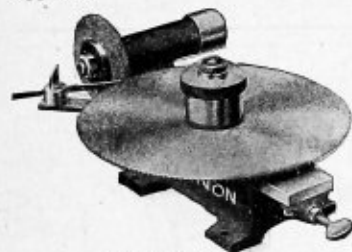
No. 2 Cold Saw

The No. 2 Cold Saw. The saw is 14 inches in diameter and will cut stock 5 inches round, 4 inches square, and flats up to 3x8 inches.

The feed is positive through a screw operated by a ratchet and double pawls one or both of which are used. The travel of the pawls is easily regulated and the feed is readily engaged or disengaged.

The No. 3 Cold Saw. The saw is 16 inches in diameter and cuts up to 6 inches round, 5½ inches square and 4x10-inch flats. The feed is of the friction type, simple and effective, giving a complete range by simply changing the position of friction roller.

A grinding device as shown below is furnished with each machine. This is designed to operate on a bench and is provided with adjustable in and out stop and adjustable tooth gauge. It will both gum and back off the teeth, two emery wheels being supplied.



Grinding Device

Metal Cold Saws

These are high class tools, strong, serviceable and efficient. The saw blades have constant relief from rim to center and may be ground as much as is profitable.

The saw arbors are driven by a shaft parallel to the bed. Through a steel worm, having a ball thrust bearing, a worm gear with bronze rim, and machinery steel spur gears, forming a powerful and substantial mechanism.

The No. 1 Cold Saw has a saw 10 inches diameter and will cut stock of any shape up to 3½ inches round. The feed is by gravity, the carriage being advanced by chain running over a sheave and connected to the lever, which has an adjustable weight which is moved out as the saw becomes dull, or to adapt the feed to different stock. This gravity feed is safer and better than a friction feed, in every way.



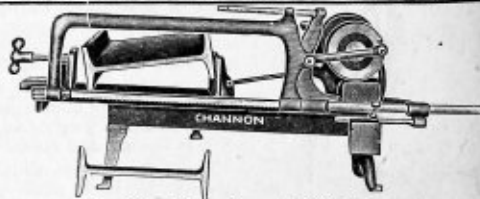
No. 1 Cold Saw

Specifications and Prices

Machine number.....	1	2	3
Capacity rounds, inches.....	3½	5	5
Capacity squares, inches.....	3	4	5
Saw diameter, inches.....	10	14	16
Saw thickness, inch.....	⅜	⅝	⅞
Feed.....	Gravity	Positive	Friction
Automatic Trip.....	Yes	Yes	Yes
Weight, belt drive, pounds.....	500	1100	2000
Weight, arranged for motor, pounds.....	575	1225	2250
Weight, motor driven, pounds.....	670	1450	2400
Price, belt driven.....	\$100.00	\$247.00	\$300.00
Price, arranged for motor.....	127.00	294.00	360.00
Price, motor driven.....	187.00	414.00	348.00

Rapid Cut Power Hack Saws

Built Low for Handling Heavy Beams

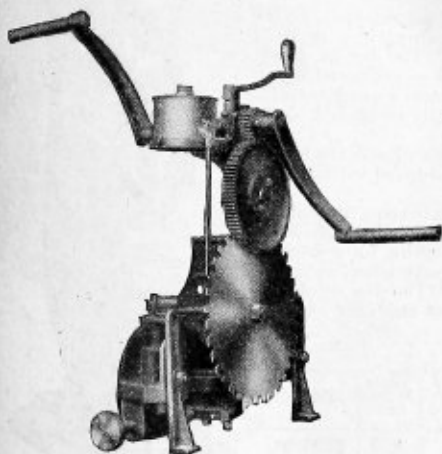


No. 4 Hack Saw, Capacity 8x15 inches

No.	Capacity, Inches	Weight, Pounds	Pulley, Inches	Floor Space, Inches	Pulley Speed	List Price	Blades, Inches	List per Dozen
4	8x15	260	2½x13½	18x55	150	\$ 50.00	24	\$4.50
5	10x15	275	2½x13½	18x60	150	60.00	24	4.50
6	12x17	600	2½x13½	18x68	150	140.00	24	4.50
7	18x17	575	2½x13½	20x70	150	150.00	24	4.50
8	Rail saw 10x6	250	Motor driven	Complete	with Motor	190.00	16	3.00
9	18x30	625	2½x13½	20x88	150	170.00	36	12.00

We can apply Motors to all Saws.

No. 7 "Q and C" Portable Rail Saw



Designed for cutting off rails at any angle with their length. The saw blade commences cutting in the center of the head of the rail, and will make a true vertical cut at whatever angle desired, leaving the ends of the rail perfectly smooth and straight.

This saw has sufficient capacity for cutting all steam rails up to 135 pounds per yard and will cut all rails up to a 7-inch girder rail in track, and higher rails out of track, by reversing rail after half of cut is made.

The reducing gear is arranged on the slide supporting the saw blade and a simple form of automatic feed lowers the saw at the proper speed for cutting the head or base of the rail. This is accomplished by means of a friction nut, located on the feed screw, which can be quickly released to feed the saw by hand through the web of the rail, or in the return of the slide, by means of the feed screw crank.

A pawl prevents the saw blade from being turned backwards, which must never be done while cutting.

The saw blade is 18 inches in diameter, $\frac{3}{8}$ -inch thick. Maximum depth of cut is $7\frac{3}{4}$ inches.

Special high speed steel blades furnished at extra charge.

Dimensions, 19x30x32 inches. Gross weight, 375 pounds. Net weight, 300 pounds. Price.....\$250.00

Price includes two saw blades and necessary wrenches.

Saw grinder—for sharpening the blades—can be attached to a bench in the shop and belted to run about 1200 R. P. M. Price of grinder.....\$30.00

Cold Metal Sawing Machine

Style No. 1 M

A Small but Powerful Saw With Large Capacity

The saw blade is driven from the periphery, steel rollers being used. These rollers are hardened and ground and journaled in removable steel bushings which are held securely in the double driving gear. These rollers greatly reduce friction on the drive. With the periphery drive a larger diameter of blade is available for cutting than can be obtained by an arbor driven blade.

Front table is of sufficient size to enable beams and channels to be properly supported while being cut off at any angle up to 45 degrees.

Feed is of the variable friction type, adjustable while the machine is in operation from $\frac{3}{8}$ to 1 inch per minute, is powerful and continuous in its action throughout its entire range.

The friction wheel shaft is provided with a patent ball thrust bearing and carries a hardened feed worm meshing in a bronze worm gear threaded to receive the feed screw which advances the carriage while cutting.

Each machine is furnished complete with two 18-inch diameter saw blades, stop gauges to cut duplicate parts, V block to center rounds, clamp bracket for holding the work and necessary wrenches.

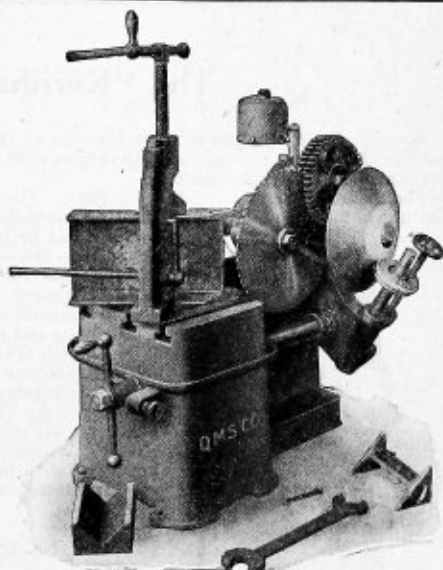


Fig. C Sawing I Beam at 45° Angle

Machine Specifications

Diameter of saw blade, inches.....	18	Diameter of driving pulley, inches.....	16
Thickness of saw blade, inches.....	$\frac{3}{8}$	Width of driving belt, inches.....	31½
Travel of saw blade carriage, inches.....	10	R. P. M. of main driving shaft.....	130
Speed per minute of blade, feet.....	35	Length of front table, inches.....	14
Cutting feed per minute, inches.....	$\frac{3}{8}$ to 1	Width of front table, inches.....	18
Maximum depth of cut, inches.....	6¼	Width overall, machine complete, inches.....	33½
Capacity rounds, inches.....	6	Length overall, machine complete, inches.....	60½
Capacity squares, inches.....	6	Height overall, machine complete, inches.....	50½
Capacity I beams, inches.....	10	Weight on skids, approximately, pounds.....	1500
Height from table to saw axis, inches.....	5	List price.....	\$343.75

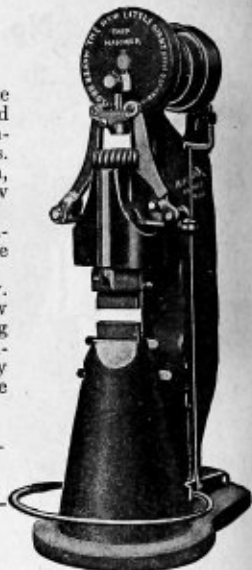
Little Giant Power Hammers

The main frame is one solid casting facilitating and simplifying erection. The ram or striking head is a steel casting with machined bearings and runs in a pressed steel channel which is provided with means for taking up wear. The dies are tempered tool steel placed in machined seats and held in position by dowel pins and keys.

The crank plate and connection between ram and crank pin, form a combination, giving to the ram a balanced reciprocating motion and a perfectly cushioned blow at both upper and lower extremities of the stroke.

Hammer has adjusting knuckle, the raising or lowering of which adjusts the hammer for work on large or small material. Crank box is brass and fitted with grease cup. Babbitted shaft boxes are long with take-up for wear.

The friction spider is keyed to shaft and has a long hub forming bearing for pulley. The pulley has compression grease cup lubricating the pulley through the hollow shaft. The friction is operated by a foot treadle provided with spring for releasing the friction automatically. The friction device disposes of the countershaft as hammer can be belted direct to line shaft and run in either direction. The dies regularly furnished are adapted for general blacksmithing. Special dies of any kind can be supplied.



Weight of Ram	Will Forge Stock up to		Size of Dies		Size of Pulley	Rev. per Min.	Est'd H. P. Req'd	Apprx. Weight, Lbs.	Price
	Square	Round	Upper	Lower					
25	1½	2	3 x 1½	3 x 2	10x3½	400	1	800	\$200.00
50	2	2½	3½x1½	3½x2½	12x4	350	2	1600	300.00
100	3	4	6 x 3	6 x 3	14x5	300	3	3300	600.00
250	5½	7	8 x 3½	8 x 3½	18x8	200	4	5000	1200.00

The "Kerrihard" Power Hammer

The Kerrihard hammer is a combination of the helve and direct acting hammer, doing away with the disc helve and pitman and condensing the entire working parts in such a way as to increase the efficiency of both the helve and direct acting features.

The main frame and anvil is in one piece. The entire casting is strong and heavily proportioned with the right amount of metal in the proper place to withstand the jar and shock of continual hammering.

The head or ram is machined and gibbed to a machined casting, securely fastened to the main frame, thus making provisions for taking up all wear and is adjustable from 3½ to 9 inches and is so arranged that it is always the right distance from the anvil block.

The eccentric strap is the best bronze.

All shafts and pins subject to wear are hammered steel.

The clutch is the friction type of new design. It has but three parts and the slightest pressure upon the tread produces the required blow at the operator's will. It releases automatically.

The spring. There is but one spring in the Kerrihard hammer and that is the finest crucible steel.

Dies. We furnish with each machine one set of regular dies (lower die is flat; upper one slightly rounding on face), which answer for all ordinary work, but we can furnish any style die at slight additional cost.



No. 1 Hammer

Height over all, inches	55
Floor space, inches	18x30
Height of anvil block, inches	31
Weight of ram, pounds	30
Shipping weight of hammer, pounds	700
Size of pulley, inches	11
Speed, R. P. M.	250
Will handle about 2-inch material, round or square.	
One horse power to operate.	
Price	\$140.00

No. 2 Hammer

Height over all, inches	60
Floor space, inches	22½x40
Height of anvil block, inches	31
Weight of ram, pounds	75
Shipping weight of hammer, pounds	1250
Size of pulley, inches	11
Speed, R. P. M.	250
Will handle about 4-inch material, round or square.	
Two horse power to operate.	
Price	\$260.00

Rochester Helve Hammer



Size "D"

The hickory helve, combined with the cushion spring, gives a springy forging blow.

The hammer is equipped with a shifting device, operated by a handle at the side of the anvil, by which the stroke can be instantly changed from a long, slow stroke to a short, rapid one while the hammer is running; this gives complete control of the hammer so that work of various kinds can be handled on the same machine.

The speed and weight of blow is controlled by the foot-treadle and the old reliable idler pulley.

Specification and Prices

Size	Weight of Head, Pounds	Will Handle Metal Size up to	Average No. of Blows per Minute	Height Anvil, Inches	Height Over All, Inches	H. P. Required	Floor Space, Inches	Driving Pulley, Inches	Shipping Weight, Pounds	Price, Inc. 1 Set of Drawing Dies	Price Extra Set Welding Dies
A	25	2 x2	400	28	44	1 to 2	16x60	13½x4	1250	\$200.00	\$10.00
B	35	2½x2½	400	28	44	2 to 2½	16x60	13½x4	1500	250.00	10.00
C	50	3 x3	350	28	52	2½ to 3	20x66	15 x5	2550	500.00	12.00
D	60	3½x3½	300	30	54	3½ to 4	24x75	16 x6	3300	600.00	15.00
E	80	4 x4	275	30	54	4½ to 5	24x75	16 x6	3700	700.00	15.00
F	100	4½x4½	250	30	54	5½ to 6	24x75	16 x6	4200	850.00	16.00

"Boss" Improved Power Hammer

One H. P. Required

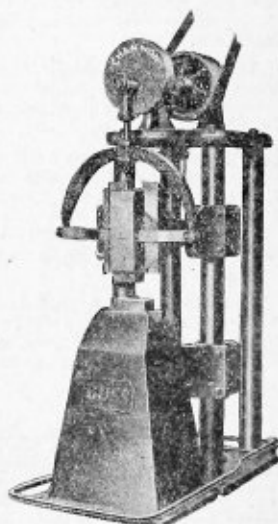
A useful machine in general repair and blacksmith shops, wagon and buggy factories, mines, shovel factories, etc.

A piece of 1½-inch square iron 6 inches long has been drawn out to 2½ feet with this hammer in one heat. It has welded iron 2 inches thick and as thin as ¼-inch.

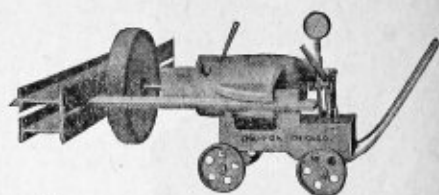
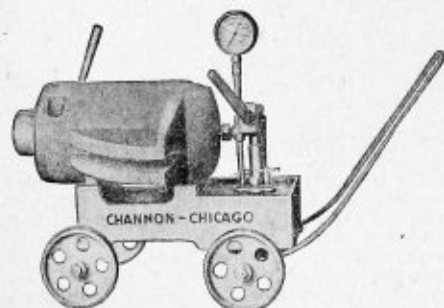
Only the best steel is used for hammer dies, and they are carefully fitted so as to be held firmly in place by means of hand-finished keys and dowel pins. The dies of the No. 2 hammer will work to the center of a 24-inch circle and will accommodate material 4 inches thick. Size of No. 2 upper die 2x4, lower die 2x5¼.

These hammers are equipped with the latest friction disc drive which releases instantly.

Specifications	No. 1	No. 2	No. 3	No. 275
Weight of head, pounds	25	50	50	75
Height of machine	5 ft. 1 in.	5 ft. 8 in.	5 ft. 8 in.	5 ft. 8 in.
Height of anvil, inches	31	31	31	31
Requires floor space, inches	18x36	26x45	26x48	26x45
Diameter and face of pulley, inches	8x3¼	11x5	11x5	11x5
Individual electric motor recommended, H. P.	1	1½		2
Net weight, pounds	700	1250	1350	1400
Maximum speed, R. P. M.	400	350	350	325
Occupies cubic feet	35	43	48	43
List price	\$170.00	\$250.00	\$370.00	\$300.00



Portable Hydraulic Presses—No. 292



Showing Press, Pump, Oil Tank, Cylinder and Gauge complete in operation with Beams and Side Bars, for pressing on or off Cranks, Car Wheels, Couplings, etc.

This is a standard portable hydraulic wheel press such as is used in car shops, mine shops, etc., for pressing wheels on and off axles, etc.

The 100-ton No. 292 is the favorite size and is usually carried in Chicago stock.

Sizes and Prices

Press No.	Capacity, Tons	Stroke of Ram, Inches	Distances between Bars		Pump		Price, Press Without Motor	Price, Heads and Bars
			Minimum Inches	Maximum Inches	No.	Driven by		
292	100	12	23	39	61	Power	\$320.00	\$ 79.00
292	100	18	23	39	61	Power	340.00	79.00
292	150	12	23	41½	61	Power	370.00	110.00
292	150	12	23	62	61	Power	400.00	134.00
292	250	18	27½	56	268	Power	268.00	207.00

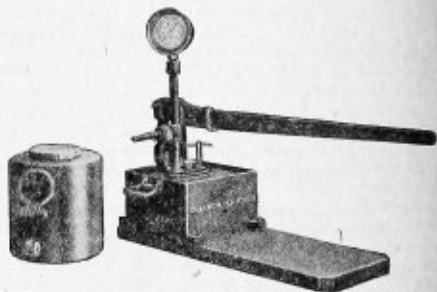
Hydraulic Press Jack and Independent Pump

This is the latest improved type of portable hydraulic press and jack combined. Pump can be set some distance from the work to make operator less liable to injury from falling parts, etc.

The cylinder is of steel. The pump is of bronze with a hand lever for operating, and is set on a cast iron bed which also serves as an oil or water tank, all self-contained and mounted on a plank.

The press and pump itself with resistance head and bars consists of the cylinder and ram complete, pump, hydraulic gauge with XX pipe and fitting for connecting same. The 10 and 20-ton jacks are furnished with 6-foot lengths of flexible tubing. If flexible tubing is desired on larger jacks, instead of XX pipe, an additional charge will be made according to length.

The four I beams, unless otherwise ordered, are each 40 inches long, with distance pieces between to allow the side bars to pass through. The side bars are long enough to make 8 feet 6 inches in the clear between the I beams, and are fitted with a nut on each end and a washer for the nut and I beams to bear against. Handles furnished on jacks 100-ton or over.

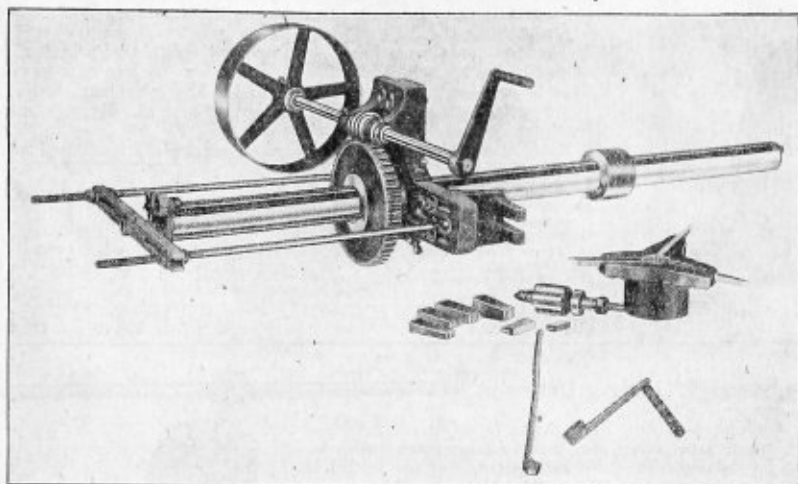


No. 371 Outfit Knocked Down

Sizes and Prices

Press No.	Capacity, Tons	Stroke of Ram, Inches	Distance between Bars		Pump		Price, Press Without Motor	Price, Heads and Bars
			Minimum Inches	Maximum Inches	No.	Driven by		
371	10	10	3	.....	61	Hand	\$105.00	\$140.00
371	20	6	3½	.....	61	Hand	115.00	154.00
371	100	8	23	40	61	Hand	187.00	57.00

Portable Cylinder Boring Bar



This bar is designed for reboring all sizes of engine cylinders, pumps, air compressors, Corliss valve seats, cranks, large wheels and hammer cylinders in place or in a lathe, and it is built to do hard work.

One end of the bar is held in place by a stationary center, and the other end is held in place by an adjustable center fitted in the stuffing box, which is made in two sizes to fit stuffing boxes from $3\frac{1}{2}$ to $5\frac{1}{2}$ inches, or $5\frac{1}{2}$ to $7\frac{3}{4}$ inches. The centers are hardened and will keep true.

The bar can be turned by hand, by a belt from a motor or small engine, and used in a horizontal, vertical or inclined position.

The tool holder or cutter head is made for three tools, and is fed by a steel screw, which is set in the bar with a bronze bearing. It has a star feed which can be regulated according to requirements for rough or finished cuts.

We furnish with this bar sufficient tools for ordinary requirements, including a wrench for driving the tool holder or cutter head back.

With inquiry please give the largest and smallest diameter and extreme length you wish to bore.

Sizes other than those listed built to suit requirements.

Specifications and Prices

Bar Number	Size Bar Feet by Inches	Size Cylinder, Inches	Stroke, Feet	Extra Number Heads	Tools	Weight, Pounds	List Price
679	$2\frac{1}{2} \times 5$	4 to 10	$2\frac{1}{2}$	1	4	800	\$473.00
400	$3\frac{1}{2} \times 5$	7 to 18	3	1	3	825	493.00
375	4 x 5	8 to 24	3	2	3	845	500.00
375	4 x 6	8 to 24	3	2	3	925	513.00
375	4 x 7	8 to 24	4	2	3	1000	527.00
375	4 x 8	8 to 24	5	2	3	1075	547.00
348	5 x 6	9 to 40	4	3	4	1125	640.00
348	5 x 8	9 to 40	5	3	4	1175	667.00
418	6 x 6	10 to 50	4	4	4	1175	767.00
418	6 x 8	10 to 50	5	4	4	1350	793.00
218	Adjustable Center $3\frac{1}{2}$ to $5\frac{1}{2}$ inches; $5\frac{1}{2}$ to $7\frac{3}{4}$ inches.						103.00

Portable Valve Seat Boring Bars

For reboring valve seats, cranks, pulleys, fly wheels, etc., on grounds. It is bolted to either end of the piece to be bored and is turned by hand.

Specifications and Prices

No. 187A. $2\frac{1}{2}$ -inch by $7\frac{1}{2}$ feet. Length of feed screw, 30 inches. Approximate weight, 275 pounds. Price.....\$120.00

No. 187B. $1\frac{1}{2}$ inches by 5 feet. Length of feed screw, 24 inches. Approximate weight, 115 pounds. Price.....\$100.00



Channon Arbor Presses

Strong, durable and portable machines—indispensable to machine shops for forcing arbors in or out of work, pressing bushings in or out, small broaching, punching, etc.

They not only save labor, but prevent splitting, springing and battering of finished work which usually results from the use of a hammer or sledge. May be used on the bench or on the bed of any lathe from 12 to 18-inch swing. Body castings are box type design, strong and heavily reinforced to prevent fracture.

Rack and pinion of machinery steel, accurately machined and tested.

Size, number	2	3	3A
Maximum diameter of work, inches	8	12	24
Largest opening in plate for arbor, inches	1	1½	1½
Height of body casting, inches	15	20	23
Height over plate, inches	7	10½	10½
Length of lever, inches	18	23½	23½
Leverage	35 to 1	45 to 1	45 to 1
Length of rack, inches	10	14	14
Diameter of rack, inches	1½	1½	1½
Net weight, pounds	65	120	225
Price	\$30.00	\$36.00	\$66.00

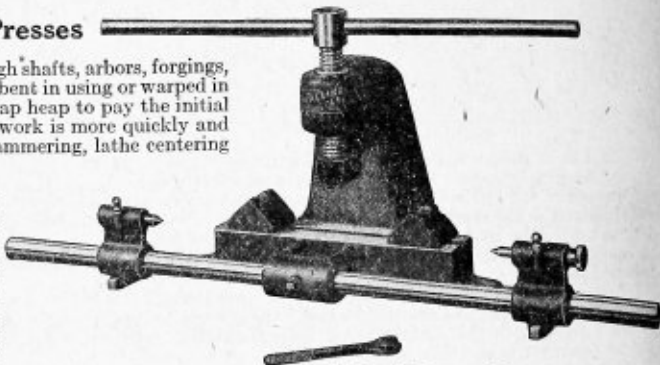


No. 2 Press

Channon Straightening Presses

For general machine shop use. Enough shafts, arbors, forgings, drills, reamers, spindles, broaches, etc., bent in using or warped in hardening may be rescued from the scrap heap to pay the initial cost of a press many times over. The work is more quickly and accurately done than the old way of hammering, lathe centering and testing.

Body castings are heavily reinforced to resist all working strains and to insure absolute rigidity. Beds are planed true, with groove in which adjustable V blocks are easily movable to accommodate work of various lengths. The center brackets, sliding on grooved shafts, are also adjustable and always in perfect alignment. Thrust block on screw is of machinery steel, case-hardened and adjustable centers are of tool steel, hardened.



No. 1—Bench Press and Centers

No. 4 is of different construction and mounted on wheels.

Size number	1	2	3	3-A	4
Capacity—will bend or straighten up to diam., ins.	2	2½	2½	3	4
Height of body casting, inches	13	16	23½	24	33
Length of bed, inches	15	20	34	34	48
Greatest distance between centers, inches	33	40	53	53	—
Centering shaft, diameter and length, inches	1½x40	1½x49	1½x64	1½x64	—
Lever, diameter and length, inches	¾x28	1x34½	1x36	1x36	1½x48
Screw, diameter and pitch, inches	1½x4	1½x4	2x4	2x4	3½x5
Net weight, pounds	135	265	500	725	900
Price each	\$90.00	\$120.00	\$200.00	\$360.00	\$420.00

No. 3 will straighten crank shafts not over 52 inches long that will swing within a 10-inch circle.

No. 4 has square head plate supported on four studs 7 inches apart; travel of screw, 7 inches.

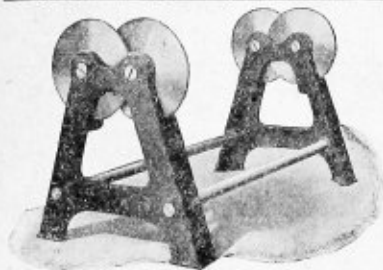
"20th Century" Balancing Tools

Always Level—Ball Bearings

For balancing pulleys, cones, armatures, fly-wheels, polishing wheels, etc. No leveling or adjusting necessary. Always ready for use, no matter where or how you place them.

No. 1 is bench size, others are floor type.

No.	Capacity, Pounds	Swing, Inches	Greatest Distance Between Standards, Inches	Weight, Pounds	Price
1	800	22	20	30	\$40.00
2	800	46	80	80	\$6.00
2-A	2000	46	30	90	\$6.00
3	5000	72	72	350	\$190.00
4	10000	96	96	785	\$250.00



No. 1—Bench Size

Garage Equipment Weaver 20 Ton Garage Press

One of the necessary labor-saving machines for the modern repair shop. Used for straightening shafts or axles; pressing bearings or hubs in or out of wheels; forcing gears or bushings on or off and for many other operations crudely performed by improvised means.

This press is designed especially for garage and repair shop service and is strongly and compactly built. The unusual width will permit the largest automobile wheel to be inserted intact, while the great depth adjustment provides for extremely large work—crank shafts and similar bulky pieces can be easily handled by reason of the divided bolster. Press may also be operated in a horizontal position by laying it over on the side.

Leverage.—The 15-inch hand wheel will supply sufficient leverage for light work—the maximum pressure of 20 tons is secured by means of ratchet lever shown.

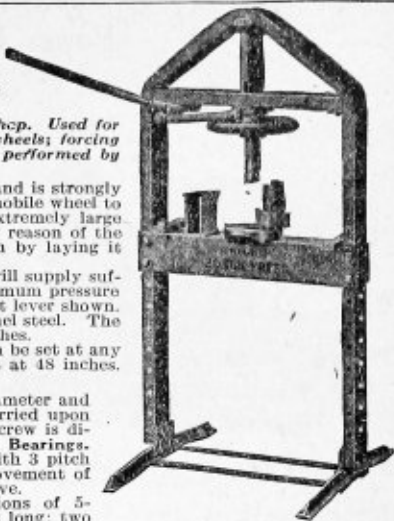
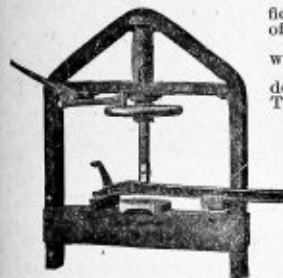
The frame is one piece of heavy channel steel. The width between frame uprights is 32 inches.

The bolster which carries the plate can be set at any desired height with extreme adjustment at 48 inches. The bolster or cross piece is divided.

The hand wheel is 15 inches in diameter and the weight of wheel and screw is carried upon ball bearings. The thrust of the screw is directed against heavy Bronze Thrust Bearings. The screw is 2 inches in diameter with 3 pitch Acme thread and has a range of movement of 12 inches. The screw does not revolve.

Equipment Supplied.—Two sections of 5-inch channel iron blocking, 8 inches long; two extension arms to attach to either end of bolster; also vise block equipment. Floor space 36 x 36 inches. Weight crated 450 pounds.

Price each.....\$60.00



The Auto Twin-Jacks

A Combination Lifting Jack, Turntable and Transporting Truck

These jacks are generally conceded to be essential to the economical operation of public garages, salesrooms, repair shops or storage rooms.

A few turns of the crank handle raises one entire end of the car and supports it firmly and securely upon the large ball and roller bearing casters. With one of these jacks under each axle, a car can be turned completely around within its own length, pushed sideways or manipulated upon the floor in any desired manner. One man can easily handle the heaviest pleasure car. Invaluable for placing cars in close formation in the garage, storage or showroom—will economize time as well as floor space. Used largely for unloading cars from freight cars.

The Extra Heavy Type was put on the market to handle light trucks or extremely heavy pleasure cars—the caster yokes on this type are heavy cast steel—each wheel revolves upon two sets of steel balls. The wheels are 7-inch diameter, with roller bearing hubs as shown.

No. and Style.....	No. 20 Reg. Jack	No. 36 Ex. Heavy
Lifting capacity, pounds.....	4,000	8,000
Diam of Wheels, inches.....	4½	7
Weight each, pounds.....	60	110
Price of two (one for each axle).....	\$20.00	\$36.00
Single jacks, price each.....	12.00	20.00

Showing Extra Heavy Type, Capacity 8,000 lbs.

The Auto Ambulance For Disabled Cars

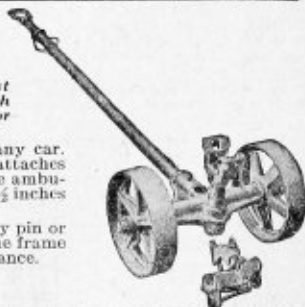
This is the only practical "towing device" that we know of—the wheels are cast steel and have three-inch tires—the axle revolves upon roller bearings and is 1½-inch diameter. Axle extends entirely through the frame, giving abundant strength for the heaviest cars.

This device can be quickly and securely clamped to either front or rear axle of any car. Where either one or both of the front wheels of the car are disabled, the ambulance attaches to the center of the front axle—the crippled car is then towed by the tongue of the ambulance which is telescopic and made of double strength steel tubing, adjusting every 2½ inches from 6½ to 12 feet, with a secure pin adjustment.

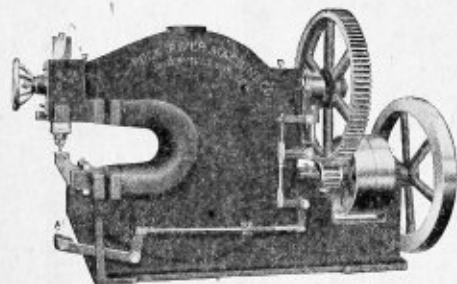
Height of the standard may be varied as conditions demand, by means of a heavy pin or key which rests upon the top of the frame socket. Two sockets are provided in the frame to permit the standard being set either in front of or behind the axle of the ambulance.

Shipping Weight, 140 lbs.

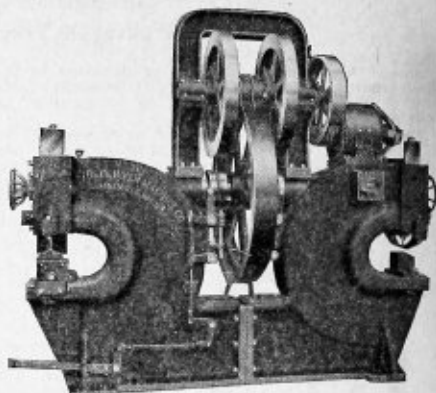
Price, Complete, \$30.00



Power Punches and Shears



Style G, Single, Belted, with 24-inch Throat and Architectural Jaws



Style F, Double, with 20-Inch Throat, Motor Driven, with Gear Guards

These machines are well designed, strong and substantial. Any style of attachment for working structural steel shapes can be supplied promptly. We can also supply deeper throat machines than listed below.

The movement of the ram is of the cam pintle type, in which there is very little wear, and the gib, which is adjustable for taking up the wear, is of phosphor bronze.

Shaft is a special forging. The gears are cast from cut gear patterns to insure smooth running. Cut gears may be had at extra price. The automatic stop is simple and positive. The jaws of the clutch are lined with tool steel. Wear on the jaw does not injure main part of clutch or gear. Strippers and hold downs are all adjustable. Attachments for architectural jaws are cast steel.

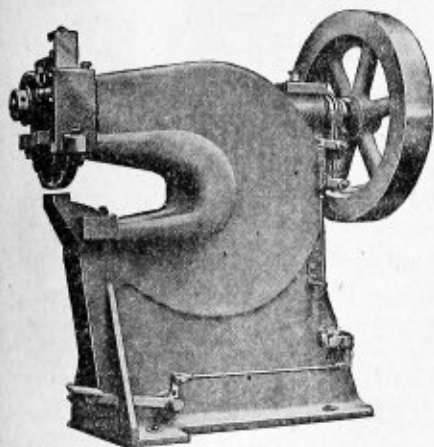
Style "L"						Single		Double	
Capacity, Inches	H. P.	Speed	Pulleys	Throat		Weight	Price	Weight	Price
Punching, 1/4-in. hole in 1/2-in. steel plate	3 1/2	250	14x4	10		2,800	\$330.00	5,400	\$655.00
Shearing, 3 1/2 x 1/2 flat bars	3 1/2	250	14x4	15		3,200	365.00	6,200	695.00
Shearing, 1/2 round bars	3 1/2	250	14x4	18		4,000	420.00	7,800	790.00
Shearing, 2x2 1/2 angles	3 1/2	250	14x4	24		4,800	460.00	9,400	890.00
Style "G"						Single		Double	
Capacity, Inches	H. P.	Speed	Pulleys	Throat		Weight	Price	Weight	Price
Punching, 3/4-in. hole in 3/4-in. steel plate	5	250	20x5	12		5,300	\$505.00	10,100	\$ 920.00
Shearing, 4x4 1/2 flat bars	5	250	20x5	15		5,900	555.00	11,500	1000.00
Shearing, 1 1/2 round bars	5	250	20x5	18		6,500	560.00	12,600	1035.00
Shearing, 3x3 1/2 angles	5	250	20x5	24		7,800	615.00	15,500	1145.00
Splitting, 1/2 steel plate	5	250	20x5	30		9,400	720.00	18,600	1350.00
Style "E"						Single		Double	
Capacity, Inches	H. P.	Speed	Pulleys	Throat		Weight	Price	Weight	Price
Punching, 1-in. hole in 1-in. steel plate	5	250	20x5	10		6,300	\$ 590.00	12,600	\$1170.00
Shearing, 6x3 1/2 flat bars	5	250	20x5	15		9,100	750.00	16,600	1420.00
Shearing, 1 1/2 round bars	5	250	20x5	20		10,600	820.00	18,400	1540.00
Shearing, 4x4 1/2 angles	5	250	20x5	24		12,200	965.00	20,800	1820.00
Splitting, 3/4 steel plate	5	250	20x5	30		14,700	1060.00	22,800	2110.00
	5	250	20x5	36		16,200	1135.00	27,000	2342.00
Style "F"						Single		Double	
Capacity, Inches	H. P.	Speed	Pulleys	Throat		Weight	Price	Weight	Price
Punching, 1 1/4 hole in 1-in. steel plate	7 1/2	250	24x6	10		7,900	\$ 745.00	13,800	\$1375.00
Cut gears	28.00	32.00	40.00	40.00		10,800	910.00	19,400	1715.00
Motor drive appl. (no motor)	50.00	59.00	90.00	72.00		12,400	975.00	22,560	1840.00
Approx. price of motor		175.00		221.00		14,900	1055.00	26,000	1905.00
Right angle drive	46.00	65.00	150.00	108.00		16,900	1130.00	29,500	2130.00
Angle shear complete	40.00	54.00	85.00	85.00		18,000	1275.00	34,200	2400.00
Angle shear blades	12.00	18.00	18.00	18.00		21,000	1400.00	39,800	2770.00
Splitting shear complete	30.00	45.00	60.00	60.00					
Splitting shear blades	5.00	8.00	12.00	12.00					

Prices include plain or structural jaw and automatic stop. Other attachments, see below. Weights given are net. When crated, weights are increased. Extra charge for boxing.

Extra Price for Special Attachments

Style of Machine	L	G	E	F	Style of Machine	L	G	E	F
Gear Guards	\$20.00	\$24.00	\$30.00	\$35.00	Bar Shear complete	\$26.00	\$32.00	\$55.00	\$54.00
Cut gears	28.00	32.00	40.00	40.00	Bar Shear blades	5.00	7.00	9.00	9.00
Motor drive appl. (no motor)	50.00	59.00	90.00	72.00	Coping attachment			102.00	75.00
Approx. price of motor		175.00		221.00	Notching attachment			150.00	180.00
Right angle drive	46.00	65.00	150.00	108.00	Flue hole blocks		32.00	50.00	58.00
Angle shear complete	40.00	54.00	85.00	85.00	Angle punching stroke	27.00	42.00	66.00	68.00
Angle shear blades	12.00	18.00	18.00	18.00	Single gag	20.00	22.00	24.00	24.00
Splitting shear complete	30.00	45.00	60.00	60.00	Double gag	38.00	49.00	65.00	65.00
Splitting shear blades	5.00	8.00	12.00	12.00	Hand lever in add. to foot lvr.	10.00	15.00	15.00	15.00

Punches and Shears with longer throats and other special attachments upon request.



Style "L" Rapid Action Punch

Cut shows machine fitted with an architectural jaw, but other attachments may be fitted to it, such as bar and round iron shear, angle shear or splitting shear. Is equipped with adjustable automatic stop so operator can bring machine to a stop at any point of stroke. A brake in front of face plate will stop punch at proper point after release of clutch. All punch and shear blocks, clutch and strippers are made of steel, and main eccentric shaft a steel forging.

Throat	Punch	Will Shear				Weight	Price
		Flat	Round	Plates	Angles		
10	$\frac{1}{2} \times \frac{1}{2}$	$3 \times \frac{1}{2}$	$\frac{3}{8}$	$\frac{1}{8}$	$2 \times 2 \times \frac{1}{8}$	2150	\$336.00
15	$\frac{1}{2} \times \frac{1}{2}$	$3 \times \frac{1}{2}$	$\frac{3}{8}$	$\frac{1}{8}$	$2 \times 2 \times \frac{1}{8}$	2670	400.00
18	$\frac{1}{2} \times \frac{1}{2}$	$3 \times \frac{1}{2}$	$\frac{3}{8}$	$\frac{1}{8}$	$2 \times 2 \times \frac{1}{8}$	3400	460.00
24	$\frac{1}{2} \times \frac{1}{2}$	$3 \times \frac{1}{2}$	$\frac{3}{8}$	$\frac{1}{8}$	$2 \times 2 \times \frac{1}{8}$	4800	600.00

Combined Stake Riveter and Punch

Our machines of this style are equipped with adjustable automatic stops which enable operator to bring punch to a stop at any point of stroke. All rivets are put in from top. An automatic hold up clamps sheets before rivet is headed.

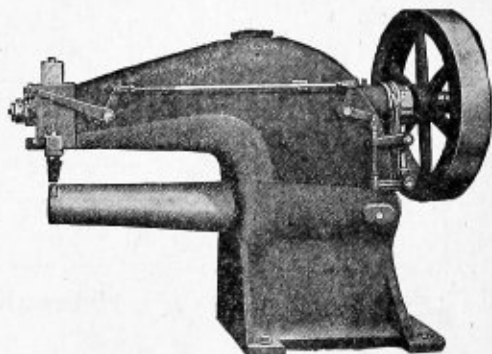
One punching and one riveting attachment with wrenches and strippers are furnished with each machine. The stake and main eccentric shaft are carbon steel forgings.

The machine should make about 80 strokes per minute.

From 20 to 30 per cent more work can be done with these machines than with a pneumatic riveter, and a skillful operator can do from 75 to 90 per cent more work with a Stake riveter than can be done by hand riveting in the same length of time.

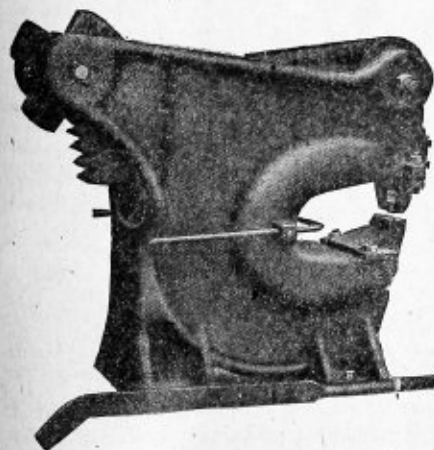
These machines cannot be excelled for working on hot water boilers, riveting pipes, conveyors, coal chutes, smoke stacks, etc.

Extra stakes for smaller diameter of pipes can be furnished.



Length Stake	Diameter Stake	Riveting Capacity	Punching Capacity	H. P.	Weight	Price
8	6	$\frac{1}{4}$	$\frac{3}{8} \times \frac{1}{8}$	2	2850	\$ 450.67
20	8	$\frac{3}{8}$	$1 \frac{1}{2} \times \frac{1}{8}$	$3 \frac{1}{2}$	5800	933.33
30	9	$\frac{3}{8}$	$1 \frac{1}{2} \times \frac{1}{8}$	$3 \frac{1}{2}$	6800	956.67
36	10	$\frac{3}{8}$	$1 \frac{1}{2} \times \frac{1}{8}$	.....	7500	1033.33
50	12	$\frac{3}{8}$	$1 \frac{1}{2} \times \frac{1}{8}$	.....	12500	1386.67
62	14	$\frac{3}{8}$	$\frac{5}{8} \times \frac{1}{8}$	.....	16000	1846.67

Punching and riveting attachments furnished with each machine.



No. 42 Boiler Makers' Hand Power Punch

Equipped with structural jaw for working angles, channels, etc. Will punch $\frac{3}{4}$ -inch hole in $\frac{1}{2}$ -inch steel plate.

Will punch to the center of 31 inches.

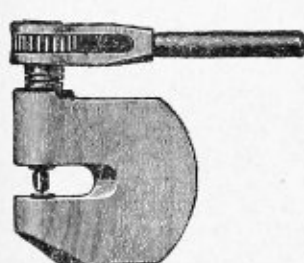
Weight of this machine, 2500 pounds.

Machine may be fitted with plain jaw.

Number	Depth Throat	Punch	Weight	Price
24	24	$\frac{1}{2} \times \frac{1}{8}$	2200	\$213.33
42	15	$\frac{3}{4} \times \frac{1}{2}$	2500	246.67
44	36	$\frac{3}{4} \times \frac{1}{2}$	4400	421.33

Boiler Makers' Screw Punches

Cast Steel Screw Punches



With Ratchet Head



With Bar Head

Drop Forged Screw Punches

Light, Stiff and
Powerful, with Bar
Head or with
Ratchet Head



Cut Shows Bar Head

Cast Steel Punches (One Punch and Die Furnished with Each Tool)

No.	Capacity		Will Punch from Edge of Sheet, Inches	Weight, Pounds	Price Each	Add for Ratchet Head	Extra Punches and Dies, per Pair
	Diameter of Hole Punched, Inches	Thickness of Plate, Inches					
A	1/2	1/4	1 1/2	15	\$20.00	\$15.00	\$3.50
B	3/8	1/4	1 1/2	17	24.00	15.00	3.50
C	1/2	3/8	1 1/2	27	30.00	15.00	4.00
D	5/8	3/8	1 1/2	40	40.00	15.00	4.00
E	3/4	1/2	3	60	60.00	15.00	5.00
G	1	3/4	4	110	80.00	15.00	5.00

Forged Steel Punches (One Punch and Die Furnished with Each Tool)

No.	Capacity		Will Punch from Edge of Sheet, Inches	Weight, Pounds	Price Each	Add for Ratchet Head	Extra Punches and Dies, per Pair
	Diameter of Hole Punched, Inches	Thickness of Plate, Inches					
1	1/2	1/4	1 1/2	20	\$16.00	\$15.00	\$2.00
2	3/8	1/4	2 1/2	48	25.00	15.00	2.50
3	1/2	3/8	3 1/2	70	32.00	15.00	2.80
4	3/4	1/2	4	100	40.00	15.00	2.80



Hydraulic Punches

Head Punches

Fitted with a pinion
meshed into a rack cut
on the ram, to with-
draw punch from metal
after punching.

Beam
Punches

No. 1 Punch

Throat 9
inches deep by
7 3/4 inches, al-
lows a beam to
be punched close
to the flange, or
9 inches from
edge. It also
allows T-iron to
be punched
lengthwise
through the
punch.

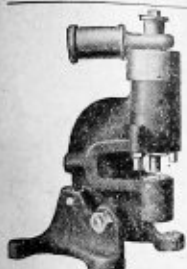
Capacity, 1-inch hole in 1-inch iron.
No. 1. Weight, 650 pounds. Price.....\$225.00

No. 2 Punch

Throat 12 1/2 inches deep by 9 inches high. The
edge of the jaw is only 1 3/4 inches from the edge to the
center of the die. Will punch beams on flanges and
webs.

Capacity, 1-inch hole in 1-inch iron.
No. 2. Weight, 800 pounds. Price.....\$275.00

No.	Capacity		Will Punch from Edge of Sheet, Inches	Wght., Lbs.	Price
	Diam. of Hole Punched, Inches	Thickness of Plate, Inches			
1	1/2	1/4	1 1/2	50	\$ 60.00
2	3/8	1/4	2	85	85.00
3	1/2	3/8	5	130	100.00
4	3/4	1/2	2 1/2	130	120.00
5	1	3/4	4 1/2	180	140.00
6	1 1/4	1	2 1/2	160	140.00



Ball Bearing Punch

No. 20

For structural and sheet metal workers.

Made of Neckrome steel and heat treated throughout. It will rivet as well as punch holes.

Capacity, $\frac{1}{2}$ -inch holes through $\frac{1}{2}$ -inch iron. Depth of throat, 2 inches. Height of throat, $1\frac{3}{4}$ inches. Weight complete, 20 pounds.

Price, including one punch and die and base. \$31.50

Price without base. 29.50

Punches and dies, rectangular stock, $\frac{1}{4} \times \frac{1}{2}$ -inch to $\frac{3}{4}$ -inch. Price each. \$0.75

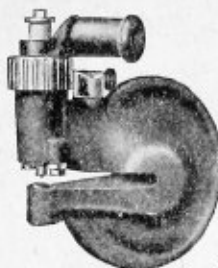
No. 40 Punch

Similar to No. 20 except is equipped with ratchet head and socket handle. Capacity, $\frac{3}{4}$ -inch holes through $\frac{3}{4}$ -inch iron. Depth of throat, 3 inches. Height of throat, 2 inches. Weight complete, 51 pounds.

Price without base. \$100.00

Price base, extra. 4.00

Price extra punch and die, each. 1.50



Ball Bearing Punch

No. 15

One-half turn of lever drives punch through $\frac{1}{4}$ -inch metal.

Capacity, $\frac{5}{8}$ -inch hole through $\frac{5}{8}$ -inch iron. Punch in center of $7\frac{3}{4}$ inches. Height of gap, $\frac{3}{8}$ inch. Has ratchet head. Weight complete, 21 pounds.

Punches and dies carried in stock, $\frac{3}{8}$ -inch to $\frac{1}{2}$ -inch by $\frac{1}{2}$ -inch.

The feature of this tool is its deep throat capacity. It is made of crucible steel casting, heat treated throughout.

Price with ratchet head and one punch and die of stock size. \$50.00

Extra punches and dies, stock sizes, each. .50



Ball Bearing Punch No. 10

Capacity, $\frac{3}{8}$ -inch hole through $\frac{1}{4}$ -inch iron. Depth of throat, $1\frac{1}{2}$ inches. Height of throat, $\frac{3}{4}$ inch. Length over all, 18 inches. Weight complete, $8\frac{1}{2}$ pounds.

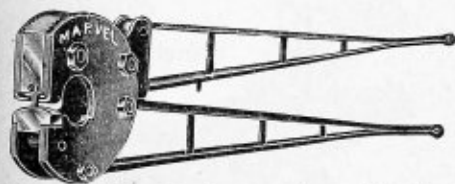
Price, with 1 punch and die. \$20.00

Price, with 6 extra punches and dies. 24.00

Price, complete with base and 6 extra punches and dies. 25.00

Extra punches and dies, each. .70

No. 20 Marvel Portable Punch



Made entirely of steel—no castings. Capacity $\frac{1}{4}$ -inch hole in $\frac{1}{4}$ -inch stock. Depth of throat, 2 inches. Length over all, 38 inches.

When not otherwise specified, a $\frac{1}{4}$ inch punch and die is sent. Other sizes up to $\frac{1}{2}$ -inch can be furnished. Weight, 16 pounds.

Price including one punch and die. \$19.50

Junior Punch No. 5



The lightest and most powerful punch of its size made. Will punch $\frac{1}{4}$ -inch hole through 18 gauge iron.

Price, including 3 sets of punches and dies, $\frac{1}{8}$, $\frac{3}{8}$ and $\frac{1}{2}$ -inch. \$8.00

Extra punches and dies, per set. .80

Other sizes made to order. 1.00

Weight, $2\frac{3}{4}$ pounds. Punch in center of 3 inches. Length over all, $8\frac{1}{4}$ inches. Height of gap, $\frac{5}{8}$ -inch.

Whitney Portable Metal Punches



No. 1 Punch

All parts are drop-forged, except pipe handles. Total length is 34 inches. Capacity, $\frac{1}{2}$ -inch hole through $\frac{1}{4}$ -inch boiler plate, or equivalent. Price includes two punches and one die, any size from $\frac{1}{4}$ to $\frac{3}{4}$ by $\frac{1}{2}$ ths. When ordering, state sizes desired. Weight, 21 pounds.

Price. \$20.00



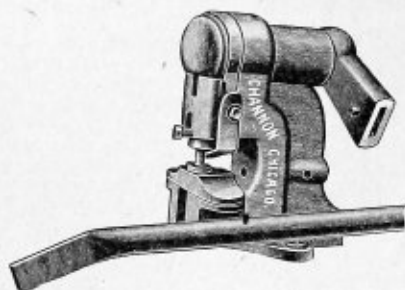
No. 2 Punch

All parts on this smaller punch are drop-forged, including the handle. Total length, 23 inches. Capacity, $\frac{5}{8}$ -inch hole in $\frac{1}{4}$ -inch iron or equivalent. Includes two punches and one die, any size from $\frac{1}{8}$ to $\frac{1}{2}$ -inch by $\frac{1}{2}$ nds. Weight, 15 pounds.

Price. \$15.00

Extra Punches or Dies for No. 1 or No. 2, \$0.70 each Punch or Die.

No. 1. Handy Punch



Will punch $\frac{1}{4}$ -inch hole in $\frac{1}{4}$ -inch plate, to the center of a 5-inch circle. Weight, 70 pounds.

Price.....\$13.75

Price includes three punches and dies.

Tinnners' Punches



No. 5

No.	Capacity, Diameter of Hole in Thickness of Plate	Depth of Throat	Weight, Pounds	Price
5	$\frac{3}{8}$ -inch hole in $\frac{1}{4}$ -inch	15	95	\$29.00
25	$\frac{1}{4}$ -inch hole in $\frac{1}{4}$ -inch	10	180	29.00

Boiler Makers' Handy Lever Punch

Illustration shows No. 8 $\frac{1}{2}$ punch.

Number	Throat, Inches	Will Punch	Weight	Price
8 $\frac{1}{2}$	5	$\frac{3}{8}$ -inch hole in $\frac{3}{8}$ -inch	214	\$ 51.00
28	10	$\frac{3}{8}$ -inch hole in $\frac{3}{8}$ -inch	450	86.00
29	15	$\frac{3}{8}$ -inch hole in $\frac{3}{8}$ -inch	750	104.00
31	18	$\frac{3}{8}$ -inch hole in $\frac{3}{8}$ -inch	875	107.00



Marvel
Multiple
Punches

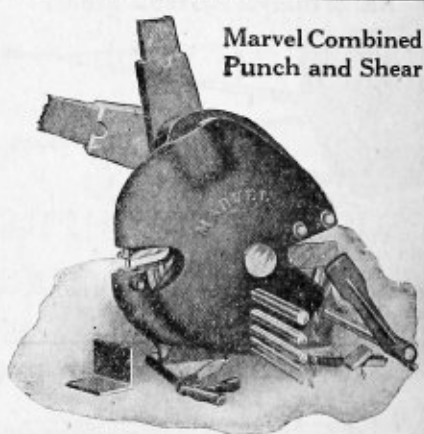
No. 10. Has 4 punches, one each $\frac{1}{8}$, $\frac{3}{8}$, $\frac{1}{4}$ and $\frac{5}{8}$ inch.

No. 11. Has 4 punches, one each $\frac{1}{4}$, $\frac{5}{8}$, $\frac{3}{8}$ and $\frac{7}{8}$ inch.

No. 12. Has 3 punches, one each $\frac{1}{2}$, $\frac{5}{8}$ and $\frac{3}{4}$ inch.

One punch is used at a time, all the punches may be left in place at all times if desired. The punches are simply dropped in place and the steel block shown with thumb screw can be rapidly shifted over any punch desired and punch tightened by turning the thumb screw.

No.	Throat Depth, Inches	Capacity	Weight, Pounds	Price Each
10	4	$\frac{1}{8}$ hole in $\frac{1}{4}$ -in. stock	90	\$ 40.00
11	5	$\frac{3}{8}$ hole in $\frac{3}{8}$ -in. stock	300	85.00
12	6 $\frac{1}{2}$	$\frac{1}{2}$ hole in $\frac{1}{2}$ -in. stock	675	150.00



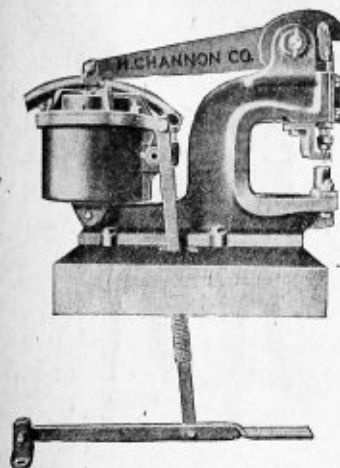
Marvel Combined
Punch and Shear

Has double levers.
Punches $\frac{3}{8}$ -inch hole in $\frac{3}{8}$ -inch stock or $\frac{1}{2}$ -inch hole in $\frac{1}{4}$ -inch stock.
Shears $\frac{1}{2}$ x2 flat and $\frac{1}{4}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{5}{8}$ and $\frac{3}{4}$ -inch round iron.

Throat 2 $\frac{3}{4}$ inches. Weight, 155 pounds.
Cuts $\frac{1}{4}$ x2x2 angle iron in two cuts.

Price, with two levers, three punches and dies and gauge for flat and round shearing.....\$54.00

With heavy iron legs, 210 pounds. Price each 59.00



Portable Pneumatic Punch and Riveter

This riveter is especially designed to meet the requirements of work in roundhouses, copper shops, or wherever light iron work is to be done. By its use one man can do the work that ordinarily would require three or four men, handling a big sheet in a stationary punch.

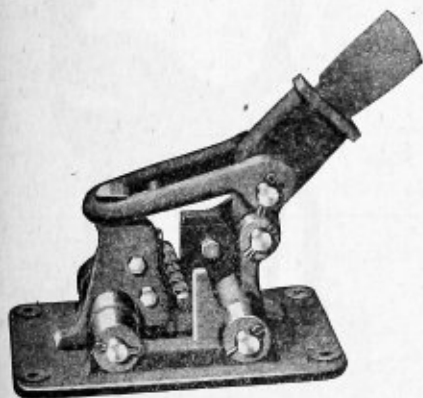
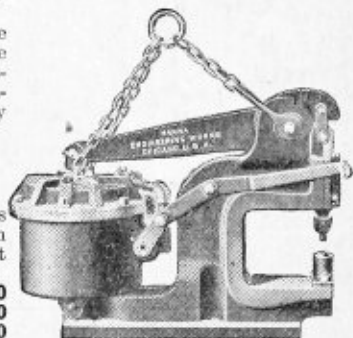
It is capable of driving rivets with less air than any other machine. Ordinarily, a number of strokes are necessary to fasten every rivet, but with this machine only one stroke is required. Because of the slow movement of the die during lever action, plenty of time is given for the metal in the rivet to flow and fill the hole completely, as well as an opportunity for the rivet to set before the pressure is completely released on the return part of the lever action. This insures tight rivets.

Each riveter is supplied with the necessary handles, lubricators, one set of sample riveting dies, and suspension bail or links. No foundation bolts furnished unless especially ordered.

Specifications

Six-inch reach, 6-inch gap. Cylinder diameter 8 inches. Exerts 12 tons pressure on die at 80 pounds air pressure. Will punch $\frac{3}{8}$ to $\frac{1}{2}$ -inch hole in $\frac{1}{4}$ -inch plate. Rivets $\frac{1}{4}$ -inch rivets cold. Total die stroke $\frac{3}{8}$ -inch. Net weight 225 pounds.

Price each	\$195.00
With foot treadle, extra	6.50
With riveting dies, extra	6.50



Hand Power Concrete Reinforcing Bar Cutters

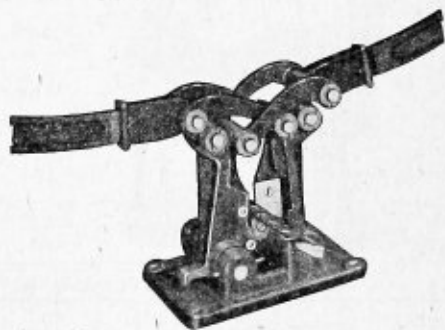


Fig. G No. 1—0 to $\frac{3}{4}$ Bars

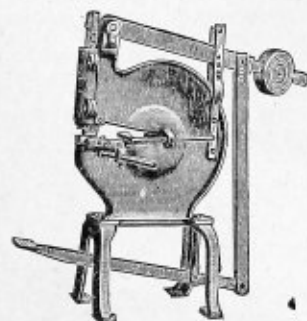
Fig. G No. 2— $\frac{3}{4}$ to $1\frac{1}{4}$ Bars.

The Kongo All-Steel Bar Cutters

With the No. 1 one man can cut off $\frac{3}{4}$ -inch bars and with the No. 2 two men can easily cut off $1\frac{1}{4}$ -inch high-carbon bars. Cast steel construction, making a light machine, convenient to handle, simple and practically unbreakable. The cutting jaws are arranged so that action becomes more powerful as the resistance increases in advancing the cut, so that the bar will not be pushed away by the knives. When cutting, the knives advance, making a clean cut, without fractured ends.

No.	Shearing Capacity, Square, Twisted or Round, Inches	Weight of Machine, Pounds	Weight of Handle, Pounds	Total Weight, Pounds	Price Each
1	0 to $\frac{3}{4}$	100	35	135	\$100.00
2	$\frac{3}{4}$ to $1\frac{1}{4}$	185	70	255	150.00

Compound Lever Sheet Iron Punches, 15-Inch Throats



Operated by either treadle or overhead lever. Lever arranged to work from front or back. Steel plunger, wrought iron lever, adjustable back gauge and an adjustable side pin gauge for punching holes equal distances apart. $\frac{3}{8}$, $\frac{1}{4}$, $\frac{5}{8}$ -inch punches and dies furnished, or larger up to $\frac{5}{8}$ -inch (larger sizes extra). In ordering, state size of punches and whether treadle or overhead lever is desired. Top lever to work front or back for \$1.50 extra. With both treadle and lever for \$6.00 extra net. To punch $\frac{3}{8}$ in $\frac{5}{8}$ and heavier requires an extension on treadle.



No. 136.	To punch $\frac{3}{8}$ in $\frac{1}{8}$.	Weight, 350 pounds.	Price	\$47.00
No. 137.	To punch $\frac{1}{4}$ in $\frac{3}{8}$.	Weight, 400 pounds.	Price	52.00
No. 138.	To punch $\frac{1}{4}$ in $\frac{1}{4}$.	Weight, 425 pounds.	Price	56.00
No. 139.	To punch $\frac{5}{8}$ in $\frac{1}{4}$.	Weight, 500 pounds.	Price	62.00
No. 140.	To punch $\frac{3}{8}$ in $\frac{5}{8}$.	Weight, 800 pounds.	Price	75.00
No. 141.	To punch $\frac{3}{8}$ in $\frac{3}{8}$.	Weight, 1000 pounds.	Price	87.00

Combined Punches and Shears, Hand Power



When Ordering State Sizes
of Punches Desired



No.	Throat, Inches	Will Punch	Blade, Ins.	To Cut	Bars	Round	Weight	Price
2	4	$\frac{1}{4}$ in $\frac{1}{4}$	10	No. 12	$\frac{1}{4} \times 1$	$\frac{3}{8}$	240	\$ 50.00
3	6	$\frac{5}{8}$ in $\frac{1}{4}$	10	No. 10	$\frac{1}{4} \times 1\frac{1}{2}$	$\frac{1}{2}$	300	56.00
4	8	$\frac{5}{8}$ in $\frac{1}{4}$	15	No. 10	$\frac{1}{4} \times 2$	$\frac{5}{8}$	450	68.00
5H	10	$\frac{5}{8}$ in $\frac{3}{8}$	15	No. 8	$\frac{3}{8} \times 2$	$\frac{5}{8}$	575	78.00
5	12	$\frac{5}{8}$ in $\frac{5}{8}$	12	No. 8	$\frac{3}{8} \times 2$	$\frac{5}{8}$	525	75.00
6	8	$\frac{3}{8}$ in $\frac{3}{8}$	12	No. 6	$\frac{1}{2} \times 2\frac{1}{2}$	$\frac{3}{4}$	640	87.00
8	12	$\frac{3}{8}$ in $\frac{3}{8}$	12	$\frac{1}{4}$ -inch	$\frac{1}{2} \times 3$	$\frac{3}{4}$	800	100.00
10	18	$\frac{3}{8}$ in $\frac{1}{4}$	18	No. 10	$\frac{1}{2} \times 2\frac{1}{2}$	$\frac{5}{8}$	1050	118.00
10A	15	$\frac{3}{8}$ in $\frac{3}{8}$	15	No. 6	$\frac{1}{2} \times 3$	$\frac{3}{4}$	1150	131.00
12	15	$\frac{1}{2}$ in $\frac{1}{2}$	12	$\frac{5}{8}$ -inch	$\frac{5}{8} \times 2\frac{1}{2}$	$\frac{7}{8}$	1200	143.00
12B	12	$\frac{1}{2}$ in $\frac{1}{2}$	12	$\frac{5}{8}$ -inch	$\frac{5}{8} \times 3$	$\frac{7}{8}$	1275	152.00
18	20	$\frac{1}{2}$ in $\frac{1}{2}$	24	$\frac{5}{8}$ -inch	$\frac{1}{2} \times 3\frac{1}{2}$	$\frac{7}{8}$	1850	200.00
18C	20	$\frac{5}{8}$ in $\frac{1}{2}$	24	$\frac{3}{8}$ -inch	$\frac{5}{8} \times 3\frac{1}{2}$	1	2100	212.00
18D	18	$\frac{3}{4}$ in $\frac{1}{2}$	24	$\frac{3}{8}$ -inch	$\frac{5}{8} \times 4$	1	2200	218.00

No. 12 and larger sizes will be furnished with an extra 9-inch top blade for trimming $\frac{3}{4}$ and $\frac{5}{8}$ plates.

The following items are extra net: With lever socket on each side, as shown on large cut, to operate punch from front or back, on No. 2 and No. 3, \$1.50; Nos. 4, 5, 6, 8 and 10, \$2.00; No. 12, \$2.50; No. 18 and larger, \$3.00. Punches $\frac{3}{4}$ -inch and larger, or special square punches, also blades fitted to cut angle iron, furnished for the proper difference in price.

Hand Power Punches and Shears

Simple and substantial machines, well adapted for work within their listed capacities. All machines should be rigidly fastened to floor to secure good results.



No. 33 Combined Punch and Shear

Will punch $\frac{3}{8}$ -inch hole in $\frac{1}{2}$ -inch plate to the center of a 6-inch circle.

Will shear $1\frac{1}{2} \times 2\frac{1}{2}$ -inch flat bars or $\frac{3}{8}$ -inch round iron.

Weight, 350 pounds.
Price each.....\$43.50

No. 6 Combined Punch and Shear

Will punch $\frac{1}{2}$ -inch hole in $\frac{1}{2}$ -inch plate to the center of a 6-inch circle.

Will shear $\frac{1}{2} \times 4$ -inch flat bars or 1-inch round. Furnished with three punches and dies and a lever bar. Weight, 510 pounds.

Price each.....\$73.50

No. 15 Combined Punch and Shear

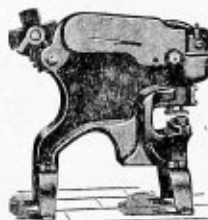
Will punch $\frac{5}{8}$ -inch hole in $\frac{1}{2}$ -inch plate to the center of a 14-inch circle.

Will shear $7 \times \frac{1}{2}$ -inch flat, $7 \times \frac{1}{2}$ band iron or 1-inch round bars.

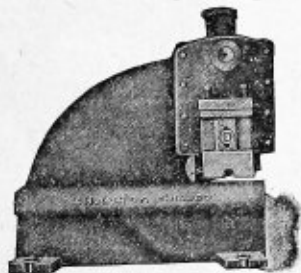
This machine is of very generous proportions (note weight) and built for continuous heavy punching and shearing.

Has three pairs of knives. Three punches and dies and lever bar go with machine. Weight, 1000 pounds. Price each.....\$103.00

Angle shear for $2 \times 2 \times \frac{1}{2}$ -inch angles. Extra.... 49.50



Nos. 30 and 40. Splitting Shears



No. 30

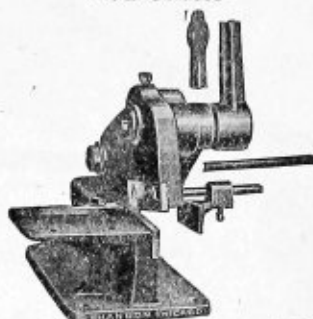
No. 30. Will shear $\frac{1}{4}$ -inch plates or less, any width or length. Shear blade $6\frac{1}{2}$ inches. Weight, 240 pounds.

Price.....\$55.00

No. 40. Will shear $\frac{3}{8}$ -inch plates or less, any width or length. Shear blade $7\frac{1}{2}$ inches. Weight, 700 pounds.

Price.....\$107.00

No. 3. Combined Splitting Shear and Rod Cutter

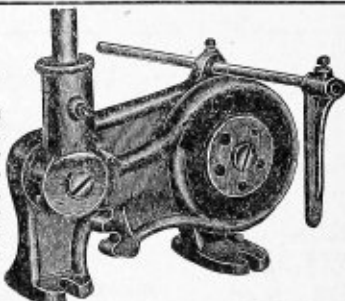


Will shear $\frac{1}{8}$ -inch sheet metal any width or length. Will shear $\frac{1}{2}$ -inch diameter round iron or less. Weight, 120 pounds.

Price.....\$29.50

"Marvel" Rod Cutter

Cutting dies have round openings of correct size to cut off rods and wire, which insures good work with ends round and true.



No.	Price Each	Cuts Rods Mentioned Below, Also Intermediate Sizes, Inches	Weight, Pounds
5	\$ 8.00	$\frac{3}{8}$, $\frac{1}{2}$, $\frac{3}{4}$, 1 , $1\frac{1}{2}$, 2	12
6	13.50	$\frac{1}{2}$, $\frac{3}{4}$, 1 , $1\frac{1}{2}$, 2 , $2\frac{1}{2}$	35
7	29.50	$\frac{3}{4}$, 1 , $1\frac{1}{2}$, 2 , $2\frac{1}{2}$, 3	95

Prices include levers, gauge and gauge rod.

Bar Shears

Operator stands before his work, the lever working towards him.

Light work can be adjusted with one hand and cut with the other.

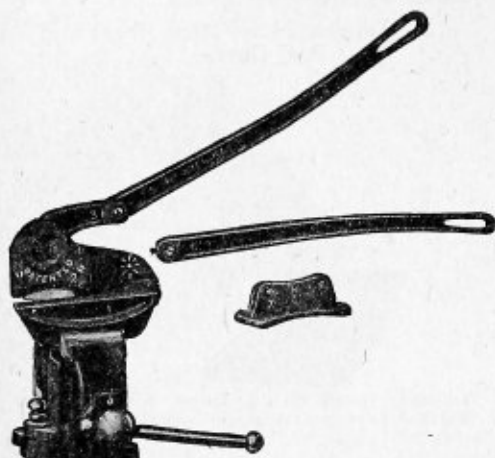


No.	Price Each	Will Shear Flats Rds.	Wght., Lbs.
A1	\$11.00	$\frac{3}{8} \times 3$	90
A1 $\frac{1}{2}$	13.50	$\frac{3}{8} \times 3$	100
A2	16.50	$\frac{3}{8} \times 3$	160
A2 $\frac{1}{2}$	21.75	$\frac{3}{8} \times 3$	170
A10	67.75	$\frac{3}{8} \times 3$	700

No. A3. Angle shear. Cuts $1\frac{1}{2} \times 1\frac{1}{4} \times \frac{3}{8}$ angle iron. Weight, 180 pounds.

Price each.....\$43.50

The Potstada Metal Shear



AA Vise Tool

Considering weight (12 pounds) is the strongest and most durable metal shear on the market today. It cuts up to $\frac{1}{8}$ -inch steel plate.

The shear is drop forged steel the handles and stand of malleable iron it will stand long and hard usage.

Is composed of seven parts, all numbered so that the knife or any of the parts can be readily replaced in case of breakage.

Price \$7.50



Shear with Bench Bracket

The Little Giant Punch and Shear

A simple, powerful and durable machine at low cost.

The punches, dies and shears are of tool steel and guaranteed equal to the best made.

Equipment

Four hook bolts for securing to block one stripper, one spanner wrench, one plate to place under die when punching thin iron, one brush for oiling punches, five punches and five dies.

Specifications and Prices

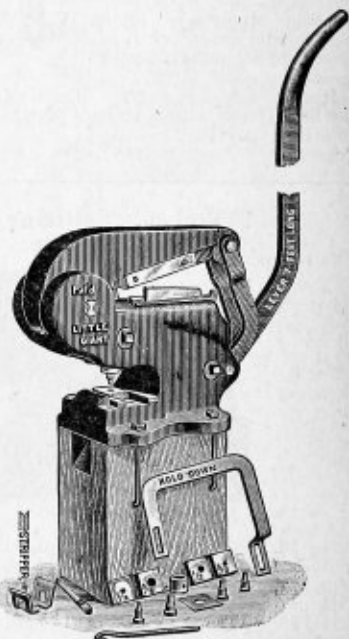
Size number.....	1	2	3
Cuts flat iron inches	$\frac{5}{8} \times 2\frac{1}{2}$	$\frac{1}{2} \times 4$	$\frac{3}{8} \times 4$
Cuts band iron ins..	$\frac{1}{4} \times 8$	$\frac{1}{4} \times 7$	$\frac{1}{4} \times 6$
Cuts round iron ins.	1	$\frac{3}{8}$	$\frac{3}{4}$
Will punch.....	$\frac{5}{8}$ " hole in $\frac{1}{2}$ "	$\frac{1}{2}$ " hole in $\frac{1}{2}$ "	$\frac{3}{8}$ " hole in $\frac{3}{8}$ "
Will punch from edge inches.....	$3\frac{1}{2}$	$2\frac{3}{4}$	$2\frac{1}{2}$
Size of punches and dies with each machine inch.....	$\frac{5}{8}$ $\frac{1}{2}$ $\frac{3}{8}$ $\frac{3}{8}$ $\frac{5}{8}$ $\frac{5}{8}$ $\frac{1}{2}$ $\frac{3}{8}$ $\frac{3}{8}$ $\frac{5}{8}$ $\frac{1}{4}$		
Floor space occupied inches.....	12x26	10x24	8x22
Weight pounds.....	525	350	280
Price complete.....	\$62.50	\$50.00	\$37.50

Extra punches and dies regular size 75c each net. Special punches at additional cost.



Shears for cutting up to $1\frac{1}{2} \times 1\frac{1}{2} \times \frac{1}{4}$ -inch. Angle iron can be furnished to fit our No. 1 Little Giant punch and shear only.

Price per set..... \$5.00



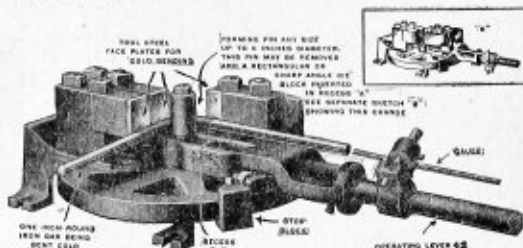
"U" Bending Tools

These tools are suitable for bending round, square, flat or square twisted bars into "U" shape or any angle up to 180 degrees with a radius at point of bending to correspond to size of forming pin.

No. 1. "U" Bender—for cold bending. Flat $\frac{1}{2}$ x 2-inch, round $\frac{1}{2}$ -inch, square $\frac{1}{2}$ -inch, square twisted $\frac{1}{2}$ -inch, or equivalent. For hot bending: Flat $\frac{1}{2}$ x 2-inch, round $\frac{3}{4}$ -inch, square $\frac{3}{4}$ -inch, square twisted $\frac{3}{4}$ -inch, or equivalent. Net weight 65 pounds. Price each.....\$40.00

No. 2. "U" bender—for cold bending: Flat $\frac{1}{2}$ x 3-inch, round 1-inch, square $\frac{3}{4}$ -inch, square twisted $\frac{3}{4}$ -inch, or equivalent. For hot bending: Flat $\frac{1}{2}$ x 3-inch, round 1 $\frac{1}{4}$ -inch, square 1 $\frac{1}{2}$ -inch, square twisted 1 $\frac{1}{2}$ -inch, or equivalent. Net weight 185 pounds. Price.....\$50.00

Extra dies for sharp corner and angle iron bending furnished upon application.



Showing Side View of No. 2

Eye Benders Nos. 1, 2 and 3



No. 1. Takes stock $\frac{1}{2}$ inch and less. Bends rings and eyes up to 2 $\frac{3}{4}$ inches outside diameter. Net weight 62 pounds. Price each.....\$40.00

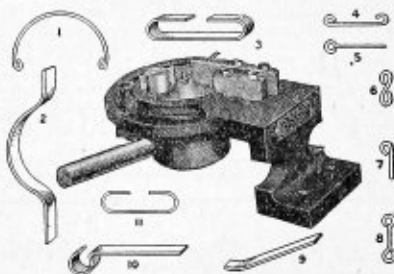
No. 2. Takes stock $\frac{3}{4}$ -inch and less. Bends rings and eyes up to 7 inches outside diameter. Net weight 83 pounds. Price each.....\$53.50

No. 3. Takes stock 1 $\frac{1}{2}$ -inch and less. Bends rings and eyes up to 7 inches outside diameter. Fitted with special hand lever for operating offset dog. Net weight 152 pounds. Price each.....\$80.00

Above prices include one size of forming pin.

Extra forming dies on application.

Eye Bender No. 12



A convenient machine for mounting on bench for forming up light stock without the necessity of heating. Illustration shows a round wire in process of bending into the form of an eye. Grip dogs are adjustable to suit thicknesses of stock to be bent. Operating lever is about 20 inches long, and by pulling this around the stock may be formed into a hinge eye as shown in Fig. 4. Eye may be centered by bending stock back against the guide block at right of illustration. Stop block on machine may be set to suit the degree of bend to be made.

Capacity, $\frac{3}{8}$ -inch diameter round rod or wire, $\frac{1}{2}$ -inch or under square rod, $\frac{1}{2}$ x 1-inch flat stock or equivalent. Net weight, 40 pounds. Price each.....\$40.00

"Hanson" Improved Bar Bender

Bends cold steel quickly up to capacity listed without jerking—just a slow steady pull.

This is the popular bender with the patent sliding shoe—on the bending point of the lever. This sliding shoe eliminates all friction on bar during the bending operation.

Made of wrought steel shapes throughout; no castings of any kind—consequently light and easily portable from job to job—and unbreakable.

All working parts are forged of open hearth steel billets, properly machined and bolted onto a steel plate.

Wearing parts are case-hardened.

Joint of bending lever is protected from scale and grit by being connected on the under side of plate.

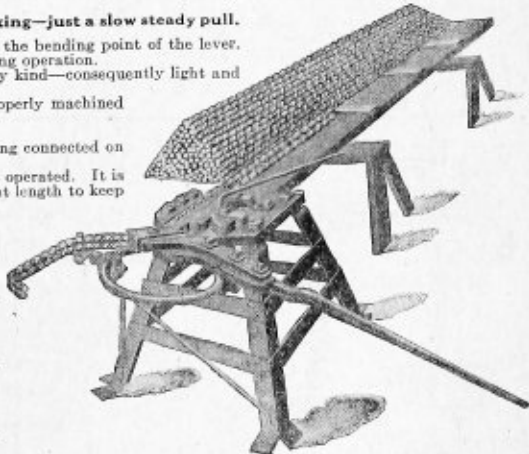
Clamping device is an eccentric lever 24 inches long—easily operated. It is an instantaneous lock against clamping die, which is of sufficient length to keep bar rigid and insure a perfect bend.

Bending die has three separate radius joints and can be turned to suit radius of bend for different sizes of bars.

Sizes and Capacities

No.	Capacity Square Cold Twisted Bars, Inches	Length of Bending Lever, Feet	Approx. Weight, Lbs.	Price
2	$\frac{1}{4}$ to $\frac{5}{8}$	3 $\frac{1}{2}$	65	\$ 60.00
3	$\frac{3}{8}$ to 1	6	250	150.00
4	$\frac{1}{4}$ to 1 $\frac{1}{4}$	7	365	187.50
5	$\frac{1}{4}$ to 1 $\frac{1}{2}$	8	415	210.00

No. 2 size is without leg base—to be bolted to bench, for bending stirrups and light bars.



No. 5. Machine with Leg Base. The most popular machine.

Bar Bending Tools

Size 0 machine is intended for forming light stock into rectangular shapes without first heating the same and can conveniently be mounted on an ordinary work bench. The operating lever is about 20 inches long and by pulling this around it rotates the slotted die in which stock is held, forcing the extended end of stock against the stationary pin, thus forming it to any angle desired less than 90 degrees. When a greater degree of angle is desired it may be accomplished by means of special forming dies made to order.

Capacity— $\frac{1}{4}$ inch or smaller round wire or rod, without heating. $\frac{3}{4}$ -inch or smaller square rod, without heating. $\frac{3}{4}$ -x-1-inch or equivalent flat stock, without heating. Gross weight 45 pounds. Net weight 25 pounds.

Price.....\$40.00

No. 1 machine is supported by cast iron lug which fits into socket and may therefore be easily removed and put out of the way when not in use.

Bends flat stock up to 2 inches wide by $\frac{3}{4}$ -inch hot, and round or square bars up to $\frac{3}{4}$ -inch hot, or $\frac{1}{2}$ -inch cold. Bends angle iron if a "V"-shaped piece of stock is cut from one leg. Will form any angle from zero to 90 degrees.

Angles less than 90 degrees may be made by the use of a special "sharp angle die." For cold bending, we recommend using steel faced dies.

Net weight 52 pounds. Gross weight 62 pounds.

Price with cast iron dies.....\$33.50

Price with dies faced with tool steel for cold bending.....40.00

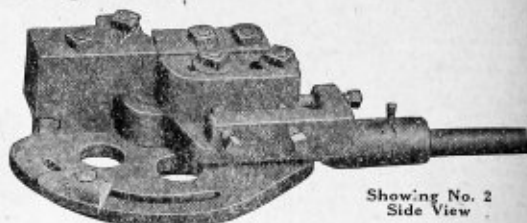
Nos. 2 and 3 machines are similar to No. 1 but are heavier and stronger, covering a wider range of work.

No. 2 bends flat stock up to 2 inches wide by $\frac{1}{2}$ -inch thick and round or square stock up to 1-inch hot. Bends $\frac{3}{4}$ -x-1 $\frac{1}{2}$ -inch stock and under edgewise hot. Bends angle iron if a triangular piece of stock is cut from one leg.

The No. 3 machine is exactly the same as the No. 2 excepting that the dies are two inches higher or 4 inches.

No.	Gross Weight, Lbs.	Net Weight, Lbs.	Price with Cast Iron Dies	Price with Steel Faced Dies
2	150	120	\$47.00	\$53.50
3	170	140	47.00	53.50

Extra dies for edge bending sharp angle bending, etc., for any of the above machines upon application.



Showing No. 2
Side View



WIDE RATCHET HANDLE
IS 24 INCHES LONG

Angle Bar Benders for Concrete Bars

These machines are strong and compact and may be operated by one man for bending iron rods

one inch and under without heating same. These benders are designed particularly for high carbon concrete reinforcing bars whether square twisted, round or square corrugated or any other reinforcing bars of high carbon stock. Fitted with auxiliary ratchet lever which operates a pinion against a series of teeth in the frame at a large ratio, thus making them very powerful. This lever is 36 inches long.

Dies are adjustable by means of set screws to suit thickness of stock to be bent.

No. 4 Bender—For cold bending: Flat $1\frac{1}{2}$ -x-2 inches, round $1\frac{1}{2}$ inches, square 1 inch, square twisted 1-inch or less. For hot bending, $1\frac{1}{2}$ -x-2 inches, round $1\frac{1}{2}$ inches, square $1\frac{1}{2}$ inches, square twisted $1\frac{1}{2}$ inches or less.

Complete with stand, weight 460 pounds net.

Price each.....\$120.00

Complete without stand, weight 300 pounds net. Price each.....100.00

No. 5 Bender—For cold bending: Flat $2\frac{1}{2}$ -x-2 inches, round $1\frac{1}{2}$ inches, square $1\frac{1}{2}$ inches, square twisted $1\frac{1}{2}$ inches or less. For hot bending: Flat 1-x-2 inches, round $1\frac{1}{2}$ inches, square $1\frac{1}{2}$ inches, square twisted $1\frac{1}{2}$ inches or less.

Complete with stand, weight 520 pounds net.

Price each.....\$163.00

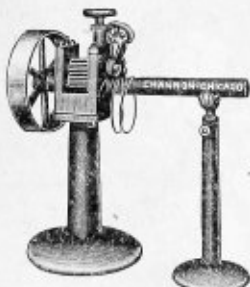
Complete without stand, weight 360 pounds net. Price each.....134.00

Stand only, suitable for either Nos. 4 or 5. Each.....20.00



THE REMOVABLE BAR IS ABOUT 3 FT
LONG USED FOR DIRECT PULL IN
BENDING LIGHT STOCK FOR ANGLES
CORRODING LEVERAGE IS NOT REQUIRED

Shows
View of
Top



Cut Shows Only a Portion
of Extension

Helix Coiling Machine

For Reinforced Concrete Columns

Wire spirals for reinforced concrete columns can be wound rapidly and profitably on this machine, which can also be used for various other purposes. The wire must be cut to length before it is fed to the machine.

It consists of a housing in which are mounted shafts with feed rolls on the ends which feed the wire by means of pressure. On the lower feed shaft is a hub on which is a projecting pin which acts as a lock on which the spiral is wound. The pipe is supported in a stand with rolls allowing it to revolve and as it revolves with the feed rolls, the spiral revolves while it is winding.

The machine may be adjusted for either open or close wound spirals and is made in two sizes.

No. 350—For $\frac{3}{4}$ -inch wire and smaller, makes spirals 4 to 30 inches in diameter, 17 feet long. Each.....\$300.00

No. 580—For $\frac{3}{4}$ -inch wire and smaller, makes spirals 12 to 40 inches in diameter, 17 feet long. Each.....\$580.00

Price is without countershaft and with one set of rails.



Model A

Equipped with six different quadrants for bending pipe $\frac{1}{2}$ -inch to 2-inch diameter, inclusive, cold without filling.
Price.....\$300.00

Model B

Equipped with three quadrants for bending pipe $2\frac{1}{2}$ -inch, 3-inch and $3\frac{1}{2}$ -inch diameter.
Price.....\$400.00



No. 5-A Pipe Bending Machine



For cold bending piping of steel, iron, copper, brass, etc., up to 2-inch, inclusive. Furnished with quadrants for 1-inch pipe with radius of 6 in., $1\frac{1}{4}$ -inches with radius of 9 in., $1\frac{1}{2}$ -inches with radius of 12 inches and 2-inches with radius of 14 inches.

Net weight 811 pounds. Price with plain stand and four adjustable quadrants as above.....\$220.00
Special quadrants furnished at extra cost.

Self-Adjusting Conduit Hickey

This hickey will bend conduit in any shape from $\frac{1}{4}$ inch to 1 inch without having to be adjusted in any way. The natural pull on the handle fits the hickey to the conduit when a positive grip which prevents it from slipping. When using hickey on the floor as in illustration it is used like the old style of hickies, but has the added advantages of the disk which greatly facilitates the bending of the pipe.

It can also be used with a bench vise, or with a pipe standard at the side of bench.

The hickey is light and can be easily carried in a workman's kit, or from floor to floor, since the weight is only 5 pounds.

It will not kink or flatten the conduit because of the curved disk.

Price each.....\$10.00



Showing method of applying Hickey when used on the floor.

Specifications

"Cincinnati" Portable Electric Drills

Air-Cooled—Ball-Bearing—Attach to any Lamp Socket

Built in all sizes and styles for drilling in iron or steel up to 2½ inches and in wood up to 3 inches. Electrically, as well as mechanically, they are correct, up-to-date and high-grade in every respect. Motor windings are fully enclosed, dirt and dust proof and all working parts protected from injury.

Air cooled by means of a fan mounted on the armature shaft—forcing a strong current of air through the ventilation holes in motor housing and end cap.

Armature is built up of highest grade electrical sheet steel wound with special magnet wire—thoroughly insulated against possibility of short-circuiting or grounding. **Field Coils** are form wound, of magnet wire, taped, baled and insulated. **Commutator** is composed of segments of hard drawn bar copper, insulated with amber mica.

Gears are steel—properly hardened and enclosed in the case at the chuck end of the motor. All gears run in grease and are separated from the motor proper by an aluminum diaphragm plate.

Ball Bearings—Armature is mounted on ball bearings and chuck spindle is fitted with ball bearing end-thrust—reducing friction to a minimum.

Switch is entirely enclosed in a pocket on the side of the motor housing and operated through one of the side handles of the drill.

Carbon Brushes are mounted in die-cast brush holders and held firmly against commutator by two springs pressing from the rear, insuring perfect contact.

Side Handles are of seamless steel tubing and knurled to give a firm grip. One operates the switch—other handle is detachable for close corner drilling.

Lubrication by graphite grease in gear case—6 months' supply. Oil cups for spindle bearings.

Current—Drills supplied for direct or alternating current, also Universal type for either current.

Direct Current Drills—Standard tools are wound for 110 and 220 volts. Specially wound for 50 to 600 volts as required.

Alternating Current Drills—Motors are of the well known squirrel-cage induction type—standard tools wound for 110 and 220 volts, 60 cycles, single, 2 or 3 phase. Specially wound for 110 to 500 volts and 25, 60 or 133 cycles and 1, 2 or 3 phase.

Single Phase tools can be run from a lamp socket.

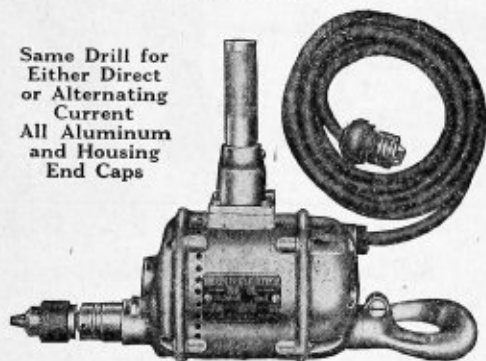
Two and Three Phase motors cannot be run from a lamp socket, but must be operated from power circuit. Where voltage is over 250, 2 or 3 phase should be ordered.

Single Phase Machines can be run from a lamp socket on the 2 or 3 phase circuit by attaching to one phase of the line.

Drills over 1½ inch capacity and grinders over 1 H. P. furnished for two or three phase only.

Universal Drill

Same Drill for
Either Direct
or Alternating
Current
All Aluminum
and Housing
End Caps



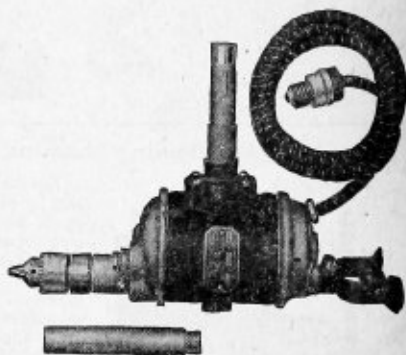
Very handy for outdoor portable work where different currents are encountered. A drill wound for 110 volts can be used on D. C. or A. C. current of the same 60 cycles single phase. A drill wound for 220 volts can be used on D. C. or A. C. current of same voltage, 60 cycles, single phase. Size U has one side handle—other sizes have two side handles—one is detachable for close corner work, one operates switch.

Type	Price	Capacity, in Steel, Inches	Weight, Pounds	Speed, R. P. M.
U	\$44.00	1½	7	1000
UB	48.00	1¾	8	900
UT	55.00	2	12	800
UH	72.00	2½	18	500
*UD	76.00	1½	19	450-750
US	98.00	2	36	250
*UU	106.00	2½	38	250-400

*Two speeds.

Hand or Breast Drills

Direct and Alternating Current



Cut shows Side Drive Drill with detachable handle for close corner work—can supply center drive drill at same price. Fitted with chucks.

Taper sockets can be had with ½ inch drills if desired. Screw feed can be furnished at extra price.

All drills will bore in wood to a greater capacity. Can furnish special slow feed drills for drilling in marble, glass, slate, etc.

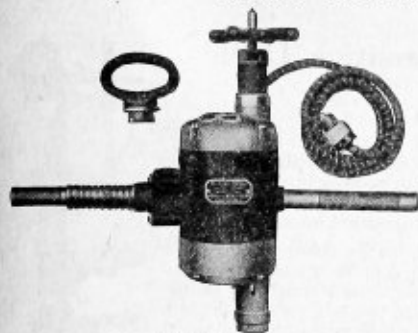
Alternating current drills weigh slightly more. *Has two speeds, 450 and 750.

Direct		Alternating		Capacity in Steel	Speed R. P. M.	Wt. D. C. Lbs.
Size	Price	Size	Price			
A	\$42.00	AA	\$44.00	1½	900	7
B	52.00	BA	55.00	2	750	12
C	65.00	CA	68.00	2½	450	18
CC*	70.00	CX	72.00	3½	450-750	19

*Two speeds.

"Cincinnati" Heavy Duty Electric Drills

Portable—Screw Feed—Direct and Alternating Current

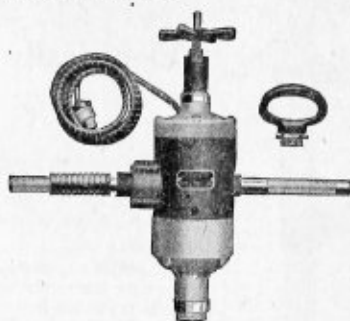


Side Drive

Particularly adapted for hard usage. Fitted with telescopic screw-feed and shovel handle. Has No. 2 Taper socket— $\frac{1}{2}$ inch chuck for smaller bits furnished as an extra. Switch operated from one side handle—other handle is detachable.

Capacity in Steel Inches	Speed R. P. M.	Weight D. C. Lbs.	Direct		Alternating	
			Size	Price	Size	Price
$\frac{1}{4}$	260	35	D	\$84.00	DA	\$86.00
$\frac{3}{8}$	260-450	37	DD*	88.00	DDA	90.00
$\frac{1}{2}$	220	38	E	90.00	EA	92.00
$\frac{3}{4}$	220-410	40	EE*	94.00	EEA	96.00

*Are two speed drills.

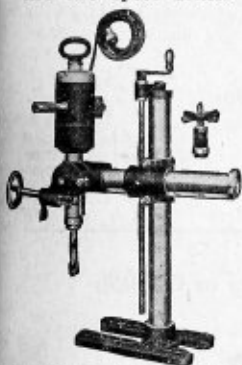


Center Drive

Showing largest type of drills from 1 to $2\frac{1}{2}$ inches.

Gears and armature are mounted on ball bearings and chuck spindle is fitted with end thrust bearings, insuring easy running. All working parts hardened. Switch in one handle, other handle is detachable.

Capacity in Steel Inches	Speed R. P. M.	Weight D. C. Lbs.	Direct		Alternating	
			Size	Price	Size	Price
1	200	40	F	\$ 96.00	FA	\$ 98.00
$1\frac{1}{4}$	150	42	G	105.00	GA	110.00
$1\frac{1}{2}$	120	70	H	120.00	HA	125.00
2	95	80	J	132.00	JA	135.00
$2\frac{1}{2}$	85	90	K	148.00	KA	145.00



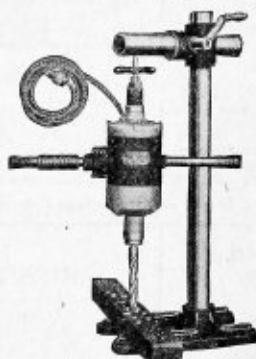
Portable Scotch Radial Drill
—Detachable Motor

Has rack on spindle casing of the drill motor which is detachable from the stand and can be used independently as a portable screw feed drill. Has a 5-inch vertical feed and practically the same adjustments as the MO type. Two speeds.

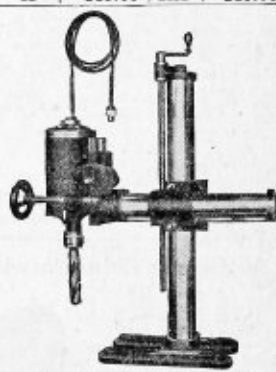
Capacity in Steel Inches	Speed R. P. M.	Weight Lbs.	Direct		Alternating	
			Size	Price	Size	Price
$\frac{1}{4}$	220-400	160	LS	\$126.00	LSA	\$132.00
1	175-350	200	LO	142.00	LOA	148.00

"OLD MAN" STAND.

Showing screw feed drill in position. Stand can be used with any type of drill over $\frac{1}{2}$ inch capacity. Columns are of Shelby steel tubing and ground. Adjustable vertically and horizontally. Height over all 38 inches, cross arm 12 inches. Weight 80 lbs. Price \$18.50.



"Old Man" Stand



Portable Scotch Radial Drill

Stand has horizontal adjustment by rack and pinion on the cross arm and a vertical adjustment through 34-inch lead screw on upright column. Drill can be set at any angle and has a circle radius of 24 in. in any direction. Has 10-inch hand wheel feed with quick return.

MS size has No. 2 Morse Taper Socket, MO and MM—No. 3, MR has No. 4 and MY has No. 5.

First three sizes have two speeds.

Capacity in Steel Inches	Speed R. P. M.	Wt. Lbs.	Direct		Alternating	
			Size	Price	Size	Price
$1\frac{1}{4}$	155-265	312	MM	\$185.00	MMA	\$200.00
2	95	340	MR	196.00	MRA	210.00

*Two speeds. †Made in two and three phase only.

Write for Special Quotations on Special Electrical Tools.

Electrically Driven Sensitive Drills

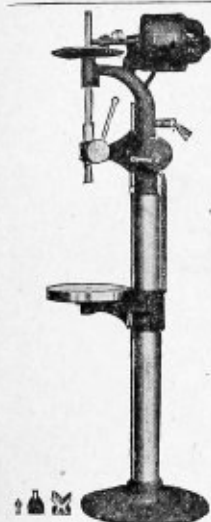
Friction Drive

These tools are designed for light work and will drill holes up to 5/8-inch in diameter. The spindle is made of tool steel, is counterbalanced by a spring, and is provided with a ball thrust bearing. The weight and thrust of the friction disc is also carried on a ball bearing.

The table is counterbalanced by a weight in the column and can be swung around out of the way when desired. A finished boss is provided on the base under the spindle for convenience in centering long shafts. There is an index line on column for setting the table central at any height. The friction disc drive permits of quick adjustment of speed and also keeps the power in proper proportion to the size of the drill. Furnished complete, ready to run. No belts, shafting or countershafting necessary.



Friction Drive Bench Type



Friction Drive Floor Type

Specifications

Type	Floor	Bench
Drills in center of, inches	12 16	12 16
Will drill holes, inches	1/2 3/4	1/2 3/4
Greatest distance from table to spindle, ins.	35 40	12 12
Vertical traverse of spindle, inches	3 3	2 3
Vertical adjustment of table, inches	35 35	6 7 1/2
Diameter of spindle in sleeve, inches	3/8 3/8	3/8 3/8
Diameter of spindle above sleeve, inches	3/8 3/8	3/8 3/8
Finished diameter of column, inches	3 3 1/4	3 3 1/4
Movement of sliding head, inches	8 8	8 8
Entire length of spindle, inches	24 27 1/2	24 27 1/2

Type	Floor	Bench
Diameter of table, inches	11 1/2 15 1/2	11 1/2 15 1/2
Max. height with spindle up, ins.	74 79	46 47 1/2
Hole in spindle fits Morse taper		
No., inches	1 2	1 2
Weight, pounds	250 310	222 280
Approximate speed of motor, R. P. M.	1500 1400	1500 1400
Floor space, inches	23x18 30x16	21x12 30x12
Maximum horse power	1/2 1/2	1/2 1/2

Floor Type

	Prices Each
	12 inch 16 inch
Direct current	\$294.00 \$350.00
2 or 3 phase, 60 cycles	307.00 393.00
Single phase, alternating current, 60 cycles	320.00 407.00

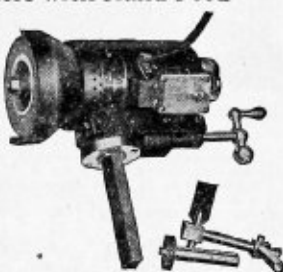
Bench Type

	Prices Each
	12 inch 16 inch
Direct current	\$280.00 \$357.00
2 or 3 phase, 60 cycles	294.00 380.00
Single phase, alternating current, 60 cycles	307.00 393.00

Wound for 110 or 220 Volts, Direct or Alternating Current, 60 Cycle only

Center Grinders with Hand Feed

Designed specially for grinding lathe centers—entirely self-contained—no loose parts. Complete, as shown, with internal grinding attachment. Larger or smaller wheels can be used.



The clamp for holding adjustment arm can be removed. The wheel end bearings are all made taper with adjustment for taking up wear. Made in three sizes. Shank removable.

No.	1	1 1/2	2
Traverse of wheel, inches	3	5	5
Size of wheel, inches	4x3 1/2	6x3 1/2	8x1
Size of shank, inches	1/2x1	3/4x1 1/4	1x1 1/2
Weight, pounds	12	22	57
H. P. of motor	1/4	1/2	3/4
Speed, R. P. M.	4500	3600	2400
Direct current, each	\$120.00	\$147.00	\$187.00
2 or 3 phase, each			200.00
Universal, each	133.00	166.00	
Single phase, each			213.50

110 or 220 volts, direct or alternating current, 60 cycles. Can also be furnished without hand feed, at a reduction in price.

U. S. Bench Buffer or Grinder



Bench buffing or grinding motor. Has split taper bearings, adjustable to wear and dustproof. Grease lubrication. Can also be furnished with pedestal base. Length of standard heads 12 inches—can be furnished 18 inches at extra charge. Made in 1/2, 1 and 2 H. P. Direct or alternating current, 110 or 220 volts, 60 cycle, 1, 2 or 3 phase.

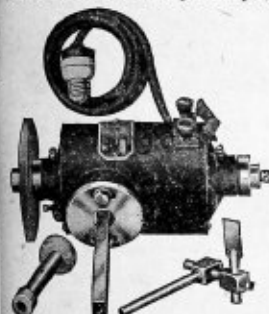
Type	H. P.	Weight	Speed	Wheel	Price
KB	1/2	60 pounds	3000	6x 3/4x3/4	\$ 80.00
KKB	1	87 pounds	2400	6x1 x3/4	113.50
KMB	2	180 pounds	2050	8x1 1/4x3/4	147.50

"Cincinnati" Electric Grinders

The motors, lead wires and brush holders are enclosed, so that short circuiting is avoided, and the vital parts guarded against external injury. Bearings are cone-shaped phosphor bronze, adjustable for wear and fitted with dust caps to protect the bearings and windings from emery and dust.

Tool Post Grinder Without Feed

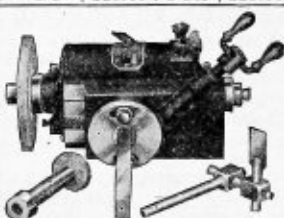
Practically the same as Type S, listed below, except that it has no horizontal feed, which is not necessary if used on a lathe having compound rest or on a machine tool with feed.



This grinder is particularly adapted for work requiring absolute rigidity. Tool rests and extension mandrel included with sizes P. and P. H. only.

H.P.	Speed R.P.M.	Size of Wheel	Wt. Lbs.	Direct		Alternating	
				Size	Price	Size	Price
1/4	4,200	4 1/2 x 3 1/2	16	P	\$32.00	PA	\$38.00
1/2	2,800	8 x 3 1/2	35	PH	55.00	PHA	65.00
1	2,000	10 x 1	75	PO	74.00	POA	88.00
2	1,600	12 x 1 1/2	198	PT	110.00	PTA	120.00

Tool Post Grinder With Horizontal Feed



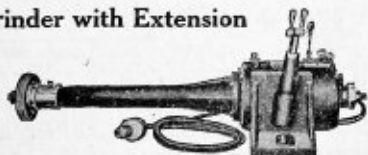
This grinder has horizontal free hand feed, an exclusive feature. Especially adapted for grinding Lathe Centers, Cutters, Reamers, Dies, Rolls, etc., and for surface, parallel and internal grinding jobs of all kinds. Can be used on lathes, planers, boring mills, milling machines or shapers.

Includes one emery wheel, one extension mandrel with wheel, one tooth rest, six feet of cord and plug. Size of mandrel for 1/4 H. P. 4 1/2 in. long wheel 1 1/2 x 3/4 x 3/4.

Size of mandrel for 1/2 H. P. 5 1/2 in. long wheel 2 x 1 x 1/2.

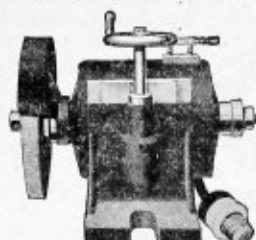
H. P.	Speed R.P.M.	Size of Wheel	Wt. Lbs.	Direct		Alternating	
				Size	Price	Size	Price
1/4	4,200	6 x 3/4	20	S	\$40.00	SA	\$44.00
1/2	2,800	8 x 1 1/2	45	SS	60.50	SSA	70.00

Internal Grinder with Extension



Vertical adjustment, about 4 inches. Standard extension is 12 inches—longer if desired.

H. P.	Speed R.P.M.	Wt. Lbs.	Size of Wheel	Direct		Alternating	
				Size	Price	Size	Price
1/4	2,600	59	4 x 3/4	V	\$78.00	VA	\$88.00
1	2,000	95	5 x 1	VV	98.00	VVA	110.00



Parallel Grinder

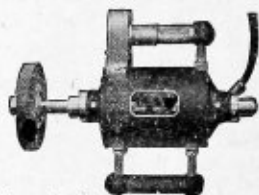
Heavy Duty—for grinding spindles, rolls, journals, bushings, crank shafts, connecting rods and parallel work of all kinds. Angle plate for bolting on to lathe, planer, boring mill or other machine tool. One H. P. and larger have wheel guard. Vertical adjustment, 4 to 6 inches. Size TP and TPA have no slide feed.

H.P.	Speed R.P.M.	Size of Wheel	Wt. Lbs.	Direct		Alternating	
				Size	Price	Size	Price
1/4	4,200	6 x 3/4	20	TP	\$35.00	TPA	\$40.00
1/2	2,800	8 x 3/4	45	T	65.00	TA	76.00
1	2,000	10 x 1	80	TT	85.00	TTA	98.00
2	1,600	12 x 1 1/2	175	TV	128.00	TVA	135.00
3	1,400	14 x 2	220	TF	150.00	TFA	165.00

Hand Aerial Grinder or Buffer

Can be used for buffing, polishing or grinding jobs of all kinds, as any kind of wheel can be attached. Can be carried any distance, as any length of cord may be attached.

A 4 to 6-inch extension mandrel is included for close corner, cylinder or hollow work. 1/2 H. P. and larger sizes have eyebolt and spring for overhead suspension.



H.P.	Speed R.P.M.	Size of Wheel	Wt. Lbs.	Direct		Alternating	
				Size	Price	Size	Price
1/4	4,200	4 1/2 x 3/4	17	HS	\$35.00	HSA	\$40.00
1/2	2,800	8 x 3/4	32	HH	55.00	HHA	58.00
1	2,000	10 x 1	68	AH	80.00	AHA	90.00
2	1,600	12 x 1 1/2	160	AT	128.00	ATA	140.00

Portable Aerial Grinder With End Handles

For grinding rough castings, welded metal or general grinding, buffing or polishing of all kinds.

Any kind of wheel or wire brush can be used. Can be suspended from eyebolt and spring furnished. Wheel guard included with sizes 1 H. P. and over.

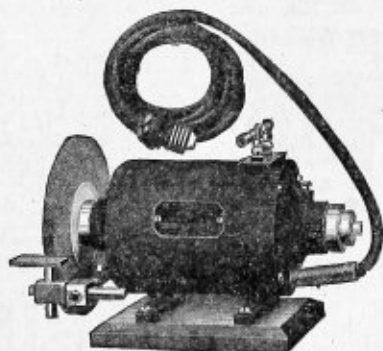


H.P.	Speed R.P.M.	Size of Wheel	Wt. Lbs.	Direct		Alternating	
				Size	Price	Size	Price
1/2	2,500	8 x 3/4	40	WH	\$55.00	WHA	\$65.00
1	2,000	10 x 1	65	WO	80.00	WOA	98.00
2	1,600	12 x 1 1/2	150	WT	128.00	WTA	140.00
3	1,400	14 x 2	215	WW	142.00	WWA	160.00

Cincinnati Electric Grinders

Portable--Air-Cooled

The motors, lead wires and brush holders, are enclosed, so that short-circuiting is avoided and the vital parts guarded against external injury. Bearings are cone-shaped phosphor-bronze, adjustable for wear and fitted with dust caps to protect the bearings and windings from emery and dust.



Single Wheel Bench Grinder

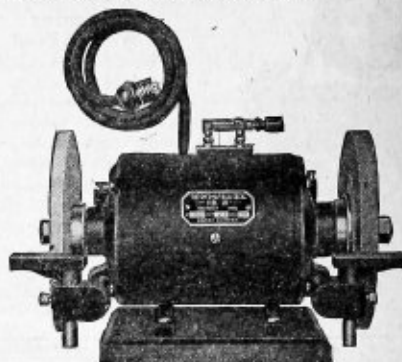
The above portable bench grinder is particularly handy for grinding small tools, etc. It can also be used for buffing and polishing, as any kind of wheel can be attached.

Fully enclosed, dirt and dust proof.

We furnish a tool rest which is detachable. Also an emery wheel and 10 feet of cord with attachment plug.

Twist drill grinding attachment may be added at \$5.00 extra.

H.P.	Speed R.P.M.	Size of Wheel	Wt. Lbs.	Direct Size	Price	Alternating Size	Price
1/4	4200	4 1/2 x 3/8	15	BW	\$30.00	BWA	\$36.00



Two Wheel Bench Grinder

This machine is furnished with a wheel at each end of the spindle—by changing wheels can be used for grinding, buffing or polishing.

Can be set anywhere—runs only when in use. Under immediate control of operator by means of knife switch on the motor.

Sent out with two wheels, as shown, one medium and one hard, also cord and plug.

Twist drill grinding attachment may be added at \$5.00 extra.

H.P.	Speed R.P.M.	Size of Wheel	Wt. Lbs.	Direct Size	Price	Alternating Size	Price
1/4	4200	4 1/2 x 3/8	18	BB	\$35.00	BBA	\$40.00
1/2	2500	8 x 3/4	45	BH	48.00	BHA	64.00

Air-Cooled Bench and Floor Grinders

Two Wheel--Heavy Duty

The bench grinder is same as illustration shown—but without the stand. Suitable for heavy grinding of all kinds—can also be used for buffing and polishing. Motor is fully enclosed and equipped with two detachable tool rests and wheel guards. All bearings are adjustable for wear.

The floor grinder, as shown, is the same as the bench, but mounted upon a heavy stand or pedestal fitted with water pot and tool pans.

Extras—

Twist drill grinding attachment.....\$ 7.50
Wet grinding attachment for 1 H. P., \$22.00, 2. H. P. \$26.00, 3 H. P. 30.00

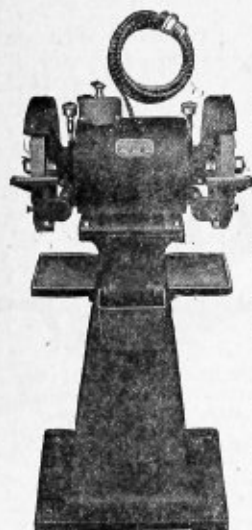
Heavy Duty Bench Grinders or Buffers

H.P.	Speed R. P. M.	Size of Wheels Furnished, Inches	Weight Lbs.	Direct Size	Price	Alternating Size	Price
1	2000	10 x 1 x 3/4	108	BO	\$ 74.00	BOA	\$ 94.00
2	1600	12 x 1 1/2 x 1	260	BT	120.00	BTA*	135.00
3	1400	14 x 2 x 1	280	BL	145.00	BLA*	165.00

Two-Wheel Floor Grinders

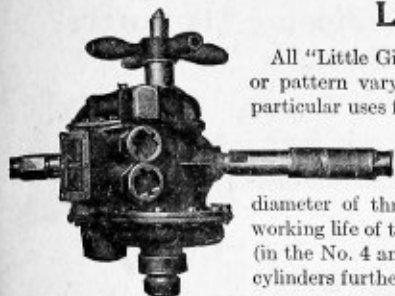
H.P.	Speed R. P. M.	Size of Wheels Furnished, Inches	Weight Lbs.	Direct Size	Price	Alternating Size	Price
1	2000	10 x 1 x 3/4	175	FO	\$ 96.00	FOA	\$110.00
2	1600	12 x 1 1/2 x 1	290	FT	138.00	FTA*	148.00
3	1400	14 x 2 x 1	390	FC	158.00	FCA*	164.00

*Made in two or three-phase only.



Floor Type

Little Giant Improved Air Drills



All "Little Giant" drills and reversible machines are made after a standard design or pattern varying only in size and construction necessary to adapt them to the particular uses for which they are intended.

The ball bearings on the cranks reduce the loss from friction to a negligible quantity; the increased port areas and directness of port passages practically annihilate wire-drawing effects; the increased diameter of thrust bearings and strengthening of other wearing parts extend the working life of the drill far beyond any previous limits; the hand-holes in the cylinders (in the No. 4 and larger) and the method of bolting the bonnets and gear cases to the cylinders further simplify the problems of repair.

No.	Diameter Piston, Inches	Length Stroke, Inches	Speed Light R. P. M.	Drilling Capacity, Inches	Net Weight, Pounds	Price Each
1	2	1 1/4	340	2	58	\$80.00
2	1 1/2	1 1/8	480	1 1/4	40	75.00
4	1 1/2	1 1/8	700	3/8	22	70.00
1R	2	1 1/8	240	2	60	85.00
2R	1 1/2	1 1/8	340	1 1/4	42	80.00
4R	1 1/2	1 1/4	500	3/8	24	75.00

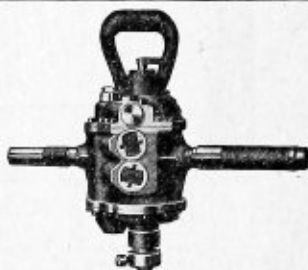
R after the number indicates reversible drills.

All of these drills may be fitted with internal or compound gearing, which reduces the speed but increases the power and adapts them for heavier work.

Little Giant Wood Boring Machines

Made in a wide range of sizes, the No. 5 and No. 14 being the most popular. Other sizes and styles upon request.

Size	Speed, Light, R. P. M.	Capacity, Inches	Net Weight, Pounds	Price Each
No. 5	650	2	24	\$75.00
No. 14	570	4	32	80.00



No. 4 drilling through a brick wall—holes are clean, round and uniform

Portable Electric Hammer Drills

For Concrete, Brick or Stone

Strikes about 50 times as many blows as a man with a hand hammer, effecting an immense saving in labor over hand methods.

The No. 4 is an all-around tool. Will drill up to 1-inch holes in concrete at the rate of three inches per minute and can be used for chipping, bush hammering, etc., or wherever star drills, chisels, etc., can be used.

Largely used for expansion bolt and hanger bolt work in modern concrete buildings, for pipe openings and electrical work.

Principle of operation is simple, consisting of a motor which drives the plunger of the tool and is connected to it by a flexible magnetic clutch.

The elasticity of the magnetic connection between the sleeve and plunger absorbs the sudden jabs and strains incident to the delivery of the blow and the reciprocation of the plunger, giving a perfect magnetic cushion.



No. D3

Direct Current Drills

No.	Voltage	Power Consumption, Watts	Blows per Minute	Capacity in Concrete	Weight, Pounds	Price Each
D3	110 or 220	150	4000	1 1/2-inch	14	\$105.00
D4	110 or 220	220	1800	1 -inch	25	130.00
D7	110 or 220	550	1300	1 1/2-inch	50	175.00

Universal Drills

Operate on direct or alternate current 25, 30 or 60 cycles.

No.	Voltage	Power Consumption, Watts	Blows per Minute	Capacity in Concrete	Weight, Pounds	Price Each
U2	110 or 220	150	4000	1 1/2-inch	15	\$130.00
U6	110 or 220	240	1800	1 -inch	27	160.00



No. D4

Prices on Bits and Drills will be found in another section of catalog.

"Boyer" Pneumatic Riveting and Chipping Hammers Holder-Ons and Rivet Busters

The Boyer Hammer in its various forms is divided into three distinct members, cylinder, handle and valve, a principle of construction that provides for quick examination and economical upkeep and repairs. In each of these members there is a moving part subject to wear but in varying degrees. It is frequently possible to replace but one of these members and obtain a comparatively new hammer as a result. All parts are made with jigs and templates and are absolutely interchangeable.



No. 80 Riveter

Boyer Riveting Hammers



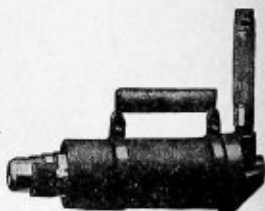
No.	Diameter Piston, Inches	Length Stroke, Inches	Capacity Rivets	Cubic Feet Free Air per Minute	Net Weight, Lbs.	Price
40	1 $\frac{1}{16}$	4	$\frac{9}{16}$	25	14	\$50.00
50	1 $\frac{1}{8}$	5	$\frac{3}{4}$	25	20	50.00
60	1 $\frac{1}{8}$	6	$\frac{7}{8}$	25	23	50.00
80	1 $\frac{1}{8}$	8	1 $\frac{1}{8}$	25	25	50.00
90	1 $\frac{1}{8}$	9	1 $\frac{1}{4}$	25	26	50.00
11	1 $\frac{1}{8}$	11	1 $\frac{1}{2}$	40	31 $\frac{1}{2}$	60.00

Chipping and Calking Hammers

Size	Suitable for	Diam. Piston, Inches	Length Stroke, Inches	Cu. Ft. of Free Air per Min.	Net Weight, Lbs.	Price Each
KB1	Light chipping	1 $\frac{1}{8}$	1	10	11 $\frac{1}{2}$	\$40.00
KB1X	Light chipping and calking	1 $\frac{1}{8}$	1 $\frac{1}{2}$	11	12 $\frac{1}{2}$	40.00
BK2	Average chipping and calking	1 $\frac{1}{8}$	2	12	13	40.00
BK2X	Average chipping and calking	1 $\frac{1}{8}$	2 $\frac{1}{2}$	12 $\frac{1}{2}$	14	40.00
BK3	Heavy chipping or calking and light riveting	1 $\frac{1}{8}$	3	13	14 $\frac{1}{2}$	40.00
BK3X	Heavy chipping or calking and light riveting	1 $\frac{1}{8}$	3 $\frac{1}{2}$	13 $\frac{1}{2}$	15	40.00
BK4	Heaviest chipping	1 $\frac{1}{8}$	4	14	15 $\frac{1}{2}$	40.00

Boyer Holder-On

Size and Style	Diam- eter Piston	Length, Stroke Inches	Shortest Length Overall Including Set Inches	Net Weight, Lbs.	Price
Long	3 $\frac{1}{8}$	4	13 $\frac{3}{8}$	26	\$25.00
Short, offset piston	3 $\frac{1}{8}$	4	9 $\frac{3}{4}$	25	25.00
Short, center piston	3 $\frac{1}{2}$	4	8 $\frac{7}{8}$	26	25.00
Extra-short offset	3 $\frac{1}{2}$	1 $\frac{1}{8}$	6	14	25.00



Boyer Rivet Buster

A handy machine for cutting off rivets in structural iron works, boiler and railway shops and in the dismantling and removal of steel structures of all kinds.

It is fitted with a special chisel holder which prevents the shooting out of the chisel and piston and will cut off $\frac{3}{4}$ and $\frac{7}{8}$ -inch rivets in from three to eight seconds.



No.	Diam. Piston, Ins.	Lgth. Stroke Ins.	Blows per Min.	Free Air per Min. Cu. Ft.	Length Overall Including Chisel, Inches	Wght. with Chisel, Lbs.	Price Each
1	1 $\frac{3}{4}$	9	680	40	38 $\frac{3}{4}$	66	\$150.00
2	2 $\frac{1}{4}$	12	360	50	40	137	200.00

We supply complete Air Plants, Compressor and Power, Tanks, Tools, Etc.

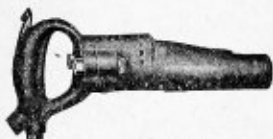
"Little David" Pneumatic Tools



Riveter with Retainer



Riveter without Retainer



Chipper



Holder On

In the Little David riveter and chipper the valve chamber is independent of the piston chamber, eliminating any chance of injury to the valve, an entirely new construction. The handle is attached to the barrel by means of through bolts and lock washers, no chance of coming loose and easy to take apart without the aid of a vise. Riveters can be supplied with an effective rivet set retainer on order; it can also be supplied as a rivet set.

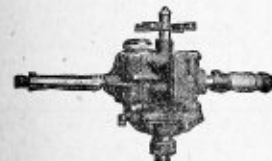
Style	Size No.	Suitable for	Cyl. Diam.	Stroke, Inches	Air Inlet	Size Hose	Length, Inches	Weight, Pounds	Price Each
Riveting Hammers	40	Driving rivets $\frac{1}{8}$ -inch diameter and less	$1\frac{1}{8}$	4	$\frac{3}{8}$	$\frac{1}{2}$	14 $\frac{1}{2}$	14	\$ 60.00
	50	Driving rivets $\frac{3}{8}$ -inch diameter and less	$1\frac{1}{2}$	5	$\frac{3}{8}$	$\frac{1}{2}$	16 $\frac{1}{2}$	19 $\frac{1}{2}$	67.00
	60	Driving rivets $\frac{1}{2}$ -inch diameter and less	$1\frac{1}{2}$	6	$\frac{3}{8}$	$\frac{1}{2}$	17 $\frac{1}{2}$	21	67.00
	80	Driving rivets $\frac{3}{4}$ to 1-inch diameter	$1\frac{1}{2}$	8	$\frac{3}{8}$	$\frac{1}{2}$	19 $\frac{1}{2}$	23	67.00
	90	Driving rivets $\frac{3}{4}$ to $1\frac{1}{4}$ -inch diameter	$1\frac{1}{2}$	8	$\frac{3}{8}$	$\frac{1}{2}$	19 $\frac{1}{2}$	28	67.00
Jam Riveters	0	Driving rivets up to $\frac{3}{8}$ -inch diameter	$1\frac{1}{4}$	4	$\frac{3}{8}$	$\frac{1}{2}$	10	30	134.00
	1	Driving rivets up to $1\frac{1}{4}$ -inch diameter	$1\frac{1}{4}$	5	$\frac{3}{8}$	$\frac{1}{2}$	11 $\frac{1}{2}$	32 $\frac{1}{2}$	167.00
Chippers and Calkers	N-0	Very light chipping and scaling	$\frac{1}{2}$	$1\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{2}$	10 $\frac{1}{2}$	6 $\frac{1}{2}$	47.00
	N-1	Very light chipping and scaling	1	$1\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{2}$	10 $\frac{1}{2}$	6 $\frac{1}{2}$	47.00
	1	Light chipping and calking	$1\frac{1}{8}$	1	$\frac{3}{8}$	$\frac{1}{2}$	11 $\frac{1}{2}$	12 $\frac{1}{2}$	53.50
	2	Light chipping and calking and flue bead	$1\frac{1}{2}$	2	$\frac{3}{8}$	$\frac{1}{2}$	12 $\frac{1}{2}$	12 $\frac{1}{2}$	53.50
	3	General calking and calking	$1\frac{1}{2}$	3	$\frac{3}{8}$	$\frac{1}{2}$	13 $\frac{1}{2}$	13	53.50
	4	Heavy chipping and calking	$1\frac{1}{2}$	4	$\frac{3}{8}$	$\frac{1}{2}$	14 $\frac{1}{2}$	13 $\frac{1}{2}$	53.50
	5	Extra heavy chipping and calking	$1\frac{1}{2}$	4	$\frac{3}{8}$	$\frac{1}{2}$	14 $\frac{1}{2}$	14 $\frac{1}{2}$	53.50

Holder On Type 4 HO. Length closed, 14 $\frac{1}{2}$ inches; open 19 inches, including tail piece and rivet set. Length of feed is 4 $\frac{1}{2}$ inches; side to center of rivet set 1 $\frac{1}{2}$ inches; hose connection, $\frac{3}{8}$; weight 26 lbs. Price.....\$33.50

Retaining springs and three rivet sets \$5.50 extra.

"Little David" Piston Air Drills

Reversible and Non-Reversible



The motor is of the angular four cylinder, single acting type, each pair of pistons being attached to opposite throws of a double crank shaft mounted on ball bearings. The connecting rods are provided with roller bearings.

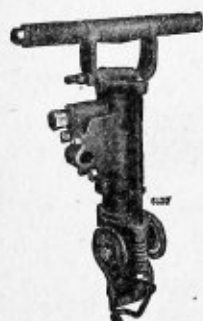
Adapted for drilling, reaming, tapping, flue-rolling and wood boring. Can be had reversible or non-reversible; specify which.

Size No.	Average Free Speed 90 Lbs. R. P. M.	Cu. Ft. per Min. 90 Lbs. Press.	Length Feed, Inches	Capacity					Length Over All	Morse Taper Socket	Hose, Inches	Dist. Side to Center of Spindle	Weight Pounds	Price Each
				Size Wood Bit Will Drive	Ream- ing, Inches	Tap- ping, Inches	Flue Roll- ing, Inches	Drill- ing, Inches						
1 AA	325	55	5		1 1/8	1 1/4	2 1/2	1 3/4	14 1/2	4	3/4	4 1/2	57	\$127.00
1 A	250	55	5		1 3/4	2	3 1/2	2	14 1/2	4	3/4	4 1/2	57	120.00
1 B	200	55	5		2	2 1/4	4	2 1/4	14 1/2	4	3/4	4 1/2	57	120.00
1 C	150	55	5		2 1/2				14 1/2	4	3/4	4 1/2	57	134.00
18 D	100	55	5		Extra Heavy Reaming, Tapping and Flue Rolling				18	5	3/4	4 1/2	62	134.00
18 E	100	55	5						18	5	3/4	4 1/2	70	134.00
2	375	50	4 1/2		1	1	2 1/2	1 1/4	13 1/2	3	3/4	3 1/2	42	107.00
2 S	375	50	4 1/2		1	1	2 1/2	1 3/4	14 1/2	4	3/4	3 1/2	44	114.00
2 C	325	50	4 1/2		1	1	2 1/2	1 3/4	14 1/2	3	3/4	3 1/2	42	107.00
2 SC	325	50	4 1/2		1 1/8	1 1/4	3	1 3/4	13 1/2	4	3/4	3 1/2	44	114.00
3	500	30	3 3/4		3/4	3/4		3/4	11 1/2	2	1/2	3	23	100.00
3 SC	200	30	3 3/4		1	1		1 1/4	23	3	1/2	3	25	114.00
4	4 to 900	17	2 1/2					1/2	13 1/2	1	1/2	3	14	80.00
44	14 to 3000	17		1 1/2				1/2	15 1/2		1/2	2 1/2	10	67.00

Standard Wood Boring Machine

12	375	50		4					17 $\frac{1}{2}$		$\frac{3}{4}$	3 $\frac{1}{2}$	33	107.00
13	700	30		2					15 $\frac{1}{2}$		$\frac{1}{2}$	3	20	100.00
14	4 to 900	17		1					15 $\frac{1}{2}$		$\frac{1}{2}$	2	14	80.00
9	150	40	3 $\frac{1}{4}$		Close 2 Quar. 2	Drill	3		9	4	$\frac{1}{2}$	1 $\frac{1}{2}$	35	167.00
7	3400				Little David Grinder				20 $\frac{1}{2}$		$\frac{1}{2}$	3 $\frac{1}{4}$	22	114.00

See Index for Glover Air Hose Couplings—they save the air.



The "Jackhammer" Drill—BCR-430

An all steel, self rotating, hand hammer drill for holes of average size and depth. It will operate on either steam or air.

Requires 70 to 80 cubic feet of air or $2\frac{1}{2}$ to 3 boiler horse power.

Used for shaft sinking, trench digging and block holing. Owing to its ability to operate on steam, it is very popular with steam shovel and dredge operators for breaking up boulders ahead of the machine.

Coal miners find the Jackhammer far superior to ordinary hand augers for boring coal. It has the additional advantage that it may be used for ordinary rock drilling for development work.

The "Jackhammer" by reason of its high drilling speed and automatic rotation which entirely relieves the operator of the fatigue of hand rotation, far exceeds the ordinary type of hand drill. The rotation is also more positive, so that trouble experienced with rifled holes or steels sticking is materially reduced.

Its drilling capacity is usually sufficient to obviate the use of a tripod drill on intermittent work where shallow holes are required.

None but the very best materials enter into its construction, so that maximum stand-up qualities are ensured. All parts subject to wear are given special treatment and ground accurately to size.

It is equipped with the "Butterfly" valve and automatic lubrication.

Water "Jackhammer" Drill—BCRW-430

This is a standard "Jackhammer" equipped with a device for feeding water and air to the bit, through the hollow drill steel.

A water tube is mounted in the handle and passes through the rifle bar and piston into the shank of the drill steel.

This device absolutely eliminates the dust nuisance. Standard dry Jackhammers may be converted into water Jackhammers by substituting a few parts.

The water Jackhammer requires water at the drill under a pressure of at least 25 pounds. If water under pressure is not available, a tank can be furnished for connection to the air supply to keep the water under sufficient pressure.

Prices and Specifications

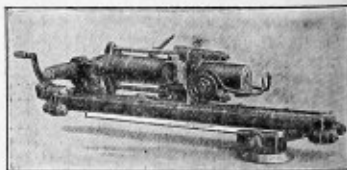
	"BCR-430" Jackhammer	"BCRW-430" Water Jackhammer		"BCR-430" Jackhammer	"BCRW-430" Water Jackhammer
Length, inches.....	19 $\frac{1}{2}$	20	Size of air hose, inch.....	$\frac{3}{4}$	$\frac{3}{4}$
Cylinder diameter, inches.....	2 $\frac{1}{4}$	2 $\frac{1}{4}$	Size of water hose, inch.....	$\frac{1}{2}$	$\frac{1}{2}$
Stroke, inches.....	2	2	Weight, pounds.....	41	41
Steel used, hollow, inch.....	$\frac{7}{8}$	$\frac{7}{8}$	Price each.....	\$190.00	\$190.00
Special spiral or twisted steel as shown in tables.	Hexagon	Hexagon			

J. C. 110 Jackhammer mounting

The mounting is designed to accommodate a standard Jackhammer, either the water type or "dry" type. It is very useful for flat-hole work, such as met with in drifting, underhand stoping, breaking down coal, driving small tunnels, etc. The Jackhammer is easily attached or detached by means of a simple clamping device. This feature makes it possible to use the drill both mounted and unmounted, without loss of time in making the changes.

The carriage is moved by a feed screw which is supported at both ends, these supports acting as stops to prevent the carriage from being fed out of the shell. The feed is augmented by means of a sliding cone, held in place by a clamp.

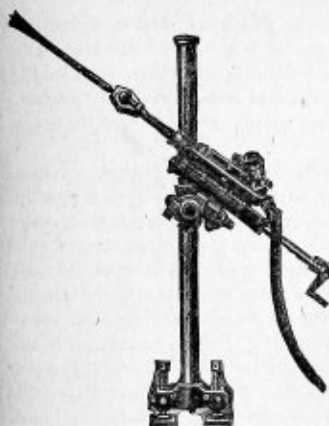
The JC110 mounting is adapted for use on either a column, shaft bar, or tripod, being fitted with a standard 5-inch cone.



Price and Specifications

Distance from center of drilling machine to top of mounting, inches.....	23 $\frac{1}{4}$	Weight, pounds.....	63
Length of screw feed, inches.....	24 $\frac{1}{4}$	Weight with Jackhammer, pounds.....	104
Slide of cone on shell, inches.....	19 $\frac{1}{4}$	Length, inches.....	39 $\frac{1}{4}$
Maximum travel of machine, inches.....	43 $\frac{1}{2}$	Height, inches.....	10 $\frac{1}{4}$
		Price, mounting only.....	\$96.00

C110—The Butterfly Rock Drill



Mounted on Tripod

The Simplest and Most Efficient Drill Made for Steam or Air
This is the latest and most up-to-date Ingersoll-Rand drill and is the fastest drill made of the reciprocating type.

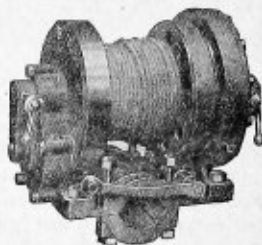
Will drive holes in any direction, either up, down or horizontally. Good up to a maximum of 10 feet depth of hole.

The "butterfly" valve is simply a winged piece of steel. Its movement is as simple as that of a cartwheel; it is indestructible; its action is positive; it controls both inlet and exhaust and when open it instantly exposes a large port area. A new chuck is also furnished with this drill, which accelerates unchucking and saves time changing steels.

Made in One Size Only

Diam. of cylinder, in.....	2 $\frac{3}{4}$	Diam. of hole drilled, in. . .	1 to 1 $\frac{1}{2}$
Length of stroke, in.....	6 $\frac{1}{4}$	Diam. of oct. st. used, in. . .	$\frac{1}{8}$ & 1
Length of drill from end of crank to end of piston, in. . .	42	Size of drill shanks, in. . .	$\frac{3}{8}$ or 1x5
Depth of hole drilled without change of steel, in. . .	20	Number of pieces in set of steels up to 8 feet.....	5
Diam. of supply inlet, in. . .	$\frac{3}{4}$	Wt. of drill, unmounted, lbs. .	130
Strokes per minute at 75 lbs. pressure at the drill.....	600	Wt. of tripod with wts., lbs. .	400
Depth of vertical hole drilled up to 10 feet requires 85 cu. ft. air at 80 lbs.		Wt. of dou. screw col., lbs. .	227
		Price drill, unmounted.....	\$280.00
		Price tripod with weights.....	66.00
		Price double screw column.....	66.00

Little Tugger Hoists



"Little Tugger" hoists are a brand new idea in portable pneumatic hoists. They are the result of a close study of the needs of the mine manager and contractor for some quick and reliable means for hoisting and lowering machines, timbers and other apparatus.

The "Little Tugger" will move a load in the time required to rig up block and tackle or while a workman is collecting a gang of other workmen to give him a "lift." It is equally useful for hauling purposes.

They are wholly enclosed, no moving parts except the drum being exposed, self-lubricating, light and compact, powerful and easy to operate. Built in two sizes, each size can be supplied for operation on either steam or air. Unless otherwise specified the standard air operated hoist will be supplied.

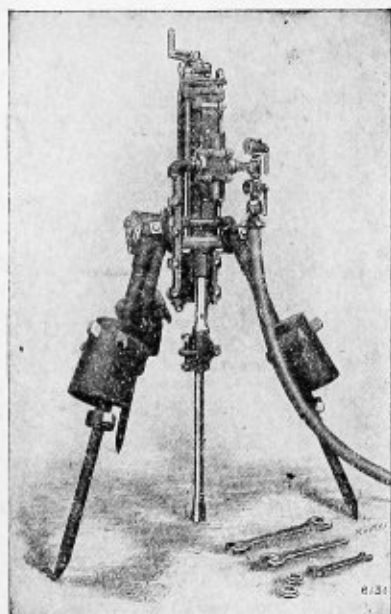
Safety is provided by a powerful band brake operated by a hand lever. A clutch is provided for releasing the drum. Clutch, throttle and brake levers are readily accessible.

Essential Details

	Nos. 1-H and 11-HS	Nos. 11-H and 11-HS
Net work delivered, horse power.....	2 $\frac{1}{2}$	2 $\frac{1}{2}$
Size of drum, rope space, diameter, inches.....	6	7
Size of drum, between flanges, length, inches.....	7	17
Depth of flanges, inches.....	3	5
Rope capacity, maximum, inches, feet.....	$\frac{1}{4}$ —700	$\frac{3}{8}$ —300
Rope capacity, maximum, inches, feet.....	$\frac{3}{8}$ —450	
Hoisting capacity, pounds.....	1000	600
At a rope speed of 85 feet per minute, 80 pounds air or steam pressure.....		
Clamp will fit, inch column.....	4 $\frac{1}{2}$	4 $\frac{1}{2}$
Air connection, inch.....	$\frac{3}{4}$	$\frac{3}{4}$
Weight, without rope, unboxed, pounds.....	285	358
Unboxed dimensions:		
Width, inches.....	21 $\frac{1}{4}$	31 $\frac{1}{4}$
Length, inches.....	16 $\frac{1}{2}$	21 $\frac{1}{2}$
Height, inches.....	20 $\frac{1}{8}$	23
No. 1-H Hoist. Price.....		\$414.00
No. 1-HS Hoist. Price.....		440.00
No. 11-H Hoist. Price.....		467.00
No. 11HS Hoist. Price.....		594.00

"Sergeant" Rock Drills (Type 24)

For Steam or Air



This drill has a wide variation of stroke, secured simply by "cranking" the machine forward, without any valves or other regulating devices. The blow is absolutely dead and no machine of same cylinder diameter can match it in its effective penetrating quality. The ability to run on a very short stroke is of great advantage when starting a hole in an oblique surface and in avoiding a glancing blow. It also admits of the hole being quickly started without "funneling" or "rifling." This feature is of vital importance when working through seams, in shelly or caving material where pebbles fall under the bit, in crevices or alternate layers of hard and soft rock. This drill also "muds" or cleans the cutting out of the hole in a most effective manner. Another valuable feature is in the fact that the valve action is not dependent upon the condition of the cylinder, piston or rings. It has an absolutely positive and independent valve movement. This is the best "all-round" drill made for contractors working in different sections of the country taking a drill from place to place. It is strong and rugged and there is nothing special about it. All bolts and threads are standard, and this drill is most economical in the matter of repairs and air consumption.

Sizes and Information

Size No.	Diam. of Cylinder and Length of Stroke, Inches	Approx. Strokes per Min. 75 Lbs. Pressure at Drill	Diam. of Supply Inlet, Iron Pipe, Inches	Depth of Vertical Hole Will Drill up to	Diam. of Holes Drilled, Inches	Diam. of Octagon Steel Used	Size of Shanks Diam. and Length	No. of Pieces in Set of Steels to Drill Depths Stated	H. P. of Boiler Recommended	Size of Supply Pipe to Carry 100 to 200 Ft.	Weight Tripod with Weights, Lbs.	Weight Drill Boxed, Lbs.	Price Drill as Below	Price Tripod with Weights.
A86	2 x 5	500	3/4	6	3/4 to 1 1/2	7/8 - 3/4	7/8 x 5	5	6	3/4	205	170	\$187.00	\$28.50
B24	2 1/2 x 6	500	1	8	1 to 1 1/2	1 - 3/8	1 x 5	5	8	1	435	235	200.00	48.00
C24	2 1/2 x 6 1/2	375	1	10	1 1/4 to 2 1/4	1 1/4 - 1	1 x 5 1/2	5	8	1	450	320	214.00	59.00
D24	2 1/2 x 6 1/2	350	1	14	1 1/2 to 2 1/4	1 1/4 - 1 1/8	1 1/8 x 6	7	8	1	450	330	240.00	64.00
D44	3 x 6 1/2	350	1	14	1 1/2 to 2 1/4	1 1/4 - 1 1/8	1 1/8 x 6	7	8	1	450	335	267.00	69.50
E24	3 1/2 x 6 1/2	350	1	16	1 3/4 to 2 3/4	1 1/4 - 1 1/8	1 1/8 x 6	8	10	1	540	345	280.00	69.50
E44	3 1/2 x 6 1/2	350	1	16	1 3/4 to 2 3/4	1 1/4 - 1 1/8	1 1/8 x 6	8	10	1	540	350	294.00	80.00
F24	3 1/2 x 7	300	1	20	1 3/4 to 3	1 1/4 - 1 1/8	1 1/8 x 6	10	10	1 1/4	650	465	294.00	80.00
F94	3 1/2 x 7 1/2	300	1	20	1 3/4 to 3	1 1/4 - 1 1/8	1 1/8 x 6	10	10	1 1/4	650	470	294.00	80.00

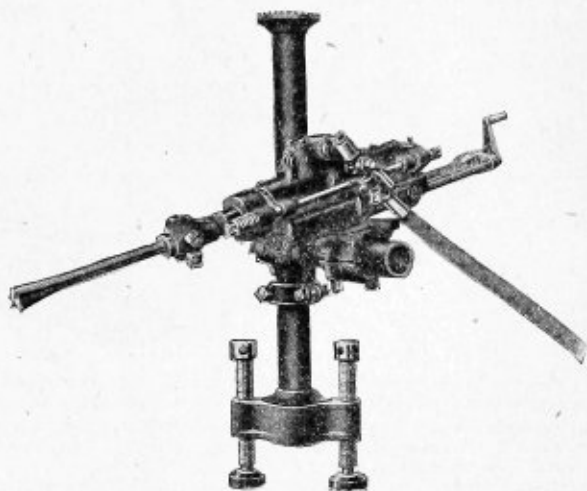
Drill complete includes drill, throttle, oiler and wrenches. Does not include tripod or column mounting, drills or steels, blacksmiths' tools, hose or sand pump which are quoted upon request.

When inquiring be sure to state character of work, kind of rock, size and depth of hole, etc.

Sullivan Rock Drills



Mounted on Adjustable Tripod



Drill on Double-Screw Mining Column

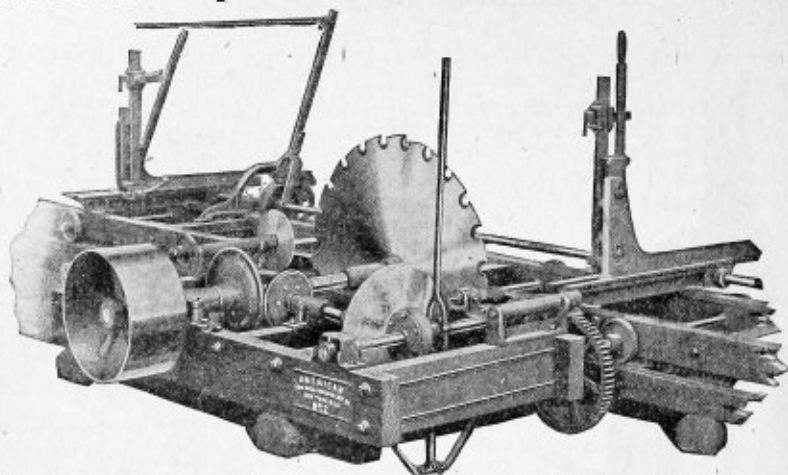
Prices, Weights and Specifications of Sullivan Rock Drills (Unmounted)

Letter indicating size	U A	U S	U B	U C-11	F F-12'	U D	U E-11	U F-11	U H-11	U K
Diameter of cylinder, inches	2	2 1/4	2 1/2	2 3/4	2 3/4	3	3 1/4	3 1/4	3 3/4	4 1/4
Length of stroke, inches	4 1/2	5	5	6 1/4	5 3/4	6 1/2	6 1/2	6 3/4	7 3/4	8
Length of feed (depth, drilled without changing steel), ins.	12	15	20	24	24	24	24	24	24	30
Depth of hole machine will drill easily, feet from 1 to	4	5	6	10	9	12	14	16	20	28
Diameter of holes that may be drilled, inches	5/8 to 1 3/4	7/8 to 2	1 to 2 1/4	1 1/4 to 2 3/4	1 1/4 to 2 1/2	1 1/4 to 3	1 1/4 to 3	1 1/4 to 3	1 1/2 to 4	2 to 5
Diameter of drill steel, inches	3/4 to 1 1/4	3/4 to 1	1/2 to 1	1 to 1 1/2	1 to 1 1/2	1 1/2 to 1 1/4	1 1/2 to 1 1/4	1 1/2 to 1 1/4	1 1/2 to 1 1/4	1 1/2 to 1 1/4
Number of pieces in set of steel to drill holes to depth above stated	4	4	4	5	5	6	7	8	10	10
Diameter of steam inlet, ins.	3/4	3/4	3/4	1	3/4	1	1	1	1 1/4	1 1/4
Size of hose to connect to drill, inches	3/4	3/4	3/4	1	3/4	1	1	1	1 1/4	1 1/4
Size of steam pipe to carry steam 100 to 200 ft, ins.	3/4	1	1	1	1	1 1/4	1 1/4	1 1/4	1 1/2	1 1/2
Size of boiler to supply steam for one drill, H. P.	5	6	8	8	8	8	10	10	12	15
Weight of drill unmounted, pounds	110	148	165	233	155	271	268	282	347	560
Shipping weight of drill, boxed, pounds	141	188	204	279	220	319	315	335	401	630
Price of drill unmounted	\$150.00	\$170.00	\$200.00	\$220.00	\$165.00	\$240.00	\$250.00	\$260.00	\$290.00	\$425.00
Price of tripod with weights	35.00	45.00	55.00	55.00	55.00	65.00	65.00	65.00	75.00	45.00
Price of single screw mining column	35.00	35.00	42.00	46.00	42.00	55.00	55.00	55.00	60.00	60.00
Price of double screw mining column	45.00	45.00	55.00	60.00	55.00	70.00	70.00	70.00	75.00	75.00
Price 50 feet steam hose with couplings	25.50	25.50	25.50	38.30	25.50	38.30	38.30	38.30	55.40	55.40

N. B.—In ordering, state whether steam or compressed air is to be used. Drills are always supplied packed for steam, unless otherwise specified.

Prices on quarry bars, drill steels, sand pumps, B. S. tools, etc., quoted upon request.

"American" Improved Variable Friction Feed Saw Mills



These mills are light running, easy to install, and do not easily get out of order. The latest improved features are embodied in their design, which enables them to cut more timber than other mills using same power.

Variable Feed—Bevel frictions are used as drivers, insuring positive motion, reducing end and lateral thrust, and maintaining a wide range of feed variation. The "gig back" is also positive and will start on highest speed without any slipping; it is many times faster than the feed.

Husk Frames are made of selected timber, well bolted together and thoroughly braced. All shafts are turned and ground perfectly true, and run in self-oiling bearings throughout.

Carriages are of sufficient strength to withstand any reasonable load and hard usage to which saw mill carriages are usually subjected.

Trucks—On all carriage trucks are large diameter, fitted with steel axles running in self-oiling babbitted boxes, with ample provision for taking up all lost motion, and accurately turned to perfectly fit guide track.

Track furnished is rolled steel in 12-foot sections and furnished with suitable holding down spikes.

Set Works—We usually furnish patented combination set works and quick receder, which are accurate and possess many advantages. Two or three pulls of lever will recede the blocks as far as is usually required. We can also furnish the larger mills with double acting set works and spring or foot receder as may be ordered.

Carriage Drives—All standard mills are furnished with rack and pinion carriage drive, but manila or wire rope drive will be supplied, if preferred, with small additional cost.

Equipped with board roll spreader wheel and saw guide.

Standard mill is furnished with rack and pinion carriage drive. Wire cable drive furnished at additional price.

No. of mill	1	2	3	4
Length of husk, feet	7	7½	8	8½
Width of husk, feet	3	3½	4	4
Size of husk timbers, inches	3½x7½	3½x9½	4½x11½	4½x11½
Diameter of mandrel, inches	2½	2½	2½	2½
Largest saw can be used, diameter, inches	52	54	60	60
Diameter of largest log mill will cut	36	40	48	54
Mandrel pulley, inches	20x10	20x10	20x12	20x12
Length of carriage, feet	16	20	24	24
Width of carriage, inches	26	30	36	40
Size of carriage timbers	3½x5½	3½x5½	4½x6½	5½x5½
Length of feed rack, feet	22	26	32	32
Size of truck wheels, inches	6	7	8	10
Number of trucks	4	6	6	6
Head of blocks, open, inches	34	38	44	48
Length of set shaft, feet	14	16	18	20
Length of steel track, feet	40	48	56	56
Horse power required	6 to 15	6 to 20	10 to 30	15 to 40
Approximate capacity feet per day	2,000 to 7,000	2,000 to 10,000	5,000 to 15,000	10,000 to 20,000
Weight complete, pounds	2550	3550	4530	5300
Price standard mill, complete, except without saw	\$310.00	\$375.00	\$450.00	\$550.00
Extra for wire cable drive for carriage	25.00	25.00	40.00	40.00

Larger mills quoted on application. Right hand mills furnished unless otherwise ordered. Mandrel pulleys of any size up to 24 inches in diameter furnished without extra charge if ordered with mill. Mills can all be furnished mounted on trucks. Prices quoted on application.

American Short Saw Mill and Bolter

With variable friction feed, which is light running, admits of wide variation and adapts the mill for light or heavy power.

Any kind of short log sawing, mine or railroad ties, fence posts, handle stock, shooks, slats, etc., can be handled on this machine.

By flitching a log into cuts of desired thickness and then placing several of these, one on top of the other, on the carriage, thin slats, laths, etc., may be made, several at one cut and very rapidly.

Regularly furnished with manila rope drive which is strong, quick in operation and allows carriage to travel the full length of the track. Wire rope drive furnished at extra cost.

Built regularly in two sizes as per specifications below.

No. 1 1/2 Mill

Husk frame 7x3 feet, timbers 3 1/2 x 7 1/2 inches.
Mandrel 2 1/2 inches with pulley 20x10 inches.
Carriage 8 feet by 30 inches, timbers 3 1/2 x 5 1/2 inches.
Trucks 3 with 7-inch wheels 1 1/4-inch axles.
Track and ways complete, 28 feet long.
Floor space required 28x10 feet.
Weight of mill complete, 3,000 lbs.
Weight of track ways only, 350 lbs.
Weight of foundation timbers, 450 lbs.
Weight of truck, if wanted, 1,000 lbs.
Weight of Mill complete, boxed for export, gross, 3,500 lbs.; net, 3,000 lbs.

Carriage..... 8 Ft. 10 Ft. 12 Ft.
No. 1 1/2 mill complete..... \$360.00 \$385.00 \$400.00

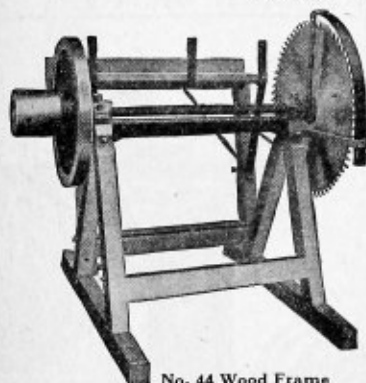
Mounting on four-wheel truck, \$155.00 extra. Foundation timbers, if not wanted, deduct \$12.00. Track way timbers, if not wanted, deduct \$17.50. Pulleys of any size furnished to suit speed of engine and size of saw. Extra charge made for pulleys over 24-inch diameter.

No. 2 1/2 Mill

Husk frame 7 1/2 x 3 1/2 feet, timbers 3 1/2 x 9 1/2 inches.
Mandrel 2 1/2 inches with pulley 20x10 inches.
Carriage 8 feet by 36 inches, timbers 4 1/2 x 6 1/2 inches.
Trucks 3 with 8-inch wheels, 1 1/2-inch axles.
Track and ways complete, 28 feet long.
Floor space required 28x11 feet.
Weight of mill complete, 3,700 lbs.
Weight of track ways only, 400 lbs.
Weight of foundation timbers, 500 lbs.
Weight of truck, if wanted, 1,000 lbs.
Weight of mill complete, boxed for export, gross, 4,500 lbs.; net, 3,700 lbs.

Carriage..... 8 Ft. 10 Ft. 12 Ft.
No. 2 1/2 mill complete..... \$445.00 \$465.00 \$490.00

Power Wood Saw Frames



No. 44 Wood Frame

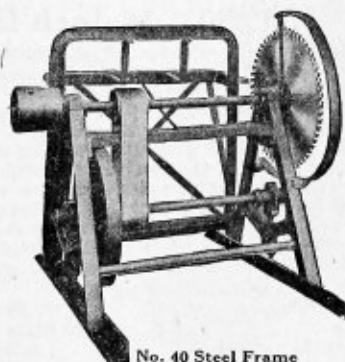
Frame of seasoned timber, securely bolted and braced. Bearings are cast on a solid iron beam extending entire length of the frame which holds them in alignment at all times.

Table is of the swing type, pivoted at bottom on a cast bearing.

This frame can be used with saws 20 to 30-inch diameter. Speeds 1000 to 1500 R. P. M. Pulley 6x6 inches. Weight 250 lbs.

Price..... \$30.00

Price does not include saw blade.



No. 40 Steel Frame

Frame of steel and cast iron securely riveted and bolted together and strongly braced in every direction. Balance wheel is placed on an independent shaft directly under saw arbor, so that poles and long sticks can be sawed to best advantage.

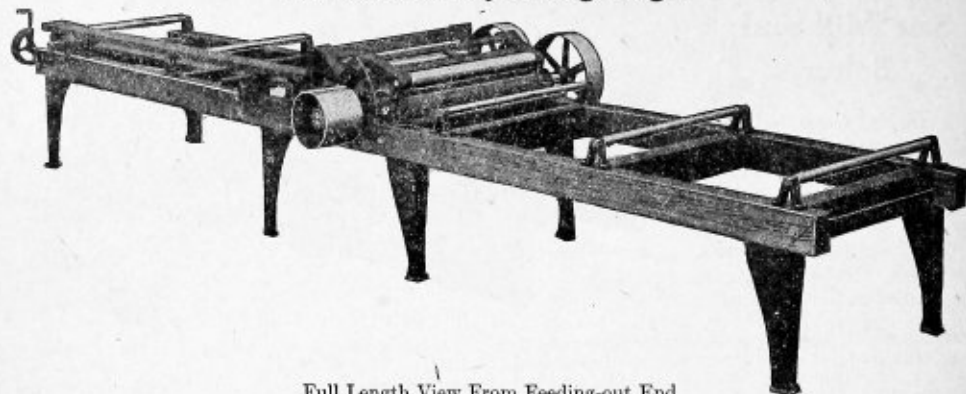
Fly wheel shaft has adjustable bearings.

Frame can be used with saws 20 to 30-inch diameter. Speeds 1000 to 1500 R. P. M. Pulley 6x6 inches. Weight 360 lbs.

Price..... \$48.00

Price does not include saw blade.

33-Inch Pony Gang Edger



Full Length View From Feeding-out End

For small plants or mills cutting 5,000 to 15,000 feet per day this edger is practically indispensable—the increase in capacity and saving in waste soon pays for it.

Made with two or three saws, solid or inserted teeth, single or double pressure rolls, self-oiling shifter forks. Has quick acting ratchet guide and indicator always in view of the operator. Lever saw shift and ratchet to hold saws in position.

For light work, edging boards, etc., the single pressure roll edger is preferred by a good many operators.

Specifications: Floor space, 18 ft. 6 in. by 48 inches. Width inside, 33 inches. Guide adjustment, 4 inches. Mandrel $1\frac{1}{2}$ -inch diameter. Mandrel pulley 8x8 inches. Saws 14-inch diameter. Speed 1600 to 2000 revolutions per minute. Feed belt required is 8 feet long and 4 inches wide. Maximum opening between saws: Two saw edger is 24 inches; three saw edger, 20 inches. Shipping weights: Single roll, 1300 lbs.; double, 1400 lbs.

Two Saw Edgers

	Single Pressure Roll	Double Pressure Roll
Price without saws	\$156.00	\$174.00
Price with solid saws	166.00	184.00
Price with inserted tooth saws	198.00	216.00

Three Saw Edgers

	Single Pressure Roll	Double Pressure Roll
Price without saws	\$174.00	\$191.00
Price with solid saws	190.00	207.00
Price with inserted tooth saws	236.00	253.00

The rear section is detachable in shipping. Front section, including working parts, shifting lever and guide are shipped intact, legs only being removed. Entire machine crated and shipped in one package.

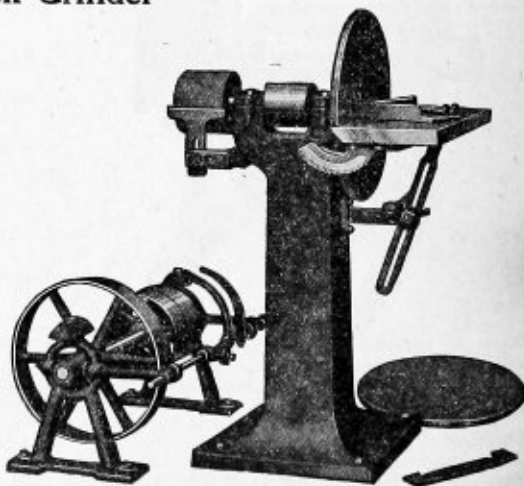
Fig. 490. 18-Inch Disk Grinder

A handy and useful machine for any pattern-shop, wood-working shop, or machine-shop. For use on wood, it will do work similar to a wood-trimmer, but will face off larger surfaces, and do it quickly and accurately. In a metal-working shop it will do a large part of the file-work at a saving of time and files. By using an emery wheel on back end in place of drum it makes a handy grinder. Machine will take emery wheel 10 inches diameter, 1-inch face, 1-inch hole. The table is adjustable for any angle from 45 degrees downward to 45 degrees upward, a graduated scale indicating the angle.

Dimensions

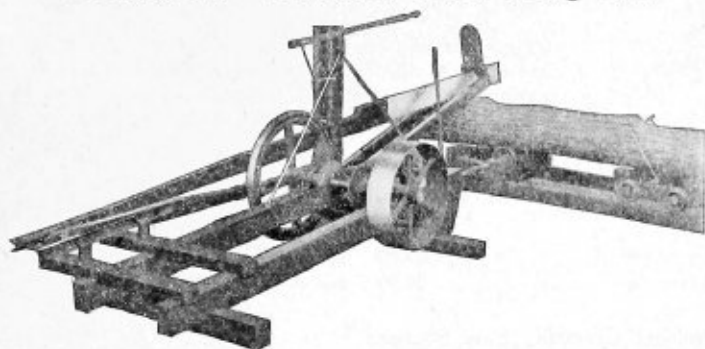
Diameter of disk	18 in.
Size of table	10x24 in.
Diameter and face of drum	6x5 in.
Width of belt for mandrel	3 in.
Size of tight and loose pulleys	8x3 in.
Speed of countershaft per minute	400 rev.
Floor space required, over all	24x27 in.
Shipping weight	475 lbs.
Horse power required	1 to $1\frac{1}{2}$
Price	\$80.00

Equipment. Each machine is equipped with two disks, one drum, one segment-stop, one angle gauge, and one countershaft.



Onoko Metal runs smooth and cool. Use it on your bearings.

"Champion" Friction Feed Drag Saw



The friction feed is positive and effective. Will start, stop or reverse instantly by a very slight motion of the feed lever without any effort on the part of the operator. This enables the operator to feed logs ahead or back and stop at any point without running back or losing time.

Main frame is 26 inches wide and $8\frac{1}{2}$ feet long, made of $3\frac{1}{2} \times 5\frac{1}{2}$ seasoned hardwood. Track is 27 inches wide by 16 feet long, made of $2\frac{1}{4} \times 4$ -inch timbers.

Balance wheel is counter-balanced, imparting a strong, steady motion and is arranged to change the stroke from 16 inches to 20 or 24 inches.

Saw is raised with one hand and the friction feed operated with the other, thus changing and setting for a new cut without slowing down or stopping. Saw guide is provided.

Two to four horse power will operate this machine to good advantage. More power will give greater capacity. Capacity is 30 to 40 cords of wood per day. Speed recommended is 125 to 175 strokes per minute. Shipping weight complete is 1150 pounds.

Price complete with one saw and pulley or universal coupling \$100.00

Price complete with one saw and tight and loose pulley 110.00

Price complete with one saw and without power feed 90.00

Knight's New Ideal Saw Mill Dog

Has improved locking mechanism, controlled by the power lever which automatically locks the dog bit at any point as it is forced into the timber.

The Duplex dogs the log from above and also below. The lower dog is entirely automatic in its action. No adjustment is necessary to bring it into proper position to hold either log or cant.

Directions for Ordering

To avoid delay and insure filling orders correctly, the following information should be given:

Size number, single or duplex, right or left hand. The hand may be determined as follows: On right-hand mills a right-hand dog is used on the front block and a left-hand on the rear or intermediate blocks. On left-hand mills a left-hand dog is used on the front block and right-hand on the rear or intermediate blocks.



Single, R. H.



Duplex, R. H.

Number	Height, Inches	Size Guide Bar	Size Slide Bar	Size Dog Bit	Weight, Pounds		Price per Pair	
					Single	Duplex	Single	Duplex
1	38	3 x $\frac{1}{2}$	2 x $\frac{5}{8}$	1 $\frac{1}{2}$ x $\frac{1}{2}$	60	80	\$ 36.00	\$ 64.50
2	41	3 $\frac{1}{2}$ x $\frac{1}{2}$	2 $\frac{1}{2}$ x $\frac{5}{8}$	2 x $\frac{1}{2}$	95	110	43.00	71.50
3	45	4 x $\frac{5}{8}$	3 x $\frac{5}{8}$	2 $\frac{1}{2}$ x $\frac{1}{2}$	115	125	50.00	78.50
3 Special	49	4 x $\frac{5}{8}$	3 x $\frac{5}{8}$	2 $\frac{1}{2}$ x $\frac{1}{2}$	135	150	86.00	121.50
4	51	5 x $\frac{3}{4}$	3 $\frac{1}{2}$ x $\frac{3}{4}$	2 $\frac{1}{2}$ x $\frac{3}{4}$	175	235	121.50	180.00



Hanchett Saw Swages

The standard tools for swaging saw teeth. Over 16,000 in operation; used in practically every lumber producing section of the world. Several wearing places on the dies. Working parts replaced at slight expense. Make strong teeth that will stand the hardest service.

Hanchett Band and Gang Saw Swage

Size		Price	Size		Price
No. 0.	For saws 8-13 gauge.....	\$33.00	No. 2.	For saws 16-18 gauge.....	\$25.00
No. 1.	For saws 12-16 gauge.....	30.00	No. 3.	For saws 18-26 gauge.....	25.00

Hanchett Circular Saw Swages

Size	For Saws	Style A	Style B	Style C	Style D	Style E
No. 1.	5-10 gauge.....	\$34.00	\$34.00	\$36.00	\$40.00	\$44.00
No. 0.	8-12 gauge.....	34.00	34.00	36.00	40.00	44.00
No. 2.	11-16 gauge.....	32.00	32.00	34.00	36.00	40.00
No. 3.	16-18 gauge.....			29.00	34.00	37.00
No. 4.	19-22 gauge.....			29.00	34.00	37.00

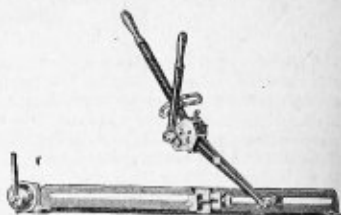
Style A includes bracket for supporting swage, attached to bench.

Style B swage rides the saw on the arbor.

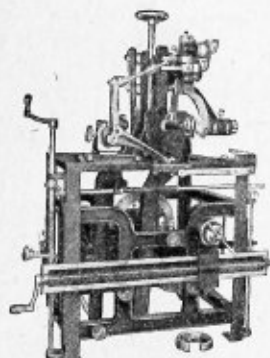
Style C includes bench attachment for holding both the swage and the saw.

Style D includes bench attachment and joiner.

Style E includes bench attachment, joiner and side-file.



Hanchett Style D Circular Saw Swage



No. 736 Automatic Sharpener

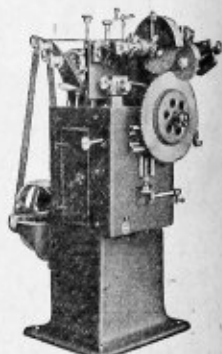
No. 736 and No. 71B Automatic Rip and Cross-Cut Circular Saw Sharpener

Will grind accurately all circular saws within capacity; adjustable to desired spacing and shape of teeth; keep saws in perfect round and all teeth uniform in size and shape; save saws, time and expense, and insure smooth cut.

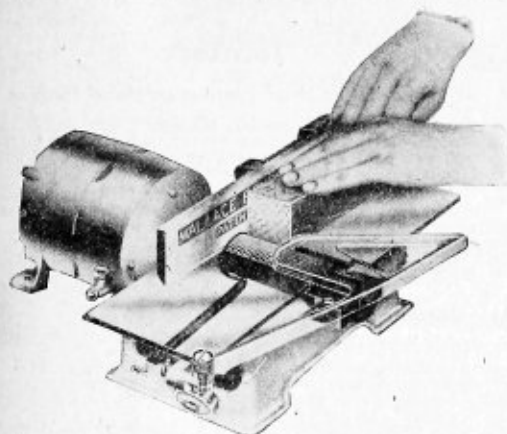
Size	For Saws	Pulleys	Speed	Weight	Price
736	6 to 36 in.	8x2½ in.	340	720 lbs.	\$135.00
71B	8 to 30 in.	5x1¾ in.	420	490 lbs.	110.00
No. 20.	For saws up to 20 inches diameter.....				\$200.00
No. 30.	For saws up to 30 inches diameter.....				250.00

Automatic Sharpener For Relieved Tooth Metal Cutting Saws

For saws with alternating long and short teeth, now coming rapidly into use for fast, smooth cutting of metals enables better work and saves strain on the saws and saw expense.



No. 20 Automatic Sharpener for Metal Cutting



The Wallace Bench Planer

A powerful machine which takes the heaviest cuts in hard or soft wood, and makes a finish cut so smooth that knife marks do not show.

The motor driven type is run from a standard light socket. It is portable and stands on a bench without fastening.

Safety Guards. The flap and shutter guards are patented and can be gotten with no other planer.

The flap is an aluminum casting swinging over the tables, independent of the shutter, when special work such as rabbetting is done, it can be swung off the table. A spring holds it against the stock, so that the unused part of the knives is covered.

The Shutter is part of a steel tube which slides in grooves in the frame, concentric with the cutter head, and covers the throat opening.

The lip of the shutter rests on top of the front table until it is pushed by the stock around under the rear table.

A spring snaps the shutter back over the knives when the cut is finished.

Specifications

Width of cutting knives, inches.....	4
Length of front table, inches.....	10
Length of rear table, inches.....	8
Weight of planer with motor, pounds.....	50
Speed of 2-knife cutter head, R.P.M.....	4000
Speed of 3-knife cutter head, R.P.M.....	3600
Diameter of drive pulley, inches.....	9
Diameter of tight and loose pulleys, inches.....	4
Speed of countershaft, R.P.M.....	900

The Safety Guard. As described above.

The Frame. One piece, no parts to get out of adjustment.

The Cutter Head. Circular safety type, two or three knives.

The Tables. One piece; ground to a true surface. Adjustable to any depth of cut.

The Fence. Adjustable to any angle.

The Finish. All working parts accurately machined and interchangeable.

Price List

With pulley for belt drive and with countershaft.....	\$56.70
With pulley for belt drive and no countershaft.....	50.00
With $\frac{1}{4}$ H.P., 110 volt D.C. (2-knife cutter head).....	80.00
With $\frac{1}{4}$ H.P., 220 volt D.C. (2-knife cutter head).....	85.00
With $\frac{1}{4}$ H.P., 110 volt 60 cycle A.C. motor (3-knife cutter head).....	90.00

With $\frac{1}{4}$ H.P., 220 volt 60 cycle A.C. motor (3-knife cutter head).....	\$92.70
For Flap and Shutter Guard attached (see other side).....	12.00
Extra knives, special steel, each.....	1.30
Motors of other voltage and current priced on application; all motors direct connected.	

The Crescent Hollow Chisel Mortiser

The chisel is square, having a round hollow center, in which the boring bit revolves. The hole is bored and squared at the same time, and by repeating, a mortise of any length is made, with square ends and bottom.

The table is adjusted vertically and horizontally. The travel of bit is operated by foot lever, the maximum depth of mortise being $3\frac{1}{2}$ inches. The stroke is readily shortened to $2\frac{1}{4}$ -inch or less, for heavy work or shallow mortises. The machine runs smoothly without jar or noise. The slide of table and upper head have adjustable gibs to take up wear which adapts it for most accurate work.

The chisel cannot lift the work. The idler and loose pulleys are oiled from chambers in the shafts. The spindle bearings have large capillary oil-chambers.

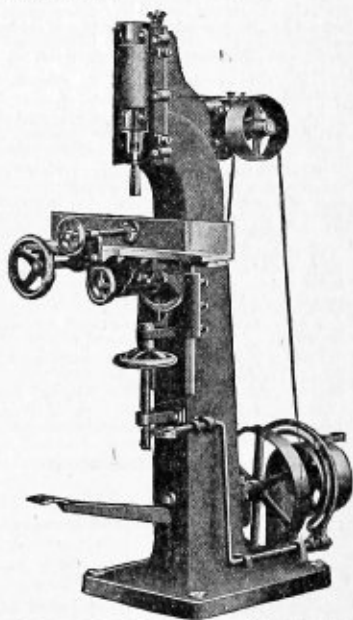
Recommended for chisels up to $\frac{3}{4}$ -inch square for hardwood. When square chisel is removed, it is an efficient borer for round holes up to $\frac{3}{4}$ -inch diameter and $3\frac{1}{2}$ -inch deep.

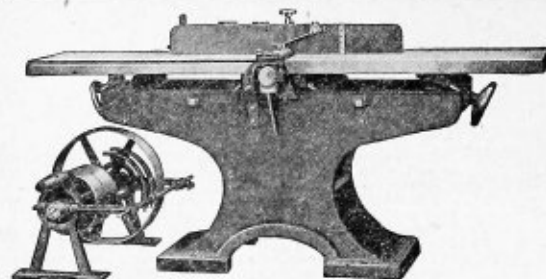
Furnished with table to tilt to an angle of 45 degrees, to right or left, at an extra charge of \$40.00. A scale and pointer indicates the degree of angle.

This tilting table has rack and pinion horizontal adjustment, and clamps for holding work instead of the regular hold-down rods. It is not necessary to remove work until the entire length of mortise is completed.

Specifications

Length of table.....	30 inches
Vertical adjustment of table.....	9 inches
Horizontal adjustment of table.....	$3\frac{1}{4}$ inches
End of chisel to table, maximum.....	13 inches
Size hole in spindle for boring bits.....	$\frac{1}{2}$ inch
Size hole for chisel shank.....	$\frac{3}{4}$ inch
Vertical travel of chisel.....	31 inches
Size of tight and loose pulleys.....	10×3 inches
Size of drive pulley on countershaft.....	$16 \times 2\frac{1}{2}$ inches
Speed of countershaft, per minute.....	500 revolutions
Speed of boring bit, per minute.....	2,600 revolutions
Diameter of pulley on spindle.....	3 inches
Belt required ($2\frac{1}{2}$ inches wide).....	14 feet 5 inches
Floor space required over all.....	30×52 inches
Height of machine, over all.....	72 inches
Power required.....	$1\frac{1}{2}$ h. p.
Cubic measure, boxed for export.....	38 feet
Gross weight, boxed for export.....	850 pounds
Domestic shipping weight.....	700 pounds
Price.....	\$110.00





Showing 12 to 24-inch

Head speeds are all 4000 revolutions per minute

Jointers

Also Called Buzz Planers or Hand Planers

Used for straightening lumber. Will plane one surface straight and out-of-wind—and by use of the "fence" will bring one surface, on dimension stock, square with another, or on accurate bevel with another.

Not intended for surfacing boards to uniform thickness—for such use a regular planer or surfacer must be used.

By use of special cutters a jointer is often used for beading, grooving, making light moulding and other similar work.

Length of Knives.....inches	8	12	16	18	20	24
Length of front, also rear tables.....inches	31½	40	40	40	40	40
Length over all.....inches	65	82	82	82	82	82
Width of tables.....inches	13	15½	19½	21½	23½	27½
Diameter of pulley on head and width belt.....inches	3½x2½	4x4	4x4	4x4	4x4	4x4
Size of tight and loose pulleys.....inches	8x3	10x5	10x5	10x5	10x5	10x5
Speed of countershaft.....R. P. M.	900	800	800	800	800	800
Floor space, exclusive of countershaft.....inches	21x64	31x82	35x82	37x82	39x82	43x82
Horse power required.....H. P.	2 to 3	3 to 4	3 to 4	4 to 5	4 to 5	4 to 5
Shipping weight.....lbs.	800	1375	1525	1625	1700	1800
Price with square head—Solid lips.....	\$130.00	\$150.00	\$165.00	\$170.00	\$180.00	\$190.00
Price with safety head—Steel lips.....	152.00	180.00	210.00	215.00	225.00	250.00

Regular Equipment: Countershaft with self-oiling loose pulley, one fence, one pressure spring, one pair of knives, one jointer guard and one wrench.

Variety Wood Worker

Jointer, Saw-Table, Hand Feed Moulder, Borer, Pole-Rounder and Emery Grinder

It is usually advisable to buy separate machines for the different kinds of work, but when working space does not admit of this, or when there is not enough of each kind of work to justify the expense of separate machines, then a good combination machine may be an advantage.

The Jointer is covered by description of the 8-inch machine listed above.

Machine can be used as a jointer, borer or saw table without any adjustments or changes whatever, as these three features are practically independent of each other.

Saw-Table Attachment. Table is 12x30 inches, groover or dado head can be used. Saw is 10-inch diameter and will cut through pieces 2½ inches thick. Fence will open 12 inches from saw, table graduated on top to show width ripped—sliding cut-off gauge also furnished.

Pole-Rounder has a sliding yoke and can be used at same time as jointer. **Emery Grinder**, 5-inch wheel for light work. **Hand Moulder** is convenient for working small mouldings and other odd jobs.

Borer has a horizontal travel of 8 inches, vertical adjustment is 5 inches—has self-centering chuck.

Safety Guards furnished with each machine.

Hold-down Spring furnished; is useful when working small stock, light moulding, finished strips, etc.

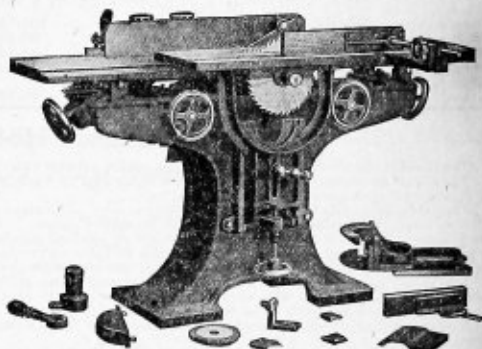
Machine is usually sold with all attachments included. Deduction for various attachments see below.

Deductions

If saw-table is omitted, deduct.....	\$20.00
If Borer is omitted, deduct.....	20.00
If Pole-Rounder, Grinder and Moulder are omitted, deduct.....	20.00

Extras

For Safety Head, \$15.00; for steel Lips, add \$7.00.



Dimensions

Dimensions given below are for complete machine. If some of the attachments are omitted, it will make a corresponding difference in weight, floor space, etc.

Size of tight and loose pulleys.....	8x3 inches
Speed of countershaft per minute.....	800 revolutions
Giving head a speed per minute of.....	3650 revolutions
Width of belt, to head.....	2½ inches
Floor space over all.....	58x64 inches
Power required.....	2 to 3 H. P.
Shipping weight.....	1100 lbs.

Regular Equipment: With jointer is furnished one pair of 8-inch knives, one countershaft having self-oiling loose pulley, one fence, one hold-down spring, one steel wrench for knife bolts, one collar guard and one knife guard.

With borer, one self-centering chuck. (Bits are not included.)

With saw-table, one 10-inch rip saw, one mandrel wrench, one ripping fence, one cut-off gauge, loose collars to fill saw-stub and one saw guard.

With pole-rounder, two pole-guides, one pair of 2-inch straight knives, two pair of rounder knives (for 1-inch and 1½-inch radius), one mandrel wrench, collars to fill spindle, one moulder table, one pressure spring, one emery wheel 5x½-inch, and one grinding rest.

Price complete, as above.....\$200.00

Ajax Rope costs more than others, but for durability it is unexcelled.

Jewel Planer**16 and 20 inch**

Designed for small shops and those requiring a good light single surface planer for general work.

Simple and compact—has large capacity in proportion to its size—working hard or soft wood equally well and particularly adapted for planing short stock.

Has two power feed rolls, one in front and one in the rear of the cutter-head. The feeding roll is fluted to secure a strong, positive feed. Two speeds of feed provided through cone pulleys. Feed can be stopped or started instantly by means of a convenient belt tightener. Bed is accurately planed and fitted with two steel idler rolls.

The cutter head is accurately turned and balanced, its position is not changed for different thickness of lumber.

Built in two sizes—to plane 16 or 20 inches wide and from $\frac{1}{4}$ to 6 inches in thickness. Regularly furnished with one pair of planer knives. No belting with machines. Feed belts require $13\frac{1}{2}$ feet of $1\frac{1}{2}$ -inch belting.

16-inch Jewel planer, with countershaft, weight 720 pounds... \$160.00
20-inch Jewel planer, with countershaft, weight 745 pounds... 140.00
If countershaft is not wanted (weight 150 pounds), deduct... 20.00

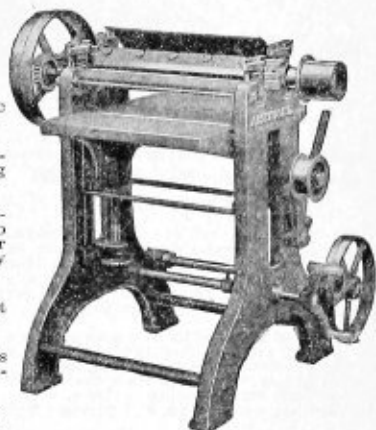


Fig. C...

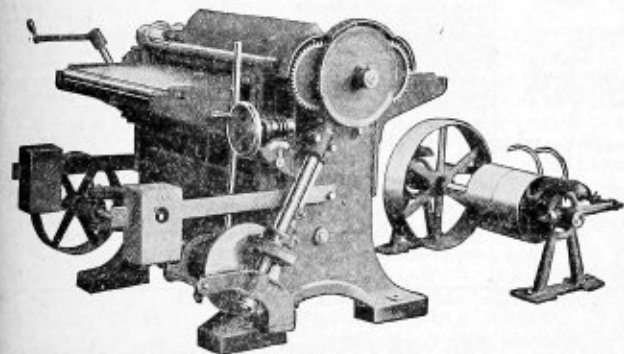


Fig. G...

**Variable
Feed Planers****Nos. 218 and 224**

Variable friction feed from 12 to 50 lineal feet per minute by simply turning a hand wheel.

A pointer and scale indicates the feed being used.

Dimensions

Width and thickness will plane.	No. 218 17 $\frac{1}{2}$ x6 in.	No. 224 23 $\frac{1}{2}$ x6 in.
Length of table.....	44 in.	44 in.
Width of drive-belt.....	4 in.	4 in.
Size of tight and loose pulleys.....	10x5 in.	10x5 in.
Speed of countershaft, per minute.....	825 rev.	825 rev.
Giving head a speed per minute of.....	4,000 rev.	4,000 rev.
Size of bearing on head.....	5x1 $\frac{1}{2}$ in.	5x1 $\frac{1}{2}$ in.
Length of 2-inch feed belt.....	6 ft. 8 in.	6 ft. 8 in.
Floor space, exclusive of countershaft.....	44x43 in.	44x49 in.
Horse power required, see page 125.....	3 to 5	4 to 5
Cubic measure, boxed for export.....	38 ft.	47 ft.
Gross weight, boxed for export.....	1,475 lbs.	1,700 lbs.
Domestic shipping weight.....	1,300 lbs.	1,500 lbs.
Price each.....	\$200.00	\$230.00

Regular Equipment: Each machine is furnished with one countershaft, having self-oiling loose pulley, one pair of two knives and two wrenches.

A new feature of these planers is that they are provided with a variable friction feed, driven direct from the head with a belt. A slow feed, or a fast feed, or any intermediate feed is instantly available, and the change is made by simply turning a handwheel. The changes can readily be made while machine is in motion. The slowest feed is 12 lineal feet per minute, and the fastest, 50 feet per minute; a pointer and scale indicates the feed being used.

When the work to be done is of a common nature, a few turns of the handwheel will set the feed on high-speed, and a marked saving of time will result. Or when extremely smooth work is desired, a few turns of the handwheel, in the opposite direction, will set the feed on slow-speed, and the work produced will be of the desired smoothness. When the rough lumber to be surfaced is not of uniform thickness there is an advantage in using a slow feed for the thicker pieces; in this way it is not necessary to choke down the machine until belts begin to slip; simply reduce the feed according to the thickness of the cut being taken. The same will apply also for wide or narrow boards. In each case the feed is adjusted according to the work being done.

These advantages can hardly be fully realized until tried, but when once tried, will at once seem indispensable. A throw-off lever, at side of table, can be used for instantly stopping the feed entirely, without stopping the machine. The front upper roll is hung with weights.

No. 424 Variable Feed Planer and Matcher

The variable feed feature is the same as described for Nos. 218 and 224 Planers.

The front upper roll is hung with weights instead of springs, and the feed is driven by belt from head instead of being driven from the countershaft. The feed is readily changed; anything from 12 to 50 feet per minute, while machine is running.

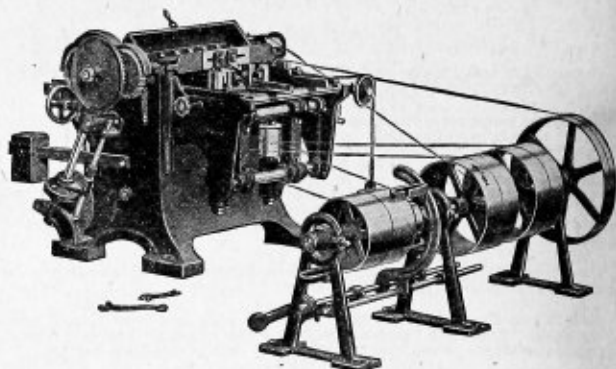
The Head is suited for two planer knives; also slotted on the other two sides for attaching special knives for making molding, beading, siding, etc. There is a clearance of one-half inch for such cutters between the head and the chip-breaker and pressure bar.

The Matcher Heads are made of bronze, mortised to admit knives 2½ inches wide, ⅜-inch thick. They are suited for matching or edging up lumber either square or molded edges. By loosening a set-screw they are readily lifted from their spindles, and the end of spindle is entirely below the surface of the table out of the way for planing.

The Countershaft is placed to rear of the machine on the floor. It cannot be used in any other position. It should be placed at least 96 inches from center of head to center of countershaft. The length of belts and floor space given are based on this distance. The countershaft can be belted in any direction to line shaft and is provided with a convenient shifter.

The Change from matcher to planer is readily and quickly made, requiring but a few minutes' time.

Other Features. The lower rolls are adjustable for height, and for lateral alignment so stock can be made to feed through straight. The machine cannot be made double-belted, nor with lower rolls driven.

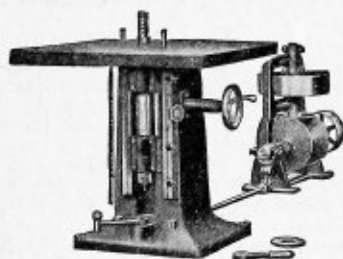


Dimensions

Width and thickness will match.....	12x2 inches
Minimum thickness will match.....	¾-inch
Width and thickness will plane.....	23 ¼x6 inches

Floor space, including countershaft.....	67x132 inches
Size of tight and loose pulley.....	10x5 inches
Speed of countershaft, per minute.....	325 revolutions
Giving planer head speed, per minute.....	4,000 revolutions
Giving matcher heads speed, per minute.....	3,300 revolutions
Length of 2-inch feed belt.....	6 feet 8 inches
Length of 2-inch matcher belts, each.....	15 feet 10 inches
Length of 4-inch drive belt.....	19 feet 3 inches
Power required.....	4 to 6 H. P.
Domestic shipping weight.....	2,000 pounds
Price.....	\$380.00

Regular Equipment: Each machine is furnished with countershaft having self-oiling loose pulley, pair of two planer knives, pair of matcher heads, with knives for matching ¾-inch flooring, two steel wrenches and one wrench for holding matcher heads. No belts furnished.



Dimensions

Size of table (iron).....	36x36 inches
Height of table from floor.....	34 inches
Size of pulley on countershaft.....	10x5 inches
Speed of pulley on countershaft.....	800 revolutions
Speed of spindle, per minute.....	5,000 revolutions
Belt required for spindle (3-in. wide).....	14 feet 8 inches long
Diameter of spindle above table.....	1 inch
Floor space required, over all.....	36x108 inches
Power required.....	2 to 3 H. P.
Domestic shipping weight.....	1,000 pounds
Price.....	\$170.00

Regular Equipment: Reverse-motion countershaft, one pair of 2-inch plain knives, one guide-pin, collars to fill the spindle, two throat-collars, one wrench and one pin with chain to hold spindle.

No. 363 Single Spindle Shaper

The frame of this machine is cast in one piece, box pattern, with wide base, for stability and steady running.

The Table also is cast in one piece with heavy ribs and wide flanges, and being belted to the frame on planed-off surfaces, insures utmost rigidity and accuracy. The table has a 6-inch opening for spindle, fitted with throat-collars; one collar having 2½-inch hole, another having 3-inch hole.

The Spindle has collar welded on and pulley shrunk on. The bearings are 1¼ inches in diameter, 6 inches long. Spindle above collar is 1 inch in diameter, 7 inches long, and will take 4-inch knives between grooved collars. The spindle-travel, vertically, is 4¼ inches, and the spindle will extend 7 inches above table when up.

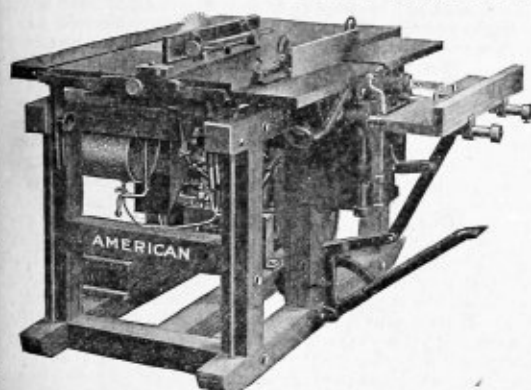
The Spindle Yoke is gibbed to the frame in adjustable dovetailed ways. It is raised and lowered by handwheel, and can be held at any point by a hand screw.

The Spindle Bearings are of high-speed babbitt, with liners to adjust for wear, have capillary felts for continuous oiling. The end-thrust bearing is made with a fiber step.

The Countershaft stands edgewise to the pull of the belt, which is the proper way—stands solidly. Has friction-cones for reversing the motion. The reversing-clutch, being on outside of frame is accessible, and will not waste oil onto friction-cones, as would be the case if placed under the cones. Loose pulley is not furnished on this countershaft, as it is preferable to let the horizontal shaft run when machine is not in use, rather than to leave a loose pulley run on the shaft.

Contractors' Portable Wood Worker

Self-Contained Power—Invaluable for Form Work on Concrete Jobs



With Gasoline Engine Built-in, Self-Contained and Portable

A Rip Saw
A Cut-Off Saw
A Miter Saw
A Dado Machine
A Boring Machine
A Rabbeting Machine
A Jointer or Planer
A Gaining Machine
A Grooving Machine
A Tenoning Machine
A Matcher
A Moulder
A Sander
All with Self-Contained Power

With this machine sawing, joining or planing, boring and scroll-sawing can all be done at once by four different men without interference or making any change in the machine.

Particularly adapted for contractors, carpenters, concrete workers and lumber yards and is intended to be used right on the job for doing a large variety of light and medium mill work.

The machine is compact, self-contained and very substantially built throughout of good materials and will stand hard, continuous service. Floor space 54x54 inches. Height 36 inches. Arbor takes 1-inch hole saws.

With 5 H. P. the capacity in 1½ lumber is 100 to 150 lineal feet per minute; in 2-inch 50 to 75 feet. Will rip 3-inch lumber easily and by feeding properly even heavier material can be worked. Will rip a board 26 inches wide through the center without removing the saw guide.

Frame is made of 3½x3½ hard wood accurately framed and bolted together.

The 30x54-inch iron table or top is of cast iron, well ribbed and accurately planed. It is hinged to the rear of the frame and raised and lowered by a hand screw. It is independent of the jointer table.

Adjustable ripping gauge is furnished which has tilting fence for bevel sawing also has rapid fine adjustment and locking device. It opens out to 14 inches from the saw.

The cut-off gauge slides in a planed groove extending the entire length of the table and can be set to cut squares mitres or any angle desired.

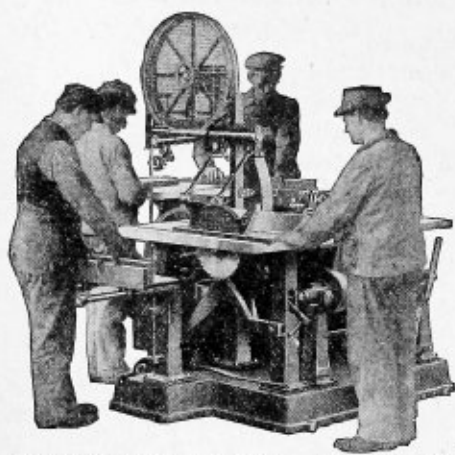
The jointer or planer is entirely separate from the top of the machine. It has a steel cutter head with two 6-inch knives and slotted on two sides to receive matcher bits or moulding cutters for working a large variety of shapes. This table is 7½ inches wide and 43 inches long and adjustable to any desired position. An adjustable fence is provided which tilts to any desired bevel for chamfering, etc. Jointer head is removable to permit the use of the sander drum. Boring table has a travel of 6 inches and vertical adjustment of 3½ inches. Arbor is 1½ and takes saws with 1-inch hole.

Regular Equipment consists of 5 H. P. gasoline engine or 3 or 5 H. P. electric motor built-in. The 5 H. P. gasoline engine is a simple water-cooled type with magneto, spark coil and connections, endless driving belt, rip and cut-off gauges, one 14-inch rip saw, one 14-inch cross-cut saw, one each ½ and ¾ dado head, one jointer head with two 6-inch knives, one each ½ and 1-inch auger bits, one sander drum and one sander disc, one emery wheel with arbor, one each throat piece for dado heads and saws, also oil can and wrenches.

No.	Style of Power Equipment	Weight, Lbs.	Prices
12	Complete with 5 H. P. gasoline engine built-in with magneto.....	1050	\$335.00
13	Complete with 3 H. P. D. C. motor, 110-220-500 volt.....	1100	315.00
14	Complete with 5 H. P. D. C. motor, 110-220-500 volt.....		340.00
15	Complete with 3 H. P. 60 cycle, A. C., 2 and 3 phase motor, 220-440-550 volt.....	1100	286.00
16	Complete with 5 H. P. 60 cycle, A. C., 2 and 3 phase motor, 220-440-550 volt.....		310.00
17	Complete with 3 H. P., 60 cycle, single phase motor, 110-220 volt.....	1100	336.00
18	Complete with 5 H. P., 60 cycle single phase motor, 110-220 volt.....		380.00
19	Complete without power, no belt nor countershaft.....		190.00
	Countershaft for machine without power.....		12.50
	Deduct for hollow chisel mortiser-boring attachment, if not wanted.....		32.00
	Deduct for jig saw, if not wanted.....		15.00
	Deduct for magneto, if not wanted.....		10.00

For other Wood Workers' Tools, Saws, Jointers, etc., see index.

The Crescent Universal Wood-Worker Nos. 51 and 59

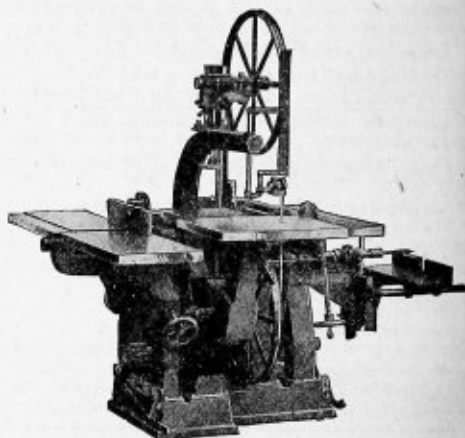


of these is swiveled, for turning. A tongue may be permanently placed, the machine does not rest on the casters, but each has a set screw which acts as a jack, lifting the machine off the floor, and supporting the weight on the casters.

There are five units to the complete machine, a band saw, jointer, shaper, saw table and borer. It is not sold with any of these omitted, except the bandsaw. Each unit has the conveniences and refinements of individual machines, and will admit the use of attachments commonly used with such machines. By using special attachments it is adaptable as a re-saw hand-feed molder, tenoner, panel-raiser, pole-rounder, disk, knife or plain grinder, and hollow chisel mortiser.

Equipment of Regular Machines

The parts belonging regularly to each machine are briefly as follows: The jointer is equipped with two knives, one fence, one hold-down spring, one jointer guard and one wrench. The shaper is equipped with a pair of 2-inch straight knives, two guide pins, collars to fill the spindle, two throat collars, one wrench, one hold-down spring, one hold-over spring, one short fence and one pin to hold spindle. The saw-table is equipped with one 12-inch rip-saw, one ripping fence and one cut-off fence. The borer is equipped with a self-centering chuck and sliding table. The band-saw is equipped with one Wright's guide, one plain guide, one brazing clamp, one brazing tongs and one saw blade. Leather belting is included, for driving each of the machines from the drive shafts on the machine. The main drive belt from line shaft to main drive pulley on the machine is not included. When machine is ordered with motor, a suitable starter is included.



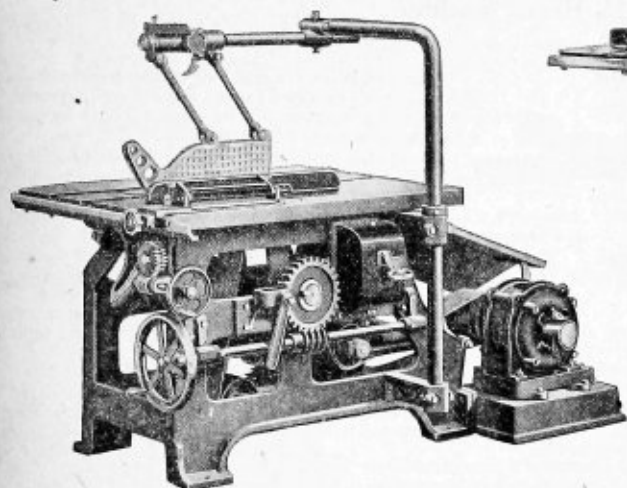
Dimensions of Regular Machines

Machine number.	51	52	53	54	55	56	57	58	59
Size of jointer, inches.	8	8	8	12	12	12	16	16	16
Size of band-saw, inches.	26	32	none	26	32	none	26	32	none
Floor space over all, inches.	75x80	83x80	68x80	75x86	83x86	68x86	75x90	83x90	69x90
Floor space when borer is removed, inches.	75x63	83x63	68x83	75x68	83x68	68x68	75x73	83x73	68x73
Height over all, inches.	78	87	42	78	87	42	78	87	42
Size of main drive pulley, inches.	10x6	10x6	10x6	10x6	10x6	10x6	10x6	10x6	10x6
Speed of main pulley, revolutions per min.	1120	1120	1120	1120	1120	1120	1120	1120	1120
Shipping weight, pounds.	3200	3300	2900	3325	3425	3025	3450	3550	3150

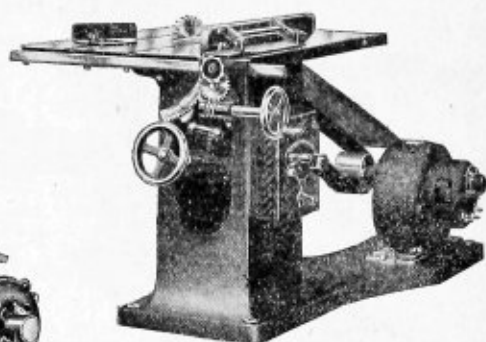
Prices quoted on application.

Motor Driven Wood Working Machines

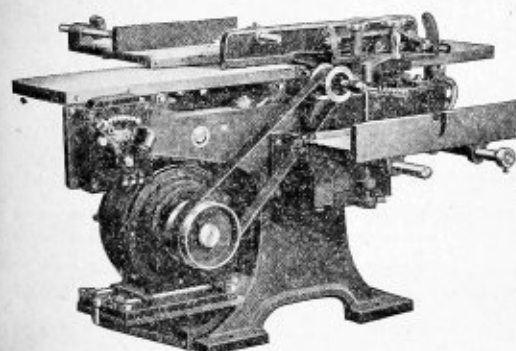
Prices on application. In writing state current. If direct, give voltage. If alternating, give voltage, phase and cycle.



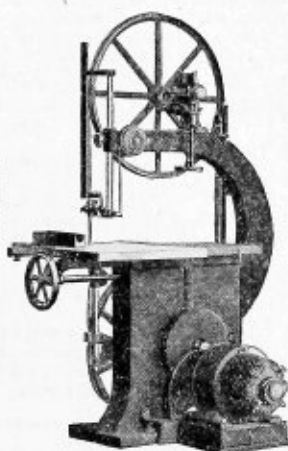
No. 5 Saw Table with Saw Guard



No. 2 Saw Table



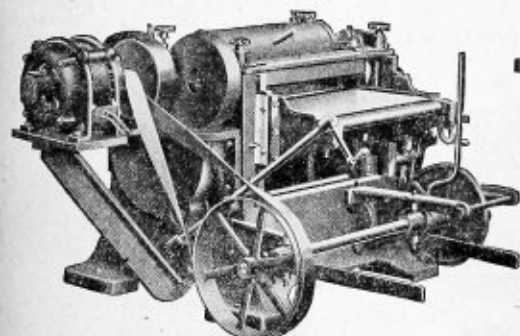
Variety Wood Worker



Band Saw



Swing Cut-Off Saw



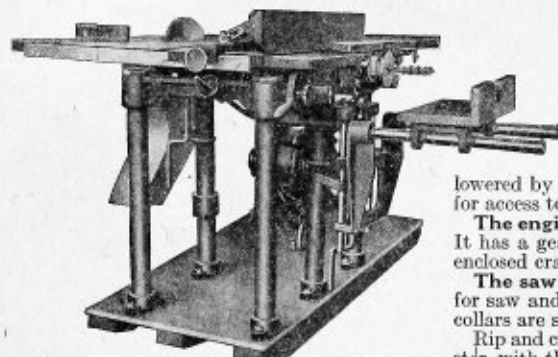
Surfacer



8-inch Jointer

The Berlin Portable Woodworking Mills

The Heavy Machine



The main frame and self oiling bearings are cast in one piece and cannot get out of alignment. This frame is mounted on steel tubular legs attached to a hardwood skid.

The table top is cast semi-steel, machined true on top and has a wooden extension in rear. The top is 68x37 inches, is hinged to main frame and lowered by hand screw. The wooden extension can be raised for access to engine or motor from above.

The engine is of the four cylinder type water hopper cooled. It has a gear driven magneto with make and break ignition, enclosed crank case, vertical valves, and all gears run in oil.

The saw arbor is 1½ inches diameter, with 1¼ inches end for saw and is ground to a perfect fit. The pulleys and tight collars are shrunk on and machined afterwards.

Rip and crosscut saws are regularly furnished, 14 inches diameter, with the No. 5 electrical and gasoline outfits, and will rip outfits we furnish 16-inch saws to rip 6-inch dressed lumber. Engines are all equipped with magneto.

4½-inch lumber. With the Nos. 7, 7½ and 10

Sizes.....	No. 5 Gasoline	No. 5 Electrical	No. 7 Gasoline	No. 7½ Electrical	No. 10 Electrical
Power.....	5 H.P. gasoline engine	5 H.P. electric motor	7 H.P. gasoline engine	7½ H.P. electric motor	10 H.P. electric motor
Size of saw, diameter, inches.....	14	14	16	16	16
Weight, net, pounds...	810	810	900	900	900
Weight of engine or motor, pounds.....	850	300	1050	500	700

Prices

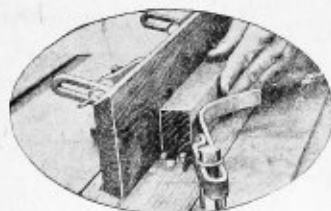
	5 H. P. Motor	5 H. P. Engine	7 H. P. Engine	7½ H. P. Motor	10 H. P. Motor
Berlin mill with engine or motor, belt, cross cut and rip saws, saw guides, tool box and tools.....	\$264.00	\$253.00	\$347.00	\$373.00	\$467.00

Mill without power, but with belt, crosscut and rip saws, saw guides, pulleys for belt to line shaft or other power, tool box and tools..... \$133.00

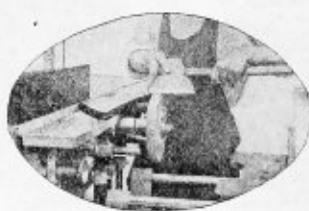
Jointer complete.....	\$47.00	Jig saw and blades.....	\$12.00	Moulding or sticker head with one set of knives.....	\$20.00
Boring attachment.....	20.00	Dado, knives and fillers.....	13.50	Extra moulding knives, per pair.....	4.00
Disk sander.....	6.75	Mortising machine.....	20.00		
Emery wheel and arbor.....	6.50	Wood turning lathe.....	20.00		

Mill complete without power, but with all of above attachments and saws, saw guides, belt tightener, tool box and tools..... \$302.50

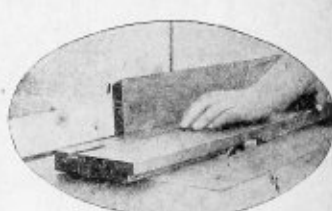
	5 H. P. Motor	5 H. P. Engine	7 H. P. Engine	7½ H. P. Motor	10 H. P. Motor
Mill complete with all above attachments and saw, saw guides, belt, belt tightener, tool box, tools, and with power engine or motor.....	\$473.00	\$462.50	\$515.00	\$543.00	\$636.00



Molding Attachment



Emery Wheel



Dado Head

Berlin Portable Wood Working Mills

Solid Top Machine

The main frame and table top form one unit. The steel angle legs and lower steel frame, being securely bolted to the table, forming a very stiff all metal frame.

The table top is stationary, but the saw is raised and lowered by means of a handle and clamp screw. The adjustment is made instantly without touching the belt tightener. The main bearing is a solid yoke, and cannot get out of alignment.

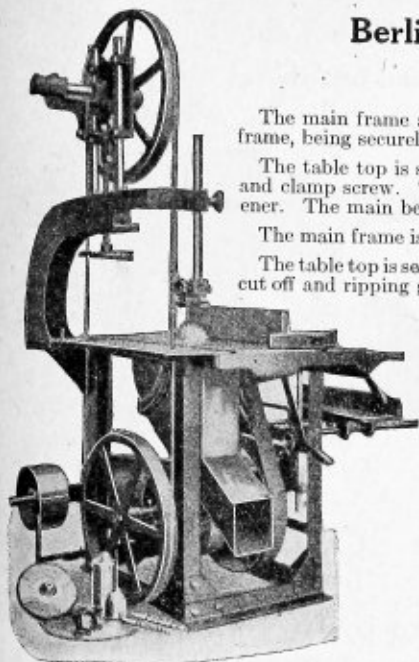
The main frame is of heavy steel angles, with braces and corner plates as shown.

The table top is semi-steel, machined true on its upper face and sides, with grooves for cut off and ripping gauges. A wooden throat-board is put in the table top of sufficient size to permit a 16-inch saw to be used in any machine.

The engine is of the same type as used with the heavy machine and described on preceding page. The band saw is of heavy-duty type.

It has 24-inch wheels, perfectly balanced and rubber banded. It has a vertical adjustment of 6-inches by hand-screw. The top wheel has adjustments for tilting to proper angle, with spring take-up. The guide has an easy adjustable vertical movement. Saw guide is smooth-running and can be adjusted in any direction. We furnish one 3/8-inch saw with every band saw attachment. The side table can be tilted for cutting angles on the band saw. When not in use, entire band saw with bracket can be swung out of way of rip saw and other attachments. The band saw bracket is exceptionally heavy for a machine of this size. If band saw is not required, we furnish a jig saw of the usual type, an excellent attachment for light work.

Saws are regularly furnished 12-inch diameter both cross cut and rip and are fitted to a ground arbor.



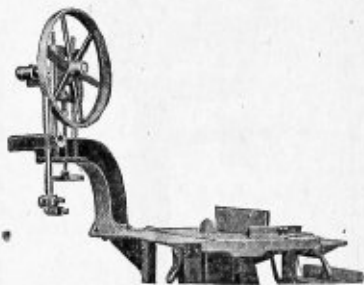
No. 4 "Berlin" Mill Without Power for Belt Drive

Specifications

Size No.	3	4	4	Size No.	3	4	4
Power.	3 H. P. Electric	4 H. P. Gasoline	Without Power Belted	Power.	3 H. P. Electric	4 H. P. Gasoline	Without Power Belted
Size of circular saw, inches.	12	12	12	Weight extra for engine, lbs.	300	500	.....
Will rip through (rough), ins.	3	3	3	Weight extra for motor, lbs.	32x42	32x42	32x42
Weight without motor or engine, pounds.	750	750	750	Table top size.			

Size and speed of pulley supplied without engine, 13-inch x 500 R. P. M.

Size and Power.	No. 3 With 3 H. P. Motor	No. 4 With 4 H. P. Engine	No. 4 Without Power With Countershaft
Price of mill with belt, cross-cut and rip-saws, saw guides, tool box and tools.	\$253.50	\$233.50	\$114.00
Jointer complete, extra.			\$33.50
Boring attachment and three bits, extra.			16.00
Disk sander, extra.			6.70
Emery wheel and arbor, extra.			5.35
Dado saw, extra.			5.70
Mortising attachment, extra.			20.00
Moulding head and one pair knives, extra.			13.35
Extra knives, per pair, extra.			4.00
Band saw attachment with tilting table.			60.00
Price of mill complete with all of the above attachments.	\$418.00	\$397.70	\$277.50
For single phase electric motor add.	67.00		



Showing Band Saw Swung Out of Position When Not in Use

To any of the above machines a small Wood-turning Lathe may be added for.	\$20.00
A jig saw for.	3.70
A 5 H. P. motor in place of 3 H. P. for.	46.70
A 7 H. P. gasoline engine in place of 4 H. P. for.	100.00
Engines are all equipped with magneto.	

No. 9 Iron Combination Saw Table

With "built-in" Countershaft and belt-shifter

This machine is adapted for use as a rip, crosscut, grooving or dado machine and makes a fine table for contractors, furniture factories, planing mills, pattern shops, wagon works or anyone needing a moderately priced table that will do accurate sawing.

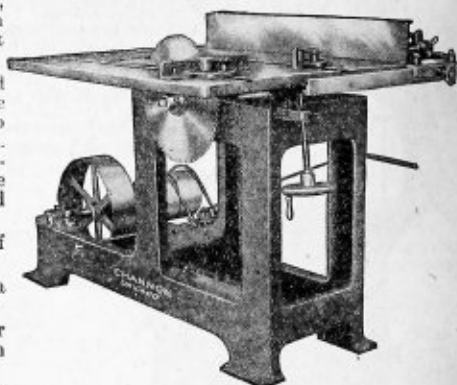
Adjustable Table is of cast iron, strongly ribbed and planed true. Table is hinged to the rear of the machine frame and is raised or lowered by a hand wheel and screw to accommodate the different thicknesses of stock to be sawed. Saw opening is fitted with a throat plate, which can be removed when using grooving heads. Two grooves extend the entire length of the table to receive the sliding miter and crosscutting gauges.

Frame is cast one piece with extension for countershaft of length for good belt centers.

Countershaft is built-in, making machine self-contained—a good rigid construction—easily portable.

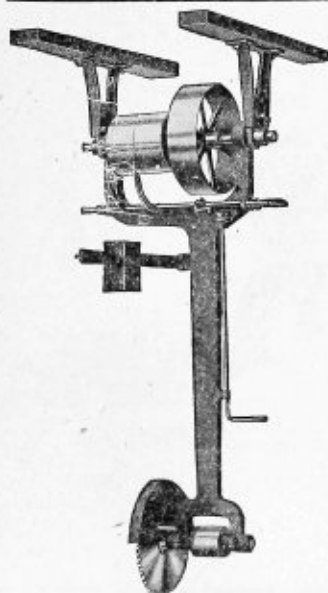
Arbor Bearings are long and lined with babbit. Arbor pulley is machined all over and perfectly balanced for smooth running.

Table is equipped with one adjustable bevel ripping gauge and two adjustable cross-cutting gauges. Maximum width 5 inches with gauge is 18 inches.



Dimensions No. 9 Saw Table

Size of table, inches.....	30x38	14-inch saw projects through table, inches.....	3
Size of base, inches.....	20x54	Size of tight and loose pulleys, inches.....	8x4
Height from floor to top of table, inches.....	34	Speed of tight and loose pulleys, R. P. M.....	650
Size of saw arbor in bearings, inches.....	1½	Size of driving pulley, inches.....	16x4½
Size of saw arbor at saw end, inches.....	1	Horse power required.....	3
Size of arbor pulley, inches.....	31½x4	Floor space, inches.....	42x60
Speed of saw arbor, R. P. M.....	3000	Weight without saw, pounds.....	800
Largest diameter of saw used, inches.....	14	Price.....	\$130.00



No. 10 Swing Cut-Off Saw

6½ Foot—for Saws up to 24-inch

Frame is cast in one piece, cored out hollow. The mandrel has pulley shrunk on solid. Mandrel bearings are 1½-inch diameter by 5 inches long—self-oiling, capillary. Hangers are adjustable, frame is hung to the hangers in such a manner that it is impossible for the weight of the frame to ride on the shaft, insuring shaft working freely and easily.

The belt shifter is conveniently arranged—the belt cannot creep from one pulley to the other and shifter handle is in easy reach. Shifter is reversible, so that machine can be belted to line shaft either in front or rear. Loose pulley is self-oiling.

Dimensions

Size of mandrel pulley, inches.....	5x5
Size of tight and loose pulleys, inches.....	10x5
Speed of countershaft, R. P. M.....	560
Making speed of 18-inch saw, R. P. M.....	2000
Length of belt (5-inch) for 6½-foot machine.....	14 feet 2 inches
Size of hole in saws, inches.....	1½
Horse power required.....	2 to 4
Shafting weight, pounds.....	450
Price.....	\$45.00

Regular Equipment includes one saw-shield 18 or 24-inch, one mandrel wrench and belt shifter. No saw or belt.

Special.—To order can furnish 5½, 6, 7, 7½ or 8-foot (measured from ceiling to mandrel) or machine with wall brackets, or 24-inch saw guard instead of 18-inch regular. All without extra charge.

Dado Head



Can be Used on any Circular Saw Mandrel

For cutting any width groove $\frac{1}{8}$ to 2-inch or over. This groove consists of two outside saws each of which is a groover itself, and as many inside cutters as is required.

The inside cutters are $\frac{1}{8}$, $\frac{1}{4}$ and $\frac{1}{2}$ -inch thick, so that any width of groove in 16ths of an inch may be cut.

The outside cutters are $\frac{1}{8}$ -inch thick.

A perfect groove can be cut with or across the grain, and will not leave a rough edge.



Showing Arrangement of Cutters on Dado Heads

	5 Ins. Diam.	6 Ins. Diam.	7 Ins. Diam.	8 Ins. Diam.	9 Ins. Diam.	10 Ins. Diam.	11 Ins. Diam.	12 Ins. Diam.	14 Ins. Diam.	16 Ins. Diam.	18 Ins. Diam.	20 Ins. Diam.	Cuts From
No. 1 Set	\$ 5.00	\$ 5.80	\$ 6.80	\$ 7.60	\$ 8.35	\$ 9.15	\$ 9.75	\$10.85	\$13.30	\$15.80	\$18.30	\$19.80	$\frac{1}{4}$ to $\frac{3}{4}$ by $\frac{1}{8}$ -inch
No. 2 Set	6.10	7.05	8.15	9.05	9.90	10.80	11.60	12.95	15.40	17.90	20.40	22.90	$\frac{1}{8}$ to $\frac{3}{4}$ by $\frac{1}{8}$ -inch
No. 3 Set	7.20	8.65	9.85	10.85	11.90	13.00	13.90	15.45	18.00	20.50	23.00	25.50	$\frac{1}{8}$ to $\frac{3}{4}$ by $\frac{1}{4}$ -inch
No. 4 Set	8.60	9.90	11.20	12.30	13.45	14.65	15.75	17.55	20.00	22.50	25.00	27.50	$\frac{1}{8}$ to 1 by $\frac{1}{4}$ -inch
No. 5 Set	10.00	12.40	13.90	15.20	16.55	17.95	19.45	21.75	24.25	26.75	29.25	31.75	$\frac{1}{8}$ to $1\frac{1}{4}$ by $\frac{1}{4}$ -inch
No. 6 Set	12.00	14.90	16.60	18.10	19.65	21.25	23.15	25.95	28.50	31.00	33.50	36.00	$\frac{1}{8}$ to 2 by $\frac{1}{4}$ -inch

Special sets made to cut from 2 to 8 inches wide.

In ordering, please state the number of set, or greatest width of groove to be cut, diameter of groover and size of hole wanted. Extra inside cutters can be had at any time.

Mortising Chisel

Mortising chisels for sash are usually furnished in the pattern illustrated above. The sash mortising chisel has $4\frac{3}{4}$ -inch blade and is about $6\frac{1}{2}$ -inch overall.

The taper of the shank varies on tools required for different makes of machines.

To secure accurate fit the dimensions should be taken with a micrometer caliper.

When ordering it would be better to send a sample shank. Otherwise, carefully state size of the mortiser and name of maker.

Sizes $\frac{1}{4}$, $\frac{5}{16}$, $\frac{3}{8}$, $\frac{7}{16}$, $\frac{1}{2}$, $\frac{9}{16}$, $\frac{5}{8}$, $\frac{3}{4}$, $\frac{7}{8}$, 1-inch. Price each\$1.50



Hollow Chisel and Bit



These chisels are of the finest and toughest tool steel obtainable. They are forged and finished by skilled workmen and are tested to accurately fit the tool holders of the particular type of machine in which they are to be used.

The hollow chisel bits are carefully proportioned for strength and easy cutting, with a twist to remove the chips rapidly.

We can supply these tools for hollow chisel mortisers of any make.

Prices on application.

Scroll Saw Blades

Scroll saw blades to fit the No. 2 and No. 7 Barnes scroll saw listed on another page.

They are 7 inches long and come in different widths, ranging from $\frac{1}{16}$ to $\frac{1}{4}$ -inch.

Price per dozen\$1.00



36-inch Saw

Power Band Saws

45 degree Angle Tilting Tables;
Patented Upper Wheel Bearings;
Wright's Anti-Friction Saw Guides;
Split Babbitted Bearings with Liners
Adjustable for Wear.

Quick Acting, Locking Device and
Angle Scale.

The 36-inch machine is the standard
size used in planing mills, factories and
pattern shops.

The 32-inch is for factory or general
planing mill use, and the 26 and 20-inch
for smaller work.



32-inch Saw

The following description applies in a general way to all sizes except the 20-inch. Owing to its small size this machine is somewhat differently constructed, having a special upper bearing without the spring tension—in other respects it is about the same as the larger machines.

The Main Frames are cast in one piece, cored-out hollow, of rectangular section.

The Upper Bearing arrangement is a vital part of the machine—upon it hangs the weight of the upper wheel plus the tension of the saw. The upper wheel is fastened to the shaft which revolves in a long split babbitted bearing adjustable for wear. The wheel can be raised or lowered or inclined backward or forward while the saw is in motion. Pivot bracket is fastened to the sliding head by two bolts in slotted holes—when bolts are released, the upper wheel can be given sidewise alignment with the lower wheel—called cross-line adjustment.

A spring near the back end of upper shaft holds bearing in proper position, preventing back-lash to the upper wheel should the saw break. The head that slides on the upright standard has steel gib and is adjustable for wear. The tension spring is telescoped over the raising screw and located inside of the frame where it does not show—this spring acts quickly, being free from inertia—no loose weights to get lost.

Tilting Tables provided on all machines. Table segment works on machined tongue and groove, has graduated brass scale and pointer degree of angle up to 45 degrees—held in any position by eccentric locking lever.

Iron Wheels are carefully turned inside and outside of rim and properly balanced. Solid rubber tires are vulcanized to the face of wheels. Belt Shifter arranged with handle under the sub-table.

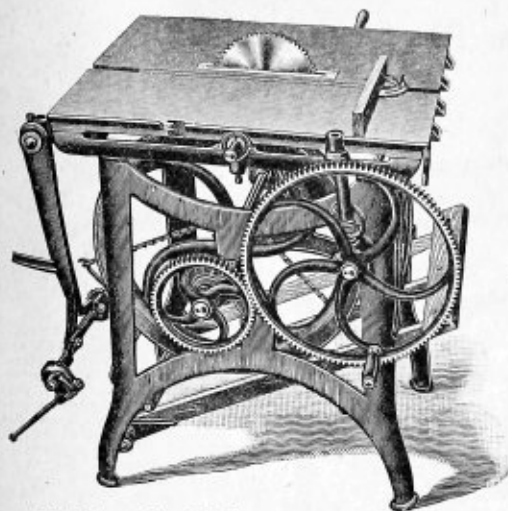
Lower Shaft runs in a long bearing that is bolted rigidly to the frame of the machine, bearing is split and babbitted and adjustable for wear. Loose pulley is self-oiling from reservoir in hollow end of shaft.

Wright's Anti-friction Saw Guides are furnished for above the table—plain guide for below table.

Size, inches.....	36	32	26	20
Size of band wheels, inches.....	36x2	32x1 $\frac{3}{4}$	26x1 $\frac{1}{2}$	20x1 $\frac{1}{4}$
Distance clear from saw to frame, inches.....	36	32	26	20
Height clear under guide, when raised, inches.....	16	13	9	7
Size of table (iron), inches.....	28x32	24x28	20x24	18x22
Size of tight and loose pulleys, inches.....	12x 4	12x 3 $\frac{1}{2}$	10x 3	7x 3
Speed, revolutions per minute.....	400 to 450	400 to 450	400 to 450	400 to 450
Length of saw blade.....	18 ft. 6 in.	16 ft. 4 in.	13 ft. 9 in.	10 ft. 1 in.
Width of saw blade regularly furnished, ins.....	3 $\frac{1}{2}$	3 $\frac{1}{2}$	3 $\frac{1}{2}$	3 $\frac{1}{4}$
Floor space required, overall, inches.....	39x57	35x50	30x40	20x30
Shipping weight, pounds.....	1200	950	650	335
Horse power required.....	2 to 3	1 to 2	1 to 1 $\frac{1}{2}$	1 $\frac{1}{2}$ to 1
Price, with iron band wheels.....	\$130.00	\$105.00	\$80.00	\$40.00

Regular Equipment.—Includes saw guides, one pair brazing tongs, one brazing clamp and one saw blade of size stated in above table or will furnish any width up to 1 inch without extra charge.

Extras.—For foot power attachment 26 and 20-inch belted saws, \$8.00. Wright's saw guide below table instead of plain guide, \$5.00. Ripping gauge or fence, \$10.00. Resaw gauge for hand feed, No. 1 for 26-inch and smaller, 60 pounds, \$16.00. No. 2, for 32-inch and larger, 100 pounds, \$20.00. **Safety Devices.**—Saw guards, upper and lower, stationary, pressed steel with attaching brackets for all except 20-inch, \$8.00. Iron enclosing door for lower wheel and regular guard for upper, including dust spout for blower for 36-inch saws only, \$40.00.



No. 4 Circular Saw

A very strong and rigid machine of first class construction throughout. Designed for carpenters, cabinet makers and woodworkers in general.

The table is 28x30 inches, made of iron and planed perfectly true.

It can be used as a circular rip saw with self feed which can be regulated for hard or soft, thick or thin lumber.

It can be used as a cross cut or rip saw. The rip saw self feed can be regulated for hard or soft, thick or thin lumber and is self-adjusting for varying thicknesses. The self feed and rip saw gauge can be instantly thrown back, leaving the table perfectly clear for cross cut work. The cut off gauge can be set at any angle, and the speed can be readily changed for cross cut or rip sawing.

It can be used for rabbetting and grooving, and the high speed of cutter heads insures smooth, clean cut work. Cutter heads are also used for graining and dadoing and with knives of suitable widths for jointing. The rip saw feed may also be used for grooving and rabbetting.

The table can be adjusted up and down to regulate the depth of groove and rabbet. A 10-inch saw will

cut 3½-inch and a 12-inch saw up to 4½-inch thick lumber. The machine is also furnished with special boring attachment as shown below.

The special universal mitre gauge especially adapts it for picture frame makers or other work requiring accurate joints. Both ends of a joint may be cut at same time and if desired the moulding may be bradded while in the gauge.

Price List

No. 4 circular saw, complete with self feed and two 10-inch circular saws (one rip and one cut off).	Price \$60.00
Same as above, except countershaft for steam instead of foot power.	Price 65.00
Boring attachment	Price 10.00
Countershaft and belt pulley.	Price 10.00
Universal mitre gauge.	Price 10.00
Weight, 400 pounds. Crated for shipment, about 500 pounds.	

Combined Circular and Scroll Saw

A circular saw with scroll saw attachment, which may be furnished without the scroll saw as shown. The capacity of the scroll saw is the same as No. 7 on following page, and the guarantee with that machine applies equally to this.

For light sawing and general work this machine with its attachments is invaluable to any woodworker.

Neither the circular or scroll saw interferes with the operation of the other.

All kinds of joint work done accurately and rapidly. Table has vertical adjustment for depth of cut.

Saws are 6-inch diameter, 1½ inches above the table. 8-inch saws can be used.

Size of table, 28x30 inches. Shipping weight boxed, 350 pounds.

Price List of Combined Machines

Combined circular and scroll saw and boring attachment, including two circular saws, twelve assorted scroll saws, the boring attachment, with self-centering drill chuck.	\$67.00
Combined circular and scroll saw, including two circular saws and twelve assorted scroll saws.	\$53.50
Circular saw alone, one rip and one cross cut.	\$47.00
Scroll saw attachment only, including twelve assorted scroll saws.	\$6.75
Boring attachment, including "Old Reliable" self-centering drill-chuck.	\$13.50

Countershaft for steam power (2x10 pulleys, speed 200 R.P.M.)... \$13.50

When countershaft is taken in place of foot power, add \$5.00 to above list price.

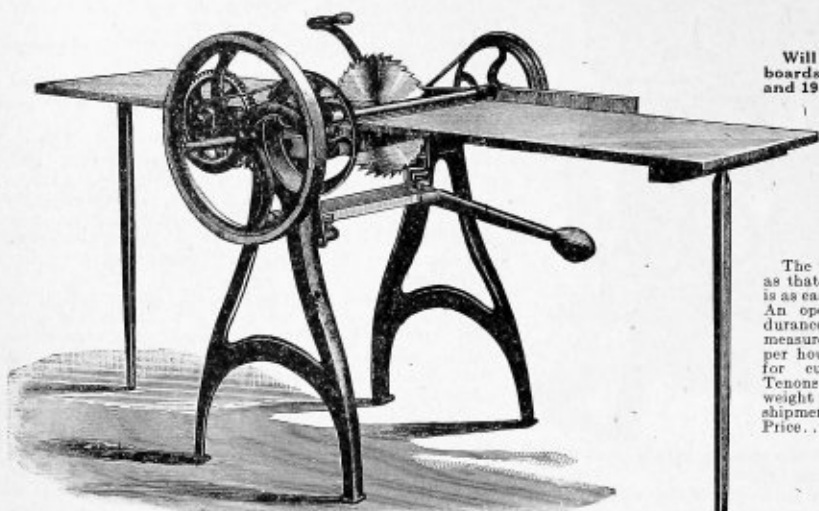


Combined Circular and Scroll Saw. Scroll Saw Attachment not Shown.



Special Boring Attachment for No. 4 and Combined Machines. Price \$10.00.

Hand Circular Rip Saw



Will rip soft and hardwood boards up to 3½-inches thick and 19-inches wide.

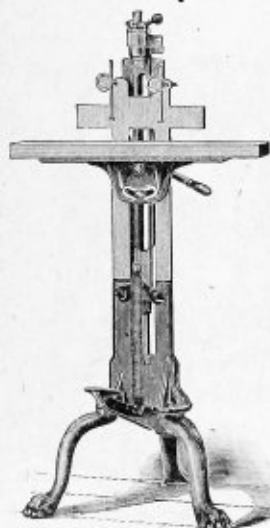
The work is as true and square as that done by power saws, and is as easily dressed with the plane. An operator with ordinary endurance can easily rip (line measure) 600 feet of one-inch pine per hour. Can be easily arranged for cutting Rabbits, bevels, Tenons, etc. Saws 10-in. diameter, weight 190 pounds. Boxed for shipment 290 pounds.
Price.....\$54.00

Foot Power Mortiser

Efficient, Compact, Durable

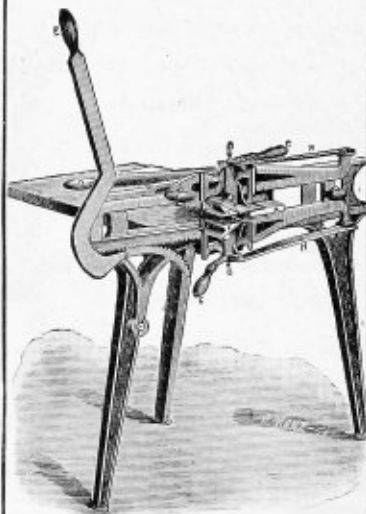
The table can be set at any angle. All necessary adjustments made easily and quickly. The spring is of special coiled steel wire, and can be readily adjusted to give any required tension.

Weight 135 pounds, boxed for shipment 170 pounds. Price, \$27.00. We make ten sizes of chisels, price \$1.30 each, extra.



Hand Tenoning Machine

Cuts tenons up to three inches long. By repeating any length can be made. Works on pieces up to 2 x 12-inches, and can be adjusted to gauge the length, thickness and shoulder. It will not cope a shoulder, but will cut one farther back or deeper than the other, or both alike. One or both sides of the tenon are cut at once, cuts true, smooth, square shoulders, and can be set to cut tenons of uniform thickness or distance between shoulders. A hand machine which cuts as perfect tenons as a power machine. Price, \$33.50, weight 100 lbs.; boxed for shipment, 140 pounds.



Foot Power Former

For moulding brackets, scroll work, panel work, regular and irregular mouldings of up to ¾-inch, speed of the knives from twenty to twenty-five per minute insuring rapid and smooth work. They are operated in either direction. The spindle and its bearings are steel with adjustments to take up wear and all parts are strong and serviceable. Weight of machine 80 pounds, boxed for shipment 110 pounds. Price without knives \$27.00.





Scroll Saw No. 7 Stand Up Foot Power

This machine is designed for practical service in the workshops of carpenters and builders, cabinet makers and other wood workers.

It is guaranteed to be well made, of good material and workmanship, and with reasonable practice to saw at the following rates: Pine, 2 inches thick, 1 foot per minute; 1 inch thick, 4 feet per minute; walnut, 3 inches thick, $\frac{1}{2}$ foot per minute; 1 inch thick, 2 feet per minute, and other woods and thicknesses at proportionate rates.

The ordinary rate of speed when sawing is from 800 to 1200 strokes per minute. The saw leaves the work as smooth as is possible for any saw to do, and can be taken out and replaced in an instant for inside work.

The swing around the blade under the arm is 24 inches.

The length of the blade is 7 inches.

The table and arms are made of hard maple.

The frame is made of cast iron, strong, yet light.

The balance wheel runs on a steel arbor.

The machine weighs 60 pounds.

Boxed for shipment, 95 pounds.

We include one dozen blades with each machine.

Price, complete with foot power\$20.00

We can also furnish the No. 7 scroll saw arranged with a countershaft. The price of countershaft, including the connecting band wheel on the machine is \$13.50. The price of No. 7 scroll saw, arranged with countershaft only (no foot power), is \$27.00. No belting furnished with power saw.

Speed of countershaft 500 R. P. M. Tight and loose pulleys 4-inch diameter x 2-inch face.

Scroll Saw No. 2 Velocipede Foot Power

This machine has about the same capacity as scroll saw No. 7, warranty as to what that machine will do applying equally to it, but this is preferred by many on account of the velocipede foot power, and because of its having a boring attachment to open for inside work.

The swing around the blade under the arm is 24 inches.

The length of blade is 7 inches.

The table and arms are of hard maple.

The frame is of cast iron.

The balance and drive wheels run on steel arbors.

The machine weighs 90 pounds.

Boxed for shipment, 130 pounds.

We include one dozen blades with each machine.

The boring attachment can be furnished at any time if not desired when machine is ordered.

Price per No. 2 scroll saw without boring attachment.....\$24.00

Price No. 2 scroll saw with boring attachment..... 27.00

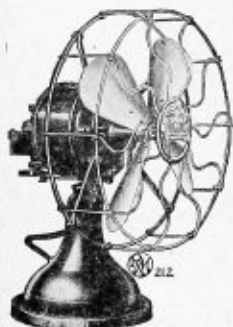
One $\frac{3}{8}$ bit is included with the boring attachment. We can furnish extra bits at the following prices each: $\frac{1}{16}$, 15c.; $\frac{3}{32}$, 15c.; $\frac{1}{8}$, 20c.; $\frac{5}{16}$, 20c.; $\frac{3}{16}$, 25c.; $\frac{1}{2}$, 30c.; $\frac{3}{4}$, 35c.



Electric Fans

Oscillating Desk or Bracket Fan—Gear Type 12 inch and 16 inch Sizes

These electric fans are made from the best material in every detail of construction, both electrical and mechanical. They are made with tools and gauges on the American interchangeable plan and should any part need replacement, a new part may be obtained by giving the number of the fan motor, and with absolute assurance of a perfect fit. The reduction mechanism is enclosed in an oilproof box filled with non-fluid oil. The worms and gear wheels are large in their proportions, accurately machined and substantially supported in bearings. The ends of the connecting rod are provided with hardened steel bushing which practically eliminates wear at any point. Fan can be made stationary by a slight operation, if desired. Made with highly efficient motors. For further particulars as to the motors, see the table below. Can furnish 8-inch fan if desired.



12 Inch Desk Position

Direct Current

No.	Diameter Blade, Inches	Volts	Price Each
1128	12	110	\$34.00
1129	12	220	36.00
1131	16	110	40.00
1132	16	220	42.00

Alternating

1153	12	110	\$36.50
1154	12	220	38.50
1159	16	110	43.00
1160	16	220	45.00

Alternating Current Swivel and Trunnion Desk or Bracket Fan

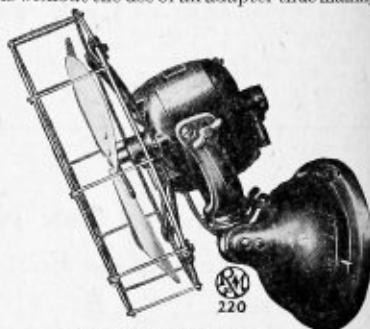
Designed with highly efficient type of winding that eliminates the centrifugal or automatic switch and gives a wide speed range. The type of winding employed also assures freedom from burn-outs, even though the motor should fail to start from any cause whatever. The body of the motor is symmetrical in appearance, avoiding deep recesses or projections, which tend to collect dirt. The bearings are accurately finished throughout, thereby securing perfect alignment. They are convertible into wall bracket fans without the use of an adapter thus making them universal desk or bracket fans. The switch base is exceptionally strong and will not crack under ordinary strain. The base of the motor is marked "Off, 1, 2, 3," indicating the different speeds. Can furnish 8-inch fan if desired.

Direct Current

No.	Diam. Blade, Inches	Volts	Cycles	Price Each
1500	12	110		\$27.00
1501	12	220		29.00
1502	16	110		31.00
1503	16	220		33.00

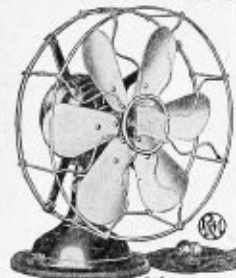
Alternating Current

1404	12	110	60	\$29.00
1405	12	220	60	31.00
1411	16	110	60	34.50
1412	16	220	60	36.50



12 Inch Wall Bracket Position

Six Blade Residence Fan



The Residence Type Fan is a type particularly adapted for home use. It is lighter than cast iron on account of its steel construction, yet it will not creep across the table or ledge on which it may be standing. It has a very low center of gravity, making it practically impossible to tip over. Has six blades, giving a wide distribution of air, runs quietly and has three speeds. This type is also well adapted for office use.

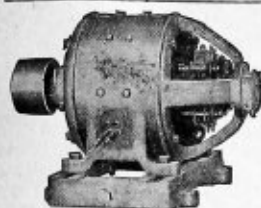
No.	Model Specifications	Price, Each
2104	Model 21 A. C. 110 V. 60 Cycle Desk	\$31.00
2200	Model 22 D. C. 110 V. Desk	29.00
2404	Model 24 A. C. 110 V. 60 Cyc. Osc.	38.50
2500	Model 25 D. C. 110 V. Oscillating	36.00

Small Exhaust Fans

For ventilation, removing smoke, dust or objectionable odors, these exhaust fans are frequently installed. Intended for mounting in walls or partitions and exhausting into open space (free air). Can be mounted in ceilings, but will require an end thrust at a slight extra cost. The motor blades and fans are the same type as described above. When working against free air the 12-inch fan will displace from 1500 to 2000 cu. ft. of air per minute, the 16-inch from 2200 to 3300 cu. ft.



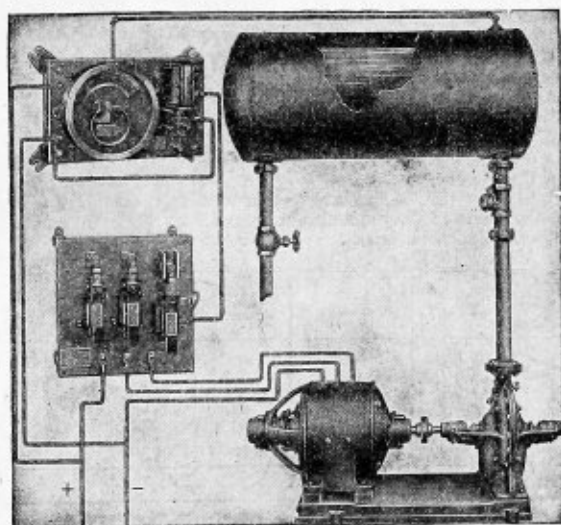
No.	Diam. Fan, Ins.	Volts	Full Speed Free Air	Watts Consumed	Price Each
1000	12	110	1550	65	\$25.00
1001	12	220	1550	65	27.00
1002	16	110	1450	100	30.00
1003	16	220	1450	100	32.00



RC Direct Current Motor

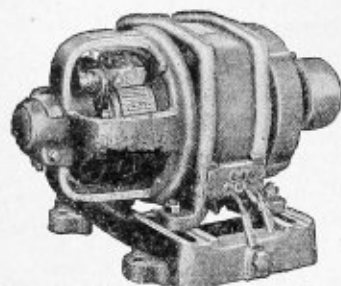
H. P.	Speed, Rev. per Minute	Pulley Diameter, Inches	Weight, Pounds	List Price Each	H. P.	Speed, Rev. per Minute	Pulley Diameter, Inches	Weight, Pounds	List Price Each
$\frac{1}{2}$	1700	3 $\frac{1}{2}$ x2	100	\$106.00	10	1150	7x 4 $\frac{1}{2}$	770	\$554.00
1	1700	4 $\frac{1}{2}$ x2	130	132.00	10	850	8x 5	930	656.00
1	1150	4 $\frac{1}{2}$ x2	170	156.00	15	1150	8x 5	930	662.00
2	1700	4 $\frac{1}{2}$ x2	170	170.00	15	800	10x 6	1160	782.00
2	1150	4 $\frac{1}{2}$ x3	265	242.00	20	1150	10x 6	1160	804.00
3	1700	4 $\frac{1}{2}$ x3	265	242.00	20	800	10x 9	1730	1088.00
3	1150	4 $\frac{1}{2}$ x4	390	302.00	25	775	13x 9	1940	1202.00
5	1700	4 $\frac{1}{2}$ x4	390	304.00	30	1100	10x 9	1800	1102.00
5	1150	5 $\frac{1}{2}$ x4	525	372.00	30	750	13x10	2380	1402.00
7 $\frac{1}{2}$	1700	5 $\frac{1}{2}$ x4	525	374.00	40	1075	13x 9	2020	1408.00
7 $\frac{1}{2}$	1150	5 $\frac{1}{2}$ x5	565	484.00	40	700	14x12	2970	1708.00
7 $\frac{1}{2}$	850	7 x 4 $\frac{1}{2}$	690	536.00	50	1050	13x10	2400	1542.00
10	1700	5 $\frac{1}{2}$ x5	650	502.00	50	650	15x12	3780	2042.00

General Electric Automatic Control Equipment



CR 2303 Self Starter and CR 2920 Pressure Governor used on a closed tank system

We are prepared to furnish a complete line of automatic control equipments for either A. C. or D. C. motors. This equipment is of extremely rugged construction, having withstood for years service such as is found in steel mills. On account of the variation that is found in automatic equipments, it will not be possible to give prices. Complete information relating to the automatic operation that is required, giving the complete rating of the motor that is to be controlled, whether it is to be controlled from a remote point by means of push button station, by pressure governor or by float switch. Some idea of the cycle of operation is required, i. e., whether the outfit will be required to start several times an hour or only once in five or six hours. The voltage and frequency of the circuit on which the equipment is to operate must be given and if these vary above and below normal the amount should be mentioned. If the equipment is not to be used with a G. E. motor, the complete rating should be given and in the case of A. C. motors the secondary current and voltage between rings. Peculiarities of installation, such as moisture and dirt, long supply mains of small capacity, small generator, or transformer capacity should be mentioned.



Electric Motors

General Electric—Type RI Single Phase A. C. Motors

Automatic starting type, requiring no external starter. They have interchangeable voltage connections, permitting their use on either 110 or 220 volt circuits. RI motors are especially adapted for heavy starting duty. They accelerate in from two to five seconds from standstill. They do not spark; have high efficiency; high overload capacity and will produce from 250 to 275 per cent of full load torque at full speed. Prices cover complete motors arranged for belt drive. Rockwood paper pulleys are furnished. Motors are for use on 60 cycle circuits only. 25 and 40 cycle motors can be furnished at special prices.

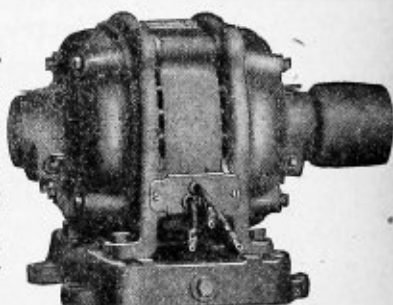
H. P.	Speed, Rev. per Minute	Size Pulley, Inches	Weight, Pounds	Price Each	H. P.	Speed, Rev. per Minute	Size Pulley, Inches	Weight, Pounds	Price Each
1/2	1800	3 1/2 x 2	105	\$110.00*	2	1800	4 1/2 x 2	196	\$222.00
1/2	1200	4 1/2 x 2	172	170.00	2	1200	4 1/2 x 3	262	278.00
3/4	1800	3 1/2 x 2	125	138.00*	3	1800	4 1/2 x 3	262	278.00
3/4	1200	4 1/2 x 2	185	186.00	3	1200	4 1/2 x 4	367	358.00
1	1800	4 1/2 x 2	172	170.00	5	1800	4 1/2 x 4	367	358.00
1	1200	4 1/2 x 2	196	204.00	5	1200	5 1/2 x 4	580	508.00

*Do not need sliding base; have slotted feet.

General Electric—Type KT & KQ 3 and 2 Phase—60 Cycle—Small AC Motors

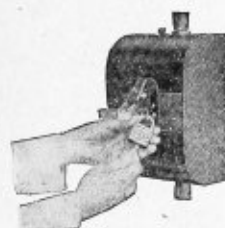
These motors are of the squirrel cage type, the stator frame being of riveted construction with exposed laminations, permitting efficient cooling and giving a rugged construction with a pleasing appearance. No starter is required with these motors, but we recommend their installation with a G. E.—C. R. 1038—motor starting switch or an oil switch having inverse time limit overload relay coils. Price covers complete belted type motors wound for 110, 220, 440 or 550 volt, 60 cycle circuits.

These motors can be furnished in vertical, back geared or totally enclosed construction at special prices. They can also be wound for service on 25 or 40 cycle circuits at special prices.



H. P.	Speed, Rev. per Minute	Size Pulley, Inches	Weight, Pounds	Price Each	H. P.	Speed, Rev. per Minute	Size Pulley, Inches	Weight, Pounds	Price Each
1/2	1800	3 1/2 x 2	65	\$ 90.00*	2	1800	4 1/2 x 2	140	\$138.00
1/2	1200	3 1/2 x 2	100	114.00	2	1200	4 1/2 x 3	180	162.00
3/4	1800	3 1/2 x 2	75	102.00*	3	1800	4 1/2 x 3	180	160.00
3/4	1200	4 1/2 x 2	130	130.00	3	1200	4 1/2 x 4	220	198.00
1	1800	3 1/2 x 2	100	114.00	5	1800	4 1/2 x 4	220	194.00
1	1200	4 1/2 x 2	140	140.00	5	1200	5 1/2 x 4	340	250.00

*Do not need sliding base; have slotted feet.

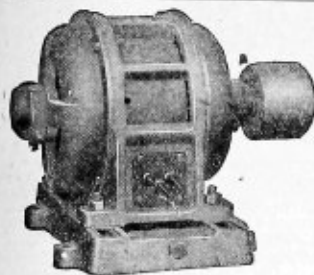


Accidental closure impossible. A push opens and a pull closes the switch.

General Electric CR-1038 Motor Starting Switch

For throwing small alternating current motors directly across the line. Capacity 3 H. P.—110 volts; 5 H. P.—220 volts; 3 H. P.—440 and 550 volts. Provides protection from overload from single phase operation and accidental closing of switch. The handle can be locked against operation or the cover can be locked shut. The operator is protected from shock or burn.

The price covers the switch complete with two protective plugs and two extra fusible links. The only renewable part required is the fusible link. These can be supplied at \$0.65 per dozen. Padlock and two keys can be furnished at \$1.15 extra. Price complete. \$16.00



ELECTRIC MOTORS

General Electric Type KT and KQ 3 and 2 Phase—60 Cycle
Large A. C. Motors

This is the continuation of the line of small alternating current motors. In the large sizes it is necessary to provide some form of starting device, as the current taken from the lines becomes excessive in motors larger than 5 H. P. The prices below therefore include in addition to the motor, sliding base and pulley, a Type CR 1034 form H-2 starting compensator provided with low voltage release attachment, fuse panel and fuses. Overload relays can be substituted for fuses at an additional price of \$30.00. These motors can be furnished in back geared or vertical construction and they can be wound for 25 and 40 cycle circuits. The following prices cover 220, 440 and 550 volt motors. Other voltages and other speeds at special prices.

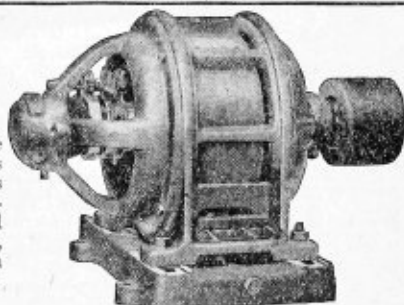
Squirrel Cage Induction Motor

H. P.	Speed, Rev. per Minute	Size Pulley, Inches	Weight, Pounds	Price Each	H. P.	Speed, Rev. per Minute	Size Pulley, Inches	Weight, Pounds	Price Each
7½	1800	5½x4	500	\$361.00	20	1200	10x6	1200	\$ 704.00
7½	1200	7 x4½	600	420.00	20	900	10x7	1330	792.00
10	1800	7 x4½	600	416.00	25	1200	10x7	1320	792.00
10	1200	7 x4½	750	508.00	30	1200	10x9	1670	924.00*
10	900	8 x5	880	554.00	30	900	13x9	1930	1034.00*
15	1800	7 x4½	610	506.00	40	1200	13x9	1930	1034.00*
15	1200	8 x5	880	594.00	50	1200	13x9	2150	1166.00*
15	900	10 x6	1120	704.00	50	900	13x12	2280	1276.00*

General Electric Slip-Ring Induction Motors

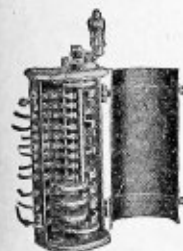
Constant and Variable Speed Types

The constant speed slip ring induction motors are for use where heavy starting duty is required, for instance in such application as the drive of reciprocating pumps, air compressors, rock crushers or concrete mixers. The prices include in each case a drum controller and resistance for 2 minute starting duty. The variable speed motors are for the drive of machine tools, fans, centrifugal pumps, etc., in cases where it is desired to operate at speeds reduced from normal. Prices in each case include a controller and resistance providing 50 per cent speed reduction.



Slip Ring Induction Motor

H. P.	Speed, Rev. per Minute	Size Pulley, Inches	Weight Constant	Price Each Constant	Weight Variable	Price Each Variable
¾	1800				95	\$156.00*
1½	1800				105	168.00*
1	1800				230	244.00*
2	1800				280	288.00*
2	1200				330	312.00*
3	1800				330	332.00*
3	1200				445	380.00*
5	1800				445	396.00*
5	1200				560	460.00*
7½	1800	7x5	600	\$572.00	560	594.00
7½	1200	7x5	610	594.00	560	616.00
10	1800	7x5	610	616.00	740	638.00
10	1200	8x5	860	682.00	960	704.00
10	900	8x6	930	726.00	1020	748.00
15	1200	8x6	930	770.00	1090	814.00
15	900	10x7	1250	858.00	1420	902.00
20	1200	10x7	1250	858.00	1490	902.00
20	900	10x8	1330	946.00	1570	990.00
25	1200	10x8	1330	924.00	1640	990.00
25	720	10x10	1890	1232.00	2000	1300.00
35	1200	10x10	1670	1078.00	2060	1170.00
35	720	13x10	1890	1360.00	2280	1460.00
50	900	13x13	2260	1410.00	2870	1560.00
50	514	16x17	3660	2200.00	4340	2330.00
75	900	15x15	2860	1830.00	4000	2030.00
75	514	21x19	4390	2550.00	6580	2730.00
100	720	21x19	4390	2440.00	5600	2680.00
100	450	28x23	6420	3280.00	7650	3540.00



Drum Controller

Note: Prices marked *do not include drum controller. Use 1261 controller for these ratings.

Steam Operated Direct Connected Generating Sets

Direct Current—250 Volts or Lower—Automatic Self-Oiling—Enclosed Vertical Engines.

This complete lighting set is exceptionally rugged, compact and low in operating cost. All working parts are accessible and adjustable. Originally designed for the U. S. Navy as a machine that would operate constantly with practically no attention except replenishing the oil reservoir. All bearings are very large, assuring smooth and constant operation. We have sold these outfits for many years for lighting dipper dredges and excavators, for marine and mill work and for isolated lighting plants of every kind.

The ventilation is unusually good and the machines will safely stand 25% overload without overheating.

The engine as well as the generator is made in the same shop—making a complete balanced unit.

The Engine is of the enclosed self-oiling type with oil pump in the base, except on the 2½ K. W. size which has a gravity multiple feed oiler.

Oil is pumped from oil reservoir in the base to sight feeds which lead to distributing trough on inside of engine frame—from here oil pipes lead to all movable bearings which are grooved for proper distribution of oil.

Oil is then drained back into the base where it is filtered and pumped.

A Water Shed Partition is provided to prevent the oil from coming in contact with the hot cylinder and causing it to carbonize.

The removable side doors, on each side of the engine frame allow ready access to the cross-head wrist pin and all adjacent parts while the hand hole plates give access to the lower end of the connecting rod.

Valve is of the balanced piston type with removable bronze valve chamber bushings.



No. 86 Machine, 3½ Kilowatt

Crank shafts are counterbalanced on all sizes 5 K. W. or larger.

The Generators are of the multipolar type, compound wound for 110 volts, unless otherwise specified. The shunt and series coils are separate and form wound, are made of very best double cotton covered magnet wire and thoroughly insulated.

The Armature is of the iron-clad ventilated type, with laminated core, built of electrical sheet steel, japanned before assembling. The drum and core are provided with air ducts, permitting a thorough circulation of air through same. The commutator is exceptionally heavy, insuring years of constant operation without renewal—it is built up on a separate sleeve and bolted to the armature drum, so that the shaft can be removed without disturbing the windings.

The engine crank coupling is coupled direct to the armature drum, dispensing with coupling on the armature shaft—a very desirable feature. Nothing but the finest double cotton covered magnet wire of the highest conductivity is used and the insulation is waterproof.

Testing and Guarantee.—Every generating set is run and carefully tested under full load before shipment and guaranteed to be in perfect working condition—we further guarantee the rating, stability and performance of these machines—besides the usual guarantee of freedom from defects in material and workmanship.

Switch Boards are not included in prices below. We can supply a plain stock board at an extra price—equipped with one voltmeter, one ammeter, one D. P. S. T., polished main switch, three branch switches, rheostat mounted, pilot lamp bracket, ground detector lamp receptacles, complete with fuses, bus bars and rear connections and with wall braces or angle iron frame as desired.

SPECIFICATIONS

Size No.	Size in Kilowatts	Rating No. of No. 50 Watt 16 C.P.Lp.	No. of Poles	Size Engine 90 lbs. Pressure	Eng. Speed R.P.M.	Diam. of Pipes, in.		Corssh'd Pin, in.		Crank Pin, in.		Main Bearing inches		Approx. Shipping Weight, pounds	Price Direct Connected Set
						Stm	Exh.	Dia.	Lgt.	Dia.	Lgt.	Diam. Shaft, inches	Lgth.		
85	2½	50	6	3½x3½	625	1	1¼	1	1¾	1½	1¾	1½	3½	675	\$ 580.00
86	3½	70	6	4½x4	625	1¼	1½	1¼	2	1½	2	1½	5	1065	670.00
87	5	100	6	4½x4	650	1¼	1½	1¼	2	1½	2	1½	5	1040	690.00
88	6	120	6	6x5	400	1½	2	1¾	2	1½	2½	1½	6	1925	890.00
89	7½	150	6	6x5	500	1½	2	1¾	2	1½	2½	1½	6	1890	925.00
90	8	160	6	7x6	375	2	2½	1¾	2½	2	2½	2½	6	2475	1115.00
91	10	200	6	7x6	450	2	2½	1¾	2½	2	2½	2½	6	2490	1150.00
92	10	200	6	7x6	350	2	2½	1¾	2½	2	2½	2½	6	2825	
93	12½	250	6	7x6	425	2	2½	1¾	2½	2	2½	2½	6	2850	Larger
94	15	300	6	8x7	325	2	2½	2¼	4	3	4	3	6	3550	Size
95	17½	350	6	8x7	400	2	3	2¼	4	3	4	3	6	3575	Quoted
96	20	400	6	8x8	325	3	3½	2¼	4	3	4	3½	6	5600	on
97	25	500	8	8x8	400	3	3½	2¼	4	3	4	3½	6	5700	Request
98	25	500	8	10x8	325	3	3½	3	4½	4	4½	3½	8¼	7000	
99	30	600	8	10x9	300	3	3½	3	4½	4	4½	3½	8¼	7200	
100	40	800	8	10x10	300	3	3½	3½	6	5	6	4½	10	9800	
101	50	1000	8	12x10	275	3	3½	3½	6	5	6	4½	10	10900	

Price includes Lubricator, necessary Wrenches and front of board Rheostat.

Generators are always furnished compound wound, 110 volt unless otherwise specified.

Small Steam Driven Electric Generators

Your Dark Troubles Made Light
on the Night Shift

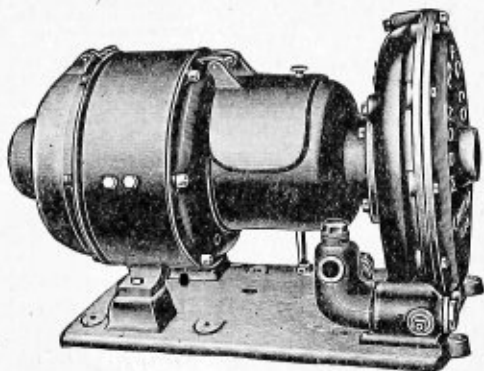
One of the neatest, most reliable and simplest lighting plants ever offered. It is of the highest quality in every detail of material and workmanship.

It is designed for constant hard service, is compact, self contained and durable. A very desirable unit for contractors, boat owners, etc.

The 1000 watt outfit is only 29 inches long, 17½ inches high, 16 inches wide and weighs 280 pounds; other sizes are in proportion. Furnished in two types, 110 volts and 32 volts. We recommend the 110 volts where the lighting currents are long and it is desired to use standard lamps. Search lights and projectors are all designed for 110 volts.

The 32 volt generator is recommended for short lighting circuits and where the lamps are subjected to a great deal of vibration as on steam shovels, locomotive cranes, dredges, ditchers, etc., as the lamp filaments are more rugged and stand up better.

Excepting the armatures, field coils, brushes and brush holders the construction of each type is the same and all parts are interchangeable.



Prices of Turbine Generators Only

32 VOLTS				110 VOLTS		32 or 110 VOLTS
300 Watt \$240.00	500 Watt \$250.00	1000 Watt \$260.00	2500 Watt \$380.00	1000 Watt \$270.00	2500 Watt \$400.00	1500 Watt \$270.00



Construction and Wrecking Lights

Designed to take the place of the more expensive search lights or projectors as its light has a greater spread it is better adapted to many conditions than the search light. Lighting larger areas, it is especially suitable for lighting large construction jobs, etc. The light spreads at an angle of 90 degrees at the lamp and clearly lights a field of 500 feet or more. When lighting a large field two or more lights may be used. This arrangement eliminates all shadows. Its construction is simple, neat and compact, nothing to get out of order.

Only one concentrated filament Mazda lamp is used and the best of workmanship and material is employed in its manufacture.

Owing to its simplicity and great adaptability it is indispensable on all kinds of excavating and construction work.

The light is instantly trained to new positions without wire changes.

Furnished either for 110 or 32 volts and can be used on either direct or alternating current circuits.

Prices and Specifications of Lights

Type	Size Incandescent Lamps Used Watts	Depth Lamp	Price without Incandescent Lamp
D-1	200	10½	\$74.00
D-1-M	400	10½	76.50
D-2	200	12½	74.00
D-2-M	400	12½	76.50
D-3	200	14½	74.00
D-3-M	400	14½	76.50

D-1-M, 2-M, 3-M have mogul screw socket, other medium screw base. Lamps are all 28½ inches high, 20 inches wide and weigh approximately 41 pounds.

Prices and Specification of Incandescent Lamps

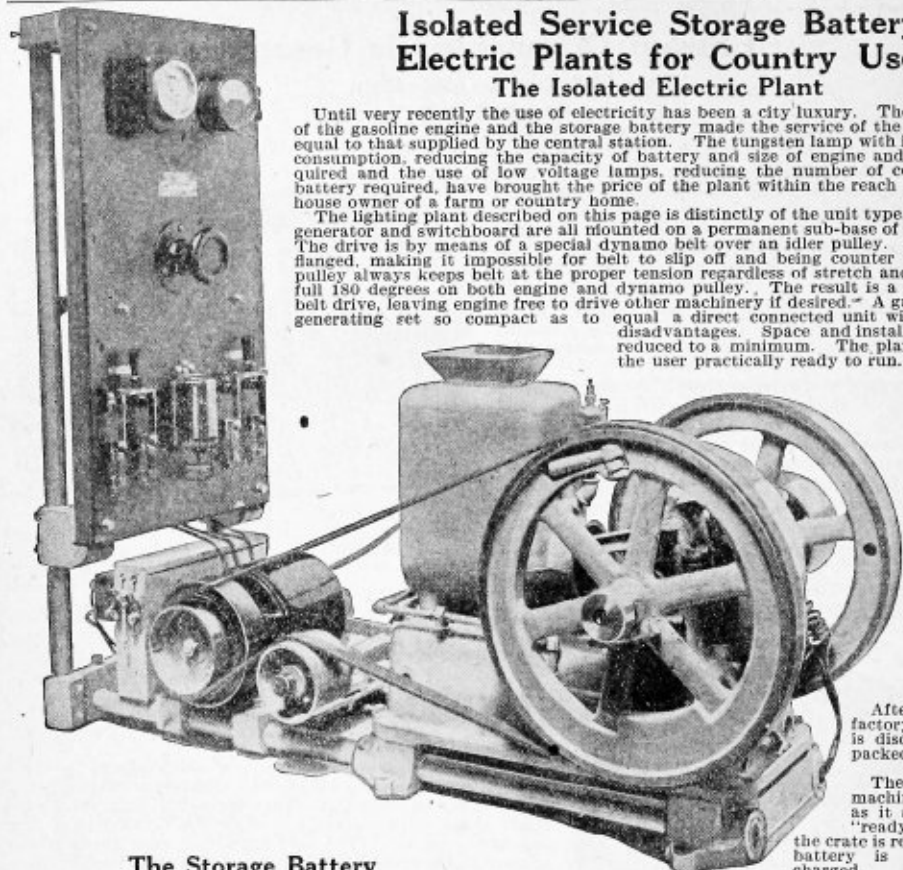
Size Lamp Watts	Volts	Bulb	Type of Lamp Base	Price Each
200	105-130	G-30	Medium Screw	\$ 5.40
250	220-250	G-30	Medium Screw	6.50
250	32	G-30	Medium Screw	6.00
400	110-130	G-40	Mogul Screw	9.00
500	220-250	G-40	Mogul Screw	13.00

The focusing device on any of our flood lights permits the use of smaller lamps, which can be accurately focused. Adapters can be furnished for mogul sockets so smaller lamps can be used.

Isolated Service Storage Battery Electric Plants for Country Use The Isolated Electric Plant

Until very recently the use of electricity has been a city luxury. The development of the gasoline engine and the storage battery made the service of the isolated plant equal to that supplied by the central station. The tungsten lamp with its low current consumption, reducing the capacity of battery and size of engine and generator required and the use of low voltage lamps, reducing the number of cells of storage battery required, have brought the price of the plant within the reach of the average house owner of a farm or country home.

The lighting plant described on this page is distinctly of the unit type. The engine, generator and switchboard are all mounted on a permanent sub-base of iron and steel. The drive is by means of a special dynamo belt over an idler pulley. This pulley is flanged, making it impossible for belt to slip off and being counter balanced, this pulley always keeps belt at the proper tension regardless of stretch and at a wrap of full 180 degrees on both engine and dynamo pulley. The result is a perfect elastic belt drive, leaving engine free to drive other machinery if desired. A gasoline electric generating set so compact as to equal a direct connected unit with none of its disadvantages. Space and installation work is reduced to a minimum. The plant goes out to the user practically ready to run.



**Shipped
Ready
to Run**

After testing at factory, switchboard is disconnected and packed separately.

The balance of the machinery is crated as it stands and is "ready to run when the crate is removed." The battery is shipped fully charged.

The Storage Battery

The storage battery used was designed to supply a demand for a battery which would give good service for isolated lighting plants, and at the same time would not require installation by an expert. The plates used are made in exactly the same way, only on a smaller scale, as those used in the batteries adopted by central stations throughout the country. The batteries are of the well known Hyray Exide, sealed, rubber jar type and are shipped already charged, so that there is no installation cost on the batteries.

The Gasoline Engine

The gasoline engines are of the four cycle hopper cooled, bit and miss governor, jump spark type. Engine is especially well balanced and of high speed making it particularly fitted for this class of work. All bearings are of tobain bronze, interchangeable and removable at slight expense. All machine work is done to micrometer size. It is not built to meet competition in price, but designed for exacting service of private utility plants.

The Switchboard

The switchboard is designed to give a full twenty-four hour service, as lights may be used while the battery is charging. It is also possible to obtain the combined capacity of generator and battery. When lights are being supplied by the generator, the battery is "floated on the line" thus giving absolutely steady lights.

The instruments are mounted on 15-inch electrical slate. Circuit breaker is automatic and all switches are normally closed making board not only semi-automatic, but as simple and as nearly inexperience-proof as possible. Charge and discharge rate is indicated by a high class Westor type ammeter and storage battery capacity is at all times correctly indicated by an ampere hour meter, enabling operator to tell at a glance just how much in amperes is contained in the batteries.

No. 100F Electric Plant

Below will be found the specifications and prices of the No. 100F Electric Plant. We can furnish eleven other sizes ranging in price up to \$1140.00 Correspondence regarding these plants is invited.

Capacity of Plant No. 100F 32 Volt

From battery, fully charged, rated in Tungsten lamps at 14 Watts per Candle-Power:

Ampere Hours 44	Watt Hours 1408
For 3 hours 16 lamps 16 C. P. or 38 lamps 8 C. P.	
For 5 hours 13 lamps 16 C. P. or 26 lamps 8 C. P.	
For 8 hours 9 lamps 16 C. P. or 18 lamps 8 C. P.	

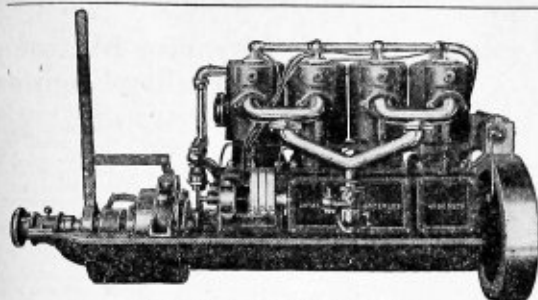
From dynamo and battery operating together, battery fully charged, dynamo rated at 12 lamps of 16 candle-power or 24 lamps of 8 candle-power.

Ampere Hours 50 1/4	Watt Hours 1658
For 3 hours 31 lamps, 16 C. P., or 62 lamps 8 C. P.	
For 5 hours, 25 lamps, 16 C. P., or 50 lamps 8 C. P.	
For 8 hours, 21 lamps, 16 C. P., or 42 lamps 8 C. P.	

1 One H. P. Hopper Cooled Gasoline Engine, lbs.	275
1 Type "F" Switchboard, pounds.	100
1 6 1/2 Ampere, 40 Volt, Generator, pounds.	55
1 Complete Sub-base, Belt Tightener and Belt, pounds	50
1 Set of 16 Type DDR-5 Storage Batteries, pounds.	350

Total weight, pounds	830
Price Complete	\$480.00
Price without Engine	\$70.00

Write for specifications and prices on larger plants.



Four Cylinder 5x6 24 H. P. Engine

Flywheel is bolted to a solid flange on the crankshaft, and the main and lower connecting rod bearings are lined with interchangeable Parson's white bronze bushings. Cranks and rollers are of hardened tool steel and with all gears are enclosed in crank case. Adjustable steel push rods work in extra long key-seated bronze guides. All parts are easily accessible. Intake valves operate mechanically and are on side of cylinders opposite exhaust valves. A special Paragon reverse gear, fitted into extended base, is entirely enclosed. A Detroit nine feed mechanical oil lubricates all cylinders and bearings automatically. "Schebler" carburetor and "Bosch" or "Dixie" high tension magnetos are also a part of regular equipment. A two unit "Leece Neville" starting and lighting outfit is supplied also when desired.

Anderson Marine or General Utility Gasoline Engines

These engines are light, compact and strictly high grade in every detail of design and construction.

The cut shows a four cylinder 5x6 24 H. P. engine. The cylinders are of the "T" type, cast integral and require no gaskets.

Exhaust manifold is water jacketed and water intake and overflow manifolds are of polished brass, fastened with studs to top and side of cylinders. A large brass plunger or gear pump forces the cold water directly around each exhaust valve in such a manner that all parts of cylinder are kept constantly at an even temperature.

Horse power	2½	4	5	6	8	12	18	24	25	37½	50	75	100	150
No. cycles	1	1	2	1	2	2	3	4	2	3	4	3	4	6
Bore and stroke	4x4	4½x5	4x4	4x4	5x6½	4½x5	5x6	5x6	5x6	7x8½	7x8½	9½x11	9½x11	9½x11
Revolutions per minute	600	550	600	600	500	550	500	500	450	450	450	400	400	400
Weight, pounds	250	375	350	600	550	850	1100	1350	1200	1700	2200	3500	4500	7500
Propeller	12x18	15x20	15x20	18x18	18x20	20x25	22x27½	24x30	28x32	30x37½	32x40	36x36	40x40	48x48
Shaft, inches x feet	¾x6	1x6	1x6	1½x7	1½x7	1½x8	1½x8	1½x8	1½x8	1½x10	2x10	2½x10	2½x12	3½x12
Length, inches	32	35	38	39½	44	55	63	71	65	75	85	105	118	149
Width, inches	15	16	16	17	17	17	17	17	22	22	30	30	30	30
Height, inches	17	21	17	24	21½	25	25	25	31½	31½	43	43	43	43
Diam. flywheel, inches	15	16	15	19	16	18	18	18	24	24	33	33	33	33
Price complete	\$133.00	\$178.00	\$267.00	\$306.00	\$355.00	\$534.00	\$711.00	\$889.00	\$845.00	\$1245.00	\$1609.00	\$1734.00	\$2440.00	\$3200.00
Price without reverse gear and marine equipment	114.00	154.00	243.00	260.00	319.00	467.00	631.00	796.00	752.00	1125.00	1467.00	1567.00	2220.00	2900.00

*Height from center of shaft—add ½ diameter of flywheel for overall height.

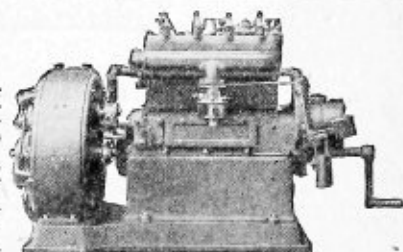
Universal General Utility Gasoline Engine

A strictly high class, dependable four cylinder engine, equally adapted for marine or general utility work. Every detail is properly designed and constructed. All parts are interchangeable and easily accessible. Liberal provision is made to take up wear. Large wearing surfaces are provided and small wearing parts are hardened.

A distinctive feature of this engine is the extreme smoothness of operation, due to a substantial and sensitive throttling governor, which acts on the throttling valve of the carburetor.

It is equally well adapted for lighting, or driving, boats, house or town lighting, moving picture work, searchlights, wireless telegraphy, battery charging, etc.

It is made in one size only and develops from 9 to 12 H. P. at speeds ranging from 1100 to 1700 R. P. M. and will operate on kerosene when necessary.



On Stationary Base Direct Connected to Dynamo

Specifications

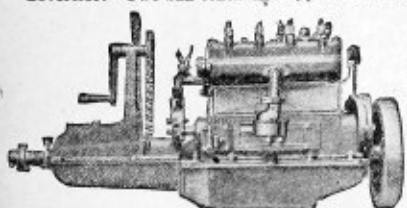
- Cylinders.** Four cylinder cast en bloc, 2½-inch diameter, 4-inch stroke. Inlet and exhaust manifolds cast integral.
- Pistons.** Close grain iron, fitted to cylinder with 3/1000-inch clearance and three packing rings, piston pin hollow hardened and ground.
- Crank Shaft.** Drop forged steel accurately ground, 1½-inch diameter, crank pins 1½x1½-inch.
- Connecting Rods.** Drop forged steel, heat treated, fitted with bronze piston bushing and the cast crank pin bearings.
- Cylinder Head.** Covering all cylinders, removable, exposing all valves and pistons, packed with copper asbestos gasket.
- Ignition.** High tension independent magneto or Atwater-Kent unisarker.
- Fuel Feed.** High grade float feed carburetor with throttle fitted to governor.
- Governor.** Two ball centrifugal type enclosed in oil tight case and fitted with non-fluctuating dash pot.

Prices

Engine only, on stationary base, for belt drive with Atwater-Kent ignition system, carburetor, flywheel pulley 13 inches diameter, 3-inch face, speed 1100 R. P. M.

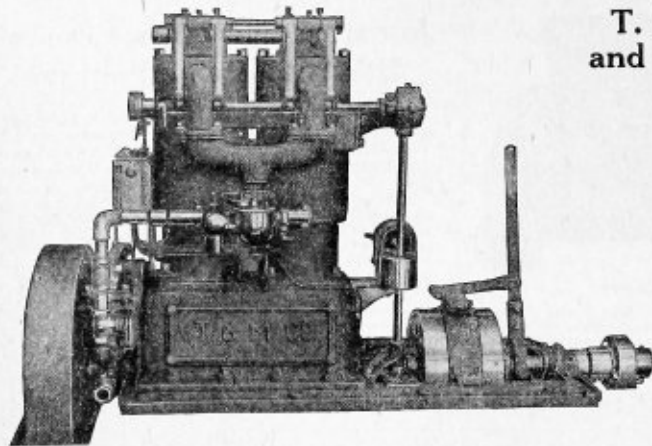
Price	\$240.00
Water pump fitted to engine, extra	13.50
Gasoline tank, 5 gals., with pipe and flanges, extra	4.00
Water tank, 60 gals., with pipe and flanges, extra	13.50
Muffler, extra	5.50
Electric starter, mounted, less battery, extra	107.00
Kerosene attachment, extra	8.00

Prices for marine equipment quoted upon request.



On Marine Base

T. & M. Gasoline Marine and General Utility Engines



The lubrication is obtained from oil mixed with the fuel in the proportion of one pint to 5 gallons of gasoline. We also supply an oil cup on inlet pipe of 3 H. P. motors and above, so that oil cup lubrication or both can be used if desired.

Water pumps of extra large capacity supplied for cooling cylinders, and provision is made for admitting water spray into the exhaust chamber for cooling it and exhaust pipes. Propeller shaft thrust taken by ball bearings. Semi-universal shaft couplings prevent strain from improper alignment.

Prices and Specifications

Horse power	2	3	5	8	12	20
Bore, inches	3	3 3/4	4 1/2	4	4 3/4	5 3/4
Stroke, inches	3 1/2	3 1/2	4 1/2	4	4 3/4	6
Speed (revolutions)	300 to 700	300 to 650	300 to 600	300 to 700	300 to 600	300 to 500
Diameter of propeller, inches	11	14	16	18	22	22
Diameter of propeller shaft	3/4"	3/4"	1"	1 1/4"	1 1/4"	1 1/2"
Length of propeller shaft, feet	6	6	6	6	8	8
Weight of motor complete, pounds	120	150	250	350	490	850
Weight of motor crated, pounds	200	220	350	550	900	1500
Boxed for export, pounds	230	260	400	800	1200	1700
Price complete	\$71.50	\$102.00	\$132.00	\$240.00	\$307.00	\$515.00
Price without shaft, propeller or stuffing box	69.00	99.00	128.00	235.00	299.00	505.00

The Evenrude

Detachable Row Boat and Canoe Gasoline Motor

A Light, Portable and Thoroughly Dependable Motor Which Can be Attached to a Boat of Any Kind

These motors are as well and perfectly made as the finest automobile engines. They are used on row boats, canoes, scows, work boats, rafts and in fact any craft within the scope of its power.

The motor is a light, compact unit with no detached parts. It is easily and quickly attached, or removed, and transferred from one boat to another. When starting on your vacation, slip it into a small canvas bag and carry it as you would a suit case. Clamp it in a moment to any boat you use and it is ready for immediate service. Can also be used for stationary work, driving machines, etc.

The immense success and efficiency of this motor is indicated by the fact that they have been adopted by 22 different governments, including our own, and over four thousand are in daily use in the Scandinavian fishing fleet alone.

The magneto is built into and made part of the flywheel. All parts and connections are made water proof and effectually insulated against spray or moisture.

It is absolutely guaranteed to give a hot spark under all conditions of speed on either clear or salt water.

By means of a special coil the boat can be electrically lighted from the magneto.

Oil for lubrication is mixed with the gasoline in tank, provision being made to insure the correct proportion of each. The steering is through the propeller. The speed control from maximum to slowest trolling speed is simple and conveniently manipulated.

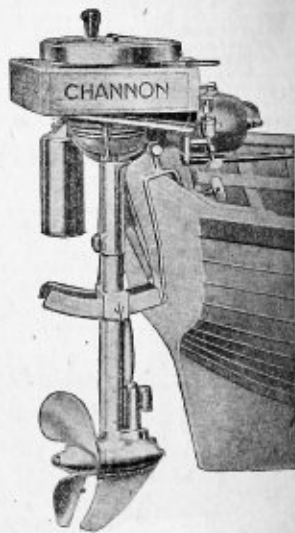
A full description of the construction and many attractive features of this motor will be furnished on request.

The standard A and B row boat type motors have nickel plated, polished flywheel, highly polished exhaust pipe, silencer, propeller and gear housing.

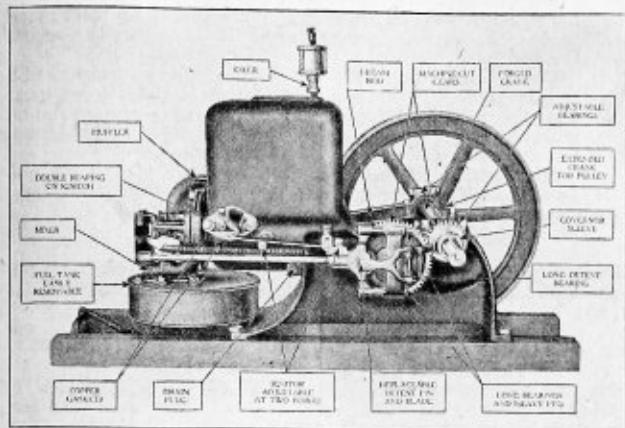
The Commercial models, C and D, do not have the fine finish of the A and B, nor all of the conveniences and safe guards.

Model	H. P.	Cycle	Cyl's	Description	Price
A	2	2	1	Standard, with magneto, silencer and automatic reverse, complete	\$107.00
B	2	2	1	Standard, reversible, with magneto and Evenrude silencer, complete	94.00
C	2	2	1	Commercial, with magneto, silencer and automatic reverse, complete	94.00
D	2	2	1	Commercial, reversible, with magneto and silencer, complete	80.00
A	3 1/2	2	1	Standard, with magneto, silencer and automatic reverse, complete	167.00
B	3 1/2	2	1	Standard, reversible, with magneto and silencer, complete	153.00
AA	4	4	2	Four cycle twin with magneto, silencer and automatic reverse, complete	167.00

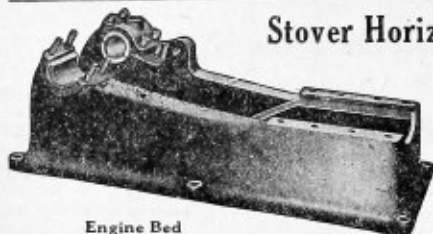
Note.—Above prices include Evenrude silencer. The Maxim silencer will be furnished for \$3.50 extra for the 2 H. P. and \$5.50 extra for the 3 1/2 H. P.



Stover Horizontal Hopper Cooled Gasoline Engines



Stover Horizontal Hopper Cooled Gasoline Engines



Engine Bed

Engine Bed. Constructed with heavy housings between the cylinder and the bearings. Pillar blocks are cast at an angle of 30 degrees, distributing the thrust equally throughout the bed itself.

Connecting Rod. The piston end of this is furnished with a removable split brass bearing which can be adjusted without removing piston. Upper half of crank end bearing is also removable, which provides easy replacement of both bearings when necessary.

Hopper Cooled Engines. Engines with this type of cool-

ing system are built in sizes from 1 to 14 H. P., inclusive. The Hopper, which is cast on the cylinder is large enough to hold the proper amount of water to keep engine at an equable temperature.

Fuel Pump is attached to main frame of engine and both pump and plunger are made of brass. A stuffing nut and gland make this pump easy to repack when necessary.

Crank Shafts: Smaller sizes are drop forged; the larger sizes are forged from solid open hearth steel billets. They are



Drop Forged Crank used on Engines up to and including 8 H.P.

carefully centered and turned to size and are also interchangeable.

Bearings. Main shaft bearings are extra long and fitted with best quality, high speed babbit metal. Main bearings of the horizontal engines are placed at an angle of 30 degrees. The bushings are at the same angle, hence the piston thrust is delivered at the strongest part of bearings, distributing strain equally throughout main frame.



Connecting Rod used on Engines up to and including 8 H. P.

Testing. Each engine undergoes a most careful and thorough test before leaving factory and must show a strong surplus of power over the catalog rating.

Specifications and Prices

Horse Power	Speed R. P. M.	Fly Wheel		Standard Pulley		Capacity Fuel Tank, Gallons	Capacity Hopper Tank, Gallons	Floor Space, Inches	Approx. Shipping Weight, Pounds	Price Each
		Diameter, Inches	Face, Inches	Diameter, Inches	Face, Inches					
1	550	15	1 3/4	4	4	3 qt.	2	19 x30	220	\$ 40.00
1 1/2	500	15 1/2	2	3 1/2 or 5	4 1/4	1	2 1/2	21 x30	300	52.00
2 1/2	375	26	2	6	4	4 1/2	5 1/2	29 x39 1/2	650	96.00
4	350	30	2 3/4	14	6	7 1/2	9	36 1/4 x47	1100	148.00
6	340	35	3 3/4	18	6	10	13	38 x57	1600	220.00
8	340	38	3 1/2	18	8	10 1/2	15	45 x62 1/2	1925	340.00
10	300	45	3	20	8	25	20	53 x72	2350	420.00
12	275	50	3 1/2	20	8	25	24	54 x81	3250	510.00
14	275	54	3 1/2	24	10	25	33	54 x84	3650	.....

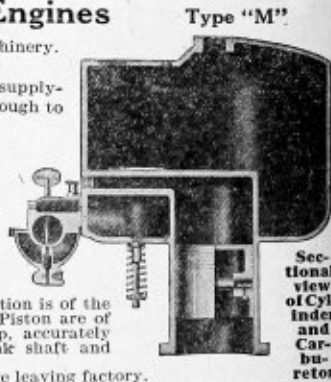
Improved Ideal Gasoline Engines

Type "M"

These Engines are designed for Concrete Mixers, Sprayers and Contractors' Machinery. They are of upright construction and fitted with the latest improvements.

Cooling Tank is of ample dimensions for supplying water around valves, which are large enough to insure cylinders receiving sufficient gas at all times. The large exhaust valve allows air to be drawn back and forth helping to cool cylinder. The carburetor, as shown in illustration, is placed on the side of cylinder so that the air is warm and dry, permitting the use of low grade gasoline. By means of the specially constructed governor the speed of engine may be regulated without stopping. Lubricating oil is always kept at a uniform temperature in pocket underneath water jacket. Ignition is of the jump spark type. Cylinder, Rings and Piston are of highest grade material and workmanship, accurately finished and are interchangeable. Crank shaft and connecting rod are solid drop forged.

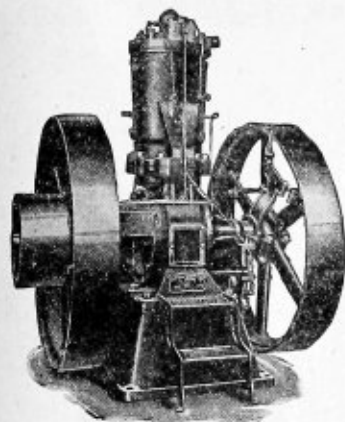
Every machine is carefully tested before leaving factory.



Sectional view of Cylinder and Carburetor

Rated Horse Power	2	3	4	6	8	10
Diameter of cylinder, inches	4	4 1/2	5	6	6 1/2	7
Stroke, inches	5	5	5	6	7	9
Size of flywheel, inches	18	20	20	23 1/2	26 3/4	30
Floor space, inches	17x20	20x20	20x20	24x26	24x26	30x44 1/2
Speed per minute	550	550	550	500	425	400
Shipping weight, pounds	420	520	580	900	1000	1600
Size pulley, diameter, inches	5x4	8x4	9x4	12x6	14x6	16x8
Size crank, inches	1 1/4	1 1/2	1 3/4	1 5/8	2 1/4	2 1/2
Price each	100.00	127.00	148.00	220.00	280.00	354.00

We have a pump for every purpose. See index of this catalog.



The Venn-Severin Vertical Oil Engine

This engine is designed and constructed along distinctive lines which avoid the difficulties common to most gas and oil engines.

It operates at ordinary gas engine pressures, not too high to cause wear or breakage, nor too low to interfere with efficiency. Every part is reduced to the most simple mechanical form. All gears, valves, magnetos, batteries, carburetors, etc., are eliminated. There are no adjustments necessary, to meet changes in load, fuel, climate, etc.

The Venn-Severin is distinguished from other crude oil engines in its principle of internal carburetion. The fuel is not injected against a red hot surface, but is sprayed by a patented inspirator in perfectly vaporized form into every part of the compressed air in such a manner that a gaseous mixture, or carburetion, is formed, which ignites spontaneously from the heat of the compressed air.

Inspiration of the oil occurs near dead center, the moment combustion is desired, thereby eliminating pre-ignition which is so destructive to an engine. Ignition is instantaneous and combustion complete.

For these reasons it runs with exceptional smoothness and a total absence of any perceptible jar or knock. Therefore, there is no danger of breaking any parts or causing early deterioration of the engine.

The superior principle of operation is indicated by the exceptional low fuel consumption which averages from .65 to .75 of a pound of fuel oil per H. P. hour. It will operate with equal success on any kerosene fuel and crude oil provided these oils are in a free flowing water like condition.

This engine has given exceptionally good results in every class of service. It is particularly adapted for electric light and power generation for pumping plants, factory power houses or other service requiring continuous heavy duty. It is built in both stationary and marine types.

Marine engines from 10 to 120 H. P. Prices on application.

The Bessemer Horizontal Oil Engines

Of massive construction well balanced and very symmetrical in design.

Its functions being comparatively few and easily understood a skilled mechanic is not required to operate.

The cheapest grade of crude oil may be used, which together with its simplicity of parts and low cost of maintenance make it a very economical proposition.

The crank end of the cylinder is used as a pump, to furnish the air necessary for combustion of oil.

Into this crank end of the cylinder, during the head end stroke of the piston, air is drawn through the valve at the bottom, filling the evacuated space at atmospheric pressure.

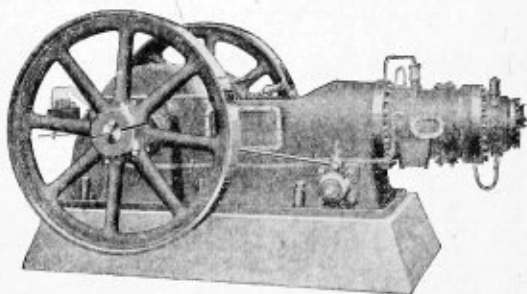
During the crank end stroke of the piston this air is compressed slightly (to about 5 pounds per square inch) and immediately upon the uncovering of the inlet port in the upper side of the cylinder by the piston this compressed air rushes over to the head end of the cylinder, sweeping before it and out of the exhaust ports at the bottom of the cylinder, the burned products of the previous charge.

Upon the following head end stroke the fresh charge is compressed in the combustion end of the cylinder, while a new charge is being drawn in at the crank end. A pump injects fuel into the combustion chamber, near the dead center, which is ignited by contact with the hot surface of the ignition bonnet in the head, and drives the piston outward upon its power stroke. The ignition bonnet is heated by means of a gas or kerosene torch for a few minutes before starting, after which the combustion supplies the necessary heat for ignition.

Bessemer oil engines are built in single cylinder type to 85 H. P. and in twin cylinder type to 180 H. P. They are guaranteed to develop their full rated horse power at the shaft, and there is an overload capacity sufficient to handle and overcome the heavy starting torque of high speed machinery or motors, or for an occasional peak load, such as sometimes occurs in wood working plants. They will overcome certain losses due to high elevations, but in choosing any engine, it is advisable to allow for the standard corrections for elevations. Bessemers are tested at 1250 feet.

Special bulletin with full description sent on request.

Prices also on request.



Vertical Steam Engines

Side and Center Crank

Class "B" Side Crank Engines

We present this style of engine as the most desirable for general purposes where a vertical engine can be used—they are well proportioned, strong and heavy in construction and will stand hard work and high speed.

Equipped with Gardner throttling governors. Above 20 H. P. these engines have center oiler for the crank pin.

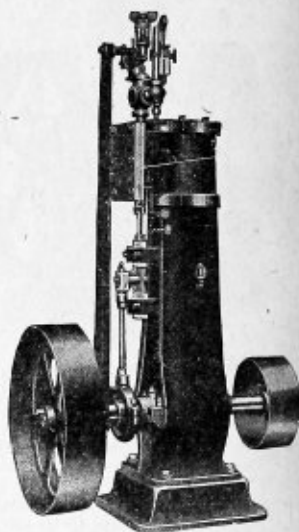
Class "F" Center Crank Engines

Owing to simplicity in construction this type can be produced at lower cost than the Class B.

Every engine is thoroughly tested and placed in running order before leaving the shops.



Class "B"—Side-Crank



Class "F"—Center-Crank

Class "B" Side Crank

No.	Price Complete with Fixtures as Listed	H. P.	Size of Cylinder, Inches	Speed Rev. per Minute	Dia. of Stm. Pipe, Ins.	Dia. of Exh. Pipe, Ins.	Dia. of Shift, Ins.	Diameter and Face of Wheel, Inches	Diameter and Face of Pulley, Inches	Height from Floor to Center of Shaft, Inches	Height from Floor to Top of Cylinder, Inches	Floor Space Occupied, Inches	Approx. Weight, Pounds
18	\$175.00	1½	3x3	400	1½	¾	1½	12x3	.....	9	30	13x23	250
19	145.00	3	4x4	325	¾	1	1½	18x4	.....	10	36	15x28	400
20	310.00	5	5x5	250	¾	1	1½	20x5	.....	12	43	18x36	650
21	380.00	7	6x6	225	1	1½	1½	24x6	.....	14	53	22x40	950
22	560.00	10	7x7	200	1½	1½	2½	32x7	.....	18	61	25x46	1350
23	660.00	14	8x8	180	1½	2	2½	36x8	.....	20	68	28x58	2000
24	765.00	20	9x9	160	2	2½	2½	42x9	.....	24	79	31x58	2650
25	1150.00	25	10x10	160	2½	3	3¼	44x10	.....	26	86	36x62	3700
26	1500.00	35	12x12	160	3	3½	3¾	48x12	.....	28	94	40x70	4800
27	2000.00	50	14x14	150	3½	4	4¾	52x14	.....	30	105	41x80	7700
28	2800.00	75	16x16	140	4	4½	5¾	54x16	.....	31½	113	41x85	11000

Class "F" Center Crank

No.	Price Complete with Fixtures as Listed	H. P.	Size of Cylinder, Inches	Speed Rev. per Minute	Dia. of Stm. Pipe, Ins.	Dia. of Exh. Pipe, Ins.	Dia. of Shift, Ins.	Diameter and Face of Wheel, Inches	Diameter and Face of Pulley, Inches	Height from Floor to Center of Shaft, Inches	Height from Floor to Top of Cylinder, Inches	Floor Space Occupied, Inches	Approx. Weight, Pounds
30	\$ 150.00	1	2½x3	400	¾	½	1½	12x3	6x3	7	28	13x13	260
31	175.00	1½	3 x 3	400	¾	¾	1½	12x3	6x3	9	31	13x13	290
32	210.00	2	3 x 5	350	1	¾	1½	15x4	10x5	10	43	17x17	375
33	225.00	3	4 x 4	325	¾	1	1½	16x4	10x5	9½	30½	13½x13½	400
34	230.00	4	4 x 5	325	¾	1	1½	17x4½	12x6	10	43	17x17	425
35	240.00	5	5 x 5	300	¾	1	1½	20x5	12x6	10	43	17x17	450
36	280.00	6	5 x 7½	250	1	1¼	2½	24x6	14x6½	13	54	20x20	750
37	300.00	7	6 x 6	225	1	1¼	2½	24x6	14x6½	14	54	20x20	775
38	325.00	8	6 x 7½	225	1¼	1½	2½	24x6	14x6½	13	54	20x20	800
39	340.00	9	6½x7½	225	1¼	1½	2½	28x7	14x6½	14½	55½	20x20	900
40	400.00	10	7 x 7	200	1½	1½	2½	30x6½	16x7½	17¼	63	24x24	1200
41	460.00	12	7 x 8½	200	1½	1½	2½	30x6½	16x7½	17¼	67	24x24	1350
42	485.00	15	8 x 8½	200	1½	2	2½	36x7¼	18x8	19¼	69	24x24	1450
43	525.00	20	9 x 9	160	2	2½	2½	40x9	20x10	23½	79	30x30	2150
44	1100.00	25	10 x10	160	2½	3	3¼	44x10½	24x12	26¼	86	36x36	3050

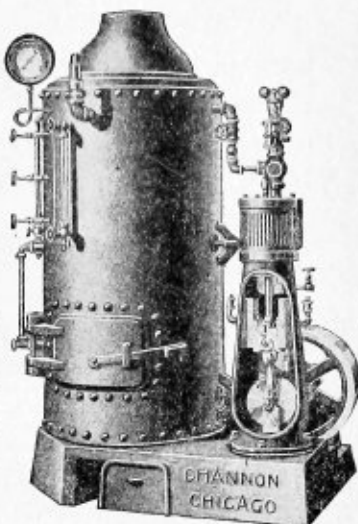
Fixtures—Include Gardner governor with belt, sight-feed lubricator, four oil cups, throttle valve with nipples, drain cocks and wrenches. No foundation bolts.

Class "F" Vertical Steam Engine and Boiler Combined on one Base

The complete outfit as shown includes all engine fixtures, all necessary boiler fixtures, with injector fitted, all piping and connections made between engine and boiler.

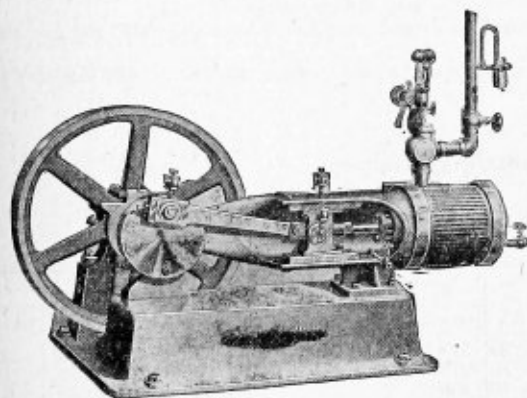
Horse Power of Engine	Horse Power of Boiler	Size of Engine Cyl., Ins.	Size of Boiler, Inches	No. of 2-inch Boiler Tubes	Height from Floor to Top of Boiler, Inches	Floor Space Occupied, Ins.	Apprx. Wght., Lbs.	Price Complete
1 1/2	1 1/2	2 1/2 x 3	20x36	16	44	26x45	750	\$143.00
2	2	3 x 3	20x36	16	44	22x33	750	155.00
3	3	3 x 5	20x42	19	50	26x48	1000	180.00
4	4	4 x 4	24x48	24	56	28x44	1550	225.00
5	5	4 x 5	24x48	24	56	30x53	1550	229.00
6	6	5 x 5	24x72	24	80	30x53	1750	258.00
7	7	5 x 7 1/2	27x60	30	68	33x59	2150	292.00
8	8	6 x 6	30x72	42	82	33x59	2750	336.00
9	9	6 x 7 1/2	30x72	42	82	36x62	2750	344.00
10	10	6 x 7 1/2	30x84	42	94	36x62	2950	368.00
11	11	7 x 7	30x84	42	94	36x62	3400	401.00
12	12	7 x 8 1/2	36x84	60	94	42x70	4250	483.00
15	15	8 x 8 1/2	36x96	60	106	42x70	4675	527.00

Price does not include stock or Exhaust Piping.



Class "B" Self-Contained Disc-Crank Horizontal Throttling Engines

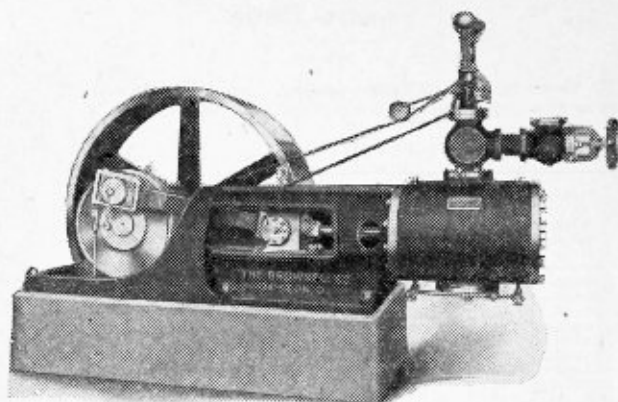
Suitable for all kinds of work where high speed and smooth running are required. The engine being all complete on a single cast-iron base, prevents any of its working parts from becoming deranged or out of line. The material is of the best that can be obtained, and the workmanship is excellent.



Horse Power	Size of Cylinder, Inches	Speed Rev. per Minute	Size of Steam Pipe, Inches	Diameter of Shaft, Inches	Fly-wheel		Floor Space, Inches	Approx. Weight, Pounds	Price with Trimmings
					Diam., Inches	Face, Inches			
5	5x5	250	3/4	1 1/2	20	5	29x34	925	\$142.00
7	6x6	200	1	1 1/2	24	6	31x38	1000	180.00
10	7x7	190	1 1/4	2 1/2	32	7	41x46	1650	245.00
14	8x8	180	1 1/2	2 3/4	36	8	48x52	2100	320.00
20	9x9	160	2	3	42	9	48x57	2700	350.00
25	10x12	160	2 1/4	3	48	10	50x72	4500	520.00
35	11x13	160	2 1/2	3	48	11	50x72	4700	555.00

Fixtures: Include Gardner governor with belt, sight feed lubricator, three oil cups, throttle valve with nipples, drain cocks and wrenches; no foundation bolts.

Side Crank Throttling Engine



The frame of this engine is of the side crank rolling mill type with the fly wheel between bearings. The main bearings in all engines with 6-inch shaft and under are of the angle type adjustable to wear by means of liners. On engines with 7-inch shaft or over the main bearings are of the quarter box type adjustable to wear by wedges which can be adjusted while the engine is running.

These are strictly high class engines in design, material and workmanship. Complete specifications will be furnished on request.

We furnish with each engine, throttling governor with automatic stop and belt, angle throttling valve with nipple, sight feed cylinder, lubricator, centrifugal oiler for crank pin, cylinder drain valves, three drop forged wrenches, blue print setting plan and book of instructions for setting and operating.

Steam and exhaust pipe and fittings, foundation bolts, plates and templates, piston and valve rod packings are extra.

Before leaving factory all engines are thoroughly tested under actual working conditions, and indicated to properly set the valves and adjustable parts.

Details—Throttling Engines

Right or Left Hand

Side Crank Detached or Self-Contained Type

Balanced Valves

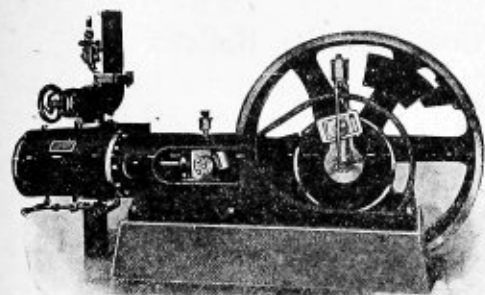
Size	Shaft Dia. & Bearing	Wheel		Pipes		Ship- ping Weight	Floor Space	Standard Ratings		Reference Ratings					
		Dia.	Face	Steam	Exh.			Speed	H. P.	Speed	H. P.	Speed	H. P.	Speed	H. P.
8x10	4-	40	8 1/2	2	3	2,500	88x 59	275	25	250	23	275	25	300	27
8x12	4	40	8 1/2	2	3	2,600	97x 59	275	30	225	23	250	26	275	30
10x12	4	48	10 1/2	2 1/2	3 1/2	3,000	102x 59	250	40	225	37	250	42	275	47
10x14	4	48	10 1/2	2 1/2	3 1/2	3,200	104x 59	250	50	200	38	225	43	250	48
12x14	5	60	12 1/2	3 1/2	4 1/2	5,000	118x 72	225	60	200	55	225	63	250	70
12x16	5	60	12 1/2	3 1/2	4 1/2	5,300	120x 72	225	75	175	56	200	64	225	72
14x16	6	72	14 1/2	4	5	7,100	133x 75	200	90	175	75	200	87	225	98
14x18	6	72	14 1/2	4	5	7,500	135x 75	200	100	150	73	175	85	200	97
16x18	7	84	16 1/2	4 1/2	6	12,800	154x 90	175	110	150	95	175	111	200	127
16x20	7	84	16 1/2	4 1/2	6	13,000	156x 90	175	125	140	100	160	114	180	128
16x22	7	84	16 1/2	4 1/2	6	13,500	158x 90	175	150	140	126	160	144	180	158
18x24	8	96	20 1/2	5	7	22,000	173x108	150	175	125	140	150	168	175	195
20x24	9	96	25 1/2	6	8	24,000	184x117	150	200	125	167	150	200	175	233

4, 5 and 6-inch shaft engines have angle bearing.

7, 8 and 9-inch shaft engines have quarter box bearing.

Quarter box bearings can be furnished on 4, 5 and 6-inch shaft engines, if desired, at an additional cost.

Note.—All engines good for 150 pounds working pressure.



Heavy Duty Side Crank Automatic Engine

Ohio Frame Type

As indicated by the illustration and table below, this engine is of the medium speed, heavy duty class with single automatic cut off valve.

The frame is well proportioned, pleasing in appearance, strong and rigid under severe strains. The cross head guides and main bearing are cast as part of the frame. The guides are circular and are bored at the same time that the frame is turned to receive the cylinder, thus assuring perfect alignment between piston and cross head.

The governor is of the well known Rites Inertia type and is of latest improved design and is the most efficient and sensitive regulating device ever applied to a steam engine.

There is also furnished a sheet steel oil shield of neat appearance which protects the floor and allows the oil to be caught, filtered and used again. The entire system of lubrication is very simple and efficient.

Every engine before leaving the shop is tested under steam, with brake, indicator and hometer, so that all parts are properly adjusted, valves properly set and speed determined under extreme conditions. These tests are more severe than is likely to occur in practice. The engine is placed in first class running order before it leaves the testing room.

Right or Left Hand

Balanced Valves

Size	Shaft Dia. & Main Bearing	Wheel		Pipes		Sh'p'g Weight	Floor Space	Standard Ratings		Reference Ratings					
		Dia.	Face	Steam	Exh.			Speed Revs.	H. P.	Speed	H. P.	Speed	H. P.	Speed	H. P.
6x12	3	40	8 1/2	2	2 1/2	2,750	86x 46	300	25	275	24	300	26	325	28
7x12	4	48	10 1/2	2 1/2	3 1/2	3,900	97x 59	300	35	275	32	300	35	None	.....
8x14	4	48	10 1/2	2 1/2	3 1/2	4,100	99x 59	275	50	250	44	275	49	300	54
10x12	5	60	12 1/2	3	4	4,400	103x 62	275	60	250	54	275	60	300	73
10x14	5	60	12 1/2	3	4	4,600	116x 62	250	65	225	59	250	65	275	77
10x16	5	60	12 1/2	3	4	4,800	118x 62	250	75	225	71	250	80	None	.....
12x14	6	72	14 1/2	4	5	6,800	121x 70	250	90	225	81	250	90	275	103
12x16	6	72	14 1/2	4	5	7,100	133x 70	250	100	225	95	250	105	None	.....
12x18	6	72	14 1/2	4	5	7,400	135x 70	225	110	200	103	225	115	None	.....
14x16	7	84	16 1/2	4 1/2	6	11,500	134x 85	225	125	200	111	225	125	250	148
14x18	7	84	16 1/2	4 1/2	6	11,900	147x 85	225	140	200	127	225	143	None	.....
14x20	7	84	16 1/2	4 1/2	6	12,300	150x 85	200	150	175	135	200	155	None	.....
16x18	8	96	19	5	7	20,000	167x 99	200	175	175	160	200	175	225	190
16x20	8	96	19	5	7	20,500	180x 99	200	190	175	166	200	190	None	.....
16x22	8	96	21	5	7	21,000	182x 99	190	200	175	194	190	210	None	.....
16x24	8	96	21	5	7	21,500	184x 99	175	225	150	183	175	214	None	.....
18x22	9	96	25	6	8	28,000	188x 123	175	250	150	221	175	250	190	268
18x24	9	96	25	6	8	29,000	190x 123	175	275	150	232	175	270	None	.....

3, 4, 5 and 6-inch shaft engines have angle bearing.

7, 8 and 9-inch shaft engines have quarter box bearing.

Quarter box bearings can be furnished on 4, 5 and 6-inch shaft engines, if desired, at an additional cost.

Note.—All engines good for 150 pounds working pressure.

Standard Fittings

With each heavy duty automatic engine we furnish elbow throttle valve, sight feed oil cups, sight feed cylinder lubricator, centrifugal oiler for crank pin, safety cylinder drain valves and pipe, oil shield for crank disc, three drop forged wrenches, blue print setting plan.

Extras.—Steam and exhaust pipe and fittings, foundation bolts, plates and templates, piston and valve rod packing.

Full Length Tube Vertical Tubular Boilers



Fig. 2219
Regular or Octagon
Base

These boilers are made of open hearth flange steel plate, having a tensile strength of 60,000 pounds per square inch of section.

All sizes above 20 inches are well braced by means of stay bolts, and all boilers 30 inches and upward in diameter have their vertical seams double riveted. From No. 1 to No. 10, inclusive, the shells are made of a single sheet.

Boilers 20 to 30 inches in diameter have two, and the larger sizes three hand holes around the water leg, and the same number above the crown sheet. In boilers 20 inches in diameter the water space around the firebox is $1\frac{1}{2}$ inches wide, in the 24-inch diameter 2 inches, and in all other sizes $2\frac{1}{2}$ inches wide.

The fixtures comprise base, grate, hood, steam gauge, glass water gauge, gauge cocks, either pop or lever safety valve, blow-off valve, check and stop valve.

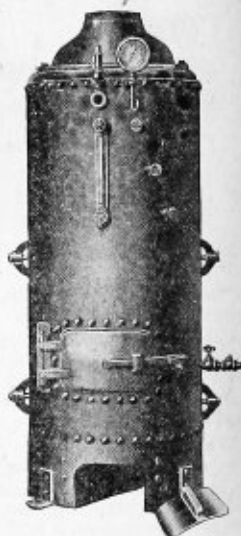


Fig. 2220
With Shell Extended
to Form Base and
Ash Pit

Sizes and Prices

No. of Size	Horse Power as Usually Rated	Diameter of Boiler, Ins.	Height of Boiler, Feet	Diameter of Furnace, Ins.	Height of Furnace, Ins.	Thickness of Shell, Ins.	Thickness of Heads, Ins.	No. of Tubes, All 2 Ins. in Diam.	Length of Tubes, Ins.	Square Feet of Heat'g Surface	Diameter of Stack Req'd., Ins.	Weight of Bare Boiler, Lbs.	Weight of Boiler Complete with Fixtures, Lbs.	Price of Boiler Complete with Std. Fixtures Without Stack or Injector
O	$1\frac{1}{2}$	20	3	16	18	$\frac{1}{32}$	$\frac{5}{16}$	16	18	18	8	350	580	\$115.00
A	2	20	$3\frac{1}{2}$	16	18	$\frac{1}{32}$	$\frac{5}{16}$	19	24	26	8	450	650	125.00
B	3	20	4	16	18	$\frac{1}{32}$	$\frac{5}{16}$	19	30	31	8	475	700	140.00
1	4	24	4	19	23	$\frac{1}{4}$	$\frac{5}{8}$	24	25	36	8	770	1000	205.00
2	5	24	5	19	23	$\frac{1}{4}$	$\frac{5}{8}$	24	37	49	8	870	1170	230.00
3	6	24	6	19	23	$\frac{1}{4}$	$\frac{5}{8}$	24	49	61	8	950	1250	250.00
$3\frac{1}{2}$	6	27	5	21	26	$\frac{1}{4}$	$\frac{5}{8}$	30	34	56	10	1000	1300	270.00
4	8	30	5	24	26	$\frac{1}{4}$	$\frac{5}{8}$	48	34	85	10	1200	1800	300.00
5	10	30	6	24	26	$\frac{1}{4}$	$\frac{5}{8}$	48	46	111	10	1400	2000	340.00
6	12	30	7	24	26	$\frac{1}{4}$	$\frac{5}{8}$	48	58	136	10	1600	2200	365.00
7	14	36	6	30	26	$\frac{1}{4}$	$\frac{5}{8}$	66	46	151	14	1700	2500	425.00
9	16	36	7	30	26	$\frac{1}{4}$	$\frac{5}{8}$	66	58	186	14	2100	2800	470.00
10	18	36	7	30	26	$\frac{1}{4}$	$\frac{5}{8}$	72	58	210	14	2300	2900	480.00
11	20	36	8	30	26	$\frac{1}{4}$	$\frac{5}{8}$	72	68	232	14	2450	3150	525.00
12	22	42	7	36	30	$\frac{1}{4}$	$\frac{5}{8}$	92	56	252	14	2850	3750	570.00
13	25	42	$7\frac{1}{2}$	36	30	$\frac{1}{4}$	$\frac{5}{8}$	92	61	272	16	3000	3900	600.00
14	27	42	8	36	30	$\frac{1}{4}$	$\frac{5}{8}$	92	68	300	16	3200	4100	630.00
15	30	42	$8\frac{1}{2}$	36	30	$\frac{1}{4}$	$\frac{5}{8}$	92	74	324	16	3400	4300	660.00
16	35	42	$9\frac{1}{2}$	36	30	$\frac{1}{4}$	$\frac{5}{8}$	92	85	368	16	3700	4600	710.00
17	40	48	$8\frac{1}{2}$	42	30	$\frac{1}{4}$	$\frac{5}{8}$	130	74	453	20	4250	5400	880.00
18	45	48	9	42	30	$\frac{1}{4}$	$\frac{5}{8}$	130	86	486	20	4400	5550	900.00

Prices do not include stack or injector, which are always classed as extras.
Carried in Chicago stock up to 35 H. P.

Portable Locomotive Fire-Box Boilers

Water Front—Open Bottom

The most popular style of boiler for contractors' work which requires moving from job to job.

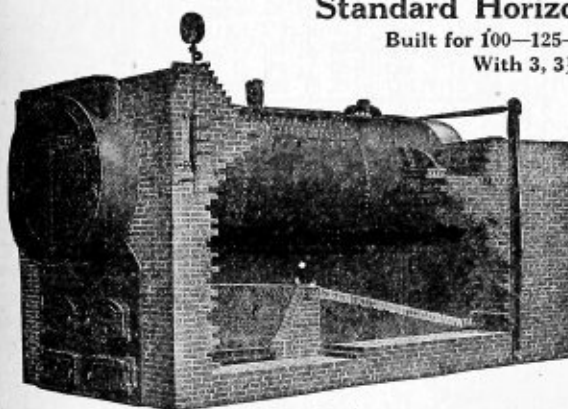
These boilers are regularly constructed for 100 pounds working pressure, with water front and open bottom. When required, we can make them with water bottom, also for 125 pounds working pressure. All boilers are subjected to a hydrostatic test pressure 50% greater than the working pressure for which they are built. Open-bottom boilers are made with wrought-iron mud-rings. The fire-door opening is formed by danging the furnace sheet outward.

Size.....	615	616	617	618	619	620	621	622	623	624	625	626
Horse power rating..... H. P.	15	20	25	30	35	40	50	60	70	80	90	100
Diameter of boiler..... inches	32	32	36	36	42	42	48	48	54	54	60	60
Length of fire-box..... inches	44	44	50	50	44	50	56	62	62	68	62	68
Width of fire-box..... inches	26	26	30	30	36	36	42	42	48	48	54	54
Number of 3-inch tubes.....	26	26	32	32	43	43	56	56	60	60	82	82
Length of tubes..... inches	72	96	96	120	96	120	120	144	144	168	156	168
Diameter and height of dome..... inches	16	16	18	18	22	22	24	24	28	28	30	30
Thickness of shell..... inches	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{5}{8}$	$\frac{5}{8}$	$\frac{5}{8}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{3}{4}$
Thickness of fire-box..... inches	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$
Thickness of heads..... inches	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$
Diameter of stack..... inches	16	16	18	18	20	20	24	24	26	26	28	28
Length of stack..... feet	20	25	25	30	25	30	30	35	35	40	40	45
Weight complete outfit..... pounds	4200	4600	5650	6350	6700	7800	10500	12000	13500	14800	17000	18000

A regular "complete outfit" consists of boiler, mounted on skids, with fixed dome, cast-iron smoke-box head with flue doors, common grates with rests, fire-door, stack of No. 16 steel with galvanized guy-wire six times length of stack, lever safety-valve, water-gauge, three gauge-cocks, steam gauge with syphon and cock, feed-valve, check-valve, and blow-off cock. Tools are extra. Sheffield or Tupper grates can be substituted for common grates without change in price. With open-bottom boilers, Century rocking grates can be furnished at an extra price.

Standard Horizontal Tubular Boilers

Built for 100—125—150 lbs. Working Pressure
With 3, 3½ or 4-inch Tubes



Full Front Setting

Complete Outfit consists of boiler with front, common grates and rests, back arch bars, soot door and frame, stack with guy-wire six times length of stack, and trimmings consisting of water column, water gauge, three gauge cocks, steam gauge, lever safety valve, check and stop valves, [and blow-off cock. Buck bars and rods, fire door arches, wall plates and [rollers are [only furnished when specified and at an extra price. Sheffield or Tupper grate bars are furnished instead of common grates without change in price. Fire tools, consisting of hoe, poker and slice bar, are extra. With boilers 18 feet and over in length we furnish three sets of buck bars and rods for side walls; with all other lengths, two sets. When specified, we will furnish boilers without dome, or with dry pipe or baffle plate.

Standard Sizes, 100-Pound Pressure

Horse power boiler as rated..... H. P.	15	20	25	30	35	40	45	50	60	70
Diameter of boiler..... inches	36	36	36	44	44	44	48	48	54	54
Length of tubes..... feet	8	10	12	10	12	14	12	14	14	16
Thickness of shell..... inches	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$
Thickness of heads..... inches	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$
Area of grates..... square feet	9	9	10.5	10.5	12.25	14	14	16	18	20.25

Standard Sizes, 100-Pound Pressure

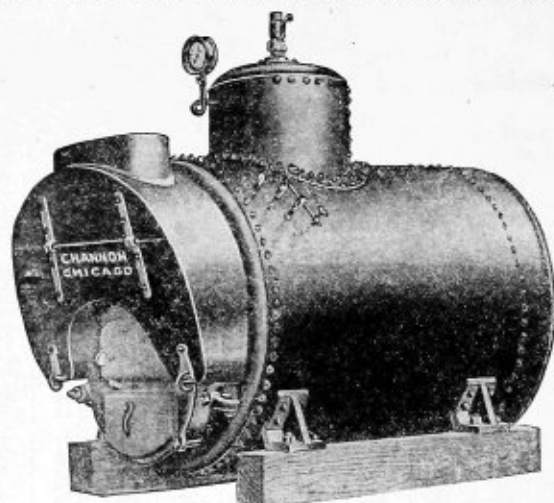
Horse power boiler as rated..... H. P.	80	90	100	110	125	150	165	180	200
Diameter of boiler..... inches	60	60	66	66	72	72	72	78	78
Length of tubes..... feet	16	18	16	18	16	18	20	18	20
Thickness of shell..... inches	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$
Thickness of heads..... inches	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$
Area of grates..... square feet	22.5	25	24.75	27.5	27	30	33	32.5	35.75

Prices on These Boilers Quoted Upon Request.

Internal Furnace Portable Tubular Boilers

For 100 lbs. Working Pressure

With Plain Riveted Furnaces and Dry or Brick Lined Combustion Chamber



Horse Power (as usually rated)	20	25	30	40	50	60
Diameter of Boiler.....inches	48	54	60	66	72	78
Length of Furnace and Tubes....."	72	72	72	72	72	72
Depth of Combustion Chamber....."	25	25	25	25	25	25
Diameter of Furnace....."	24	26	28	30	34	38
Number of Tubes (all 2-inch).....	56	70	86	116	146	176
Square Feet of Heating Surface.....	200	248	301	397	498	595
Square Feet of Grate Surface.....	8	8½	10½	11¼	14½	15½
Length of Grates.....inches	48	48	54	54	60	60
Thickness of Shell.....	⅝	⅝	⅝	¾	⅞	⅞
Thickness of Heads.....	⅞	⅞	⅞	⅞	⅞	⅞
Thickness of Furnace.....	⅞	⅞	⅞	¾	¾	¾
Diameter of Dome.....	22	22	30	30	30	30
Height of Dome.....	24	24	30	30	30	30
Diameter of Smoke Stack.....	16	18	20	22	24	26
Length of Smoke Stack.....feet	24	24	24	24	24	24
Weight of Boiler and Fixtures.....	6000	6850	8350	9450	11500	13400

With the bare boiler is furnished legs and skids for support; No. 10 steel smoke box as shown by cut; shell extended at rear for combustion chamber, intended for fire brick lining (no brick furnished), with ¼-inch steel door on end with cleaning-out door near bottom; cast iron front and doors for end of furnace as shown by cut, with liner for fire door and dead plate for front support for grates; sheet iron ash door under front.

Man hole in shell and two hand holes in front head.

Furnace of first three sizes in one plate, others in two plates and are made with lap seams single riveted.

Longitudinal seams of shell, vertical and flange seams of dome double riveted; heads and girth seams single riveted; domes 22-inch diameter are single riveted to shell. Heads braced with through rods.

Fixtures Comprise: Grates the width of furnace with bearers; safety valve (ball and lever or pop); steam gauge with syphon and cock, water gauge and three gauge cocks attached direct to shell; blow-off valve, check valve and feed valve; smoke stack of No. 16 steel with galvanized guy wires (four times the length of stack).



Fig. C.

Ornamental Boiler Fronts

Fitted with Liner
Plates, Bearing
Bars, Soot Doors
and Frames, and
Skeleton Arch.

Size of Boiler, Inches	Height of Front, Feet and Ins.	Width of Front, Feet and Ins.	Fire Space, Ins.	Ash Pit, Ins.	Distance Be- tween Blrs., Ins.	Weight, Lbs.
36 single...	7 2	6 4	18	18	20	2,000
36 double...	7 2	11 0	18	18	20	3,700
42 single...	7 10	7 2	18	18	20	2,250
42 double...	7 10	12 4	18	18	20	4,350
48 single...	9 1	7 8	20	20	24	3,125
48 double...	9 1	13 8	20	20	24	5,900
48 triple...	9 1	19 8	20	20	24	8,700
54 single...	9 6	8 0	24	20	24	3,300
54 double...	9 6	14 6	24	20	24	6,400
54 triple...	9 6	21 0	24	20	24	9,400
60 single...	10 3	8 6	26	21	24	3,900
60 double...	10 3	15 6	26	21	24	7,400
60 triple...	10 3	22 6	26	21	24	10,800
66 single...	11 6	9 2	28	22	26	4,450
66 double...	11 6	16 10	28	22	26	8,400
66 triple...	11 6	24 6	28	22	26	12,300
72 single...	11 6	9 2	28	22	26	4,500
72 double...	11 6	17 4	28	22	26	8,500
72 triple...	11 6	25 6	28	22	26	12,500

Plain Boiler Fronts

Fitted with Liner Plates, Bearing Bars, Soot
Doors and Frames, Skeleton Arch.

Size of Boiler, Inches	Height of Front, Feet and Ins.	Width of Front, Feet and Ins.	Fire Space, Ins.	Ash Pit, Ins.	Distance Be- tween Blrs., Ins.	Weight, Lbs.
48 single...	8 9	6 6	24	21	24	2,600
48 double...	8 9	12 6	24	21	24	5,200
48 triple...	8 9	18 6	24	21	24	7,900
54 single...	8 9	6 6	24	21	24	2,700
54 double...	8 9	13 0	24	21	24	5,400
54 triple...	8 9	19 6	24	21	24	8,100
60 single...	9 7	7 4	26	21	24	3,100
60 double...	9 7	14 4	26	21	24	6,200
60 triple...	9 7	21 2	26	21	24	9,300
66 single...	10 4	8 4	28	22	26	3,700
66 double...	10 4	15 10	28	22	26	7,400
66 triple...	10 4	23 8	28	22	26	11,100
72 single...	11 0	8 4	28	22	26	3,750
72 double...	11 0	16 6	28	22	26	7,500
72 triple...	11 0	24 8	28	22	26	11,250

Prices on above, also plain fronts, on application.

Half Fronts

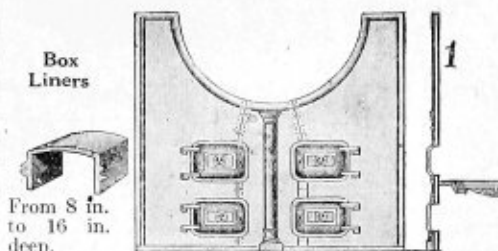


Fig. G

Size of Boiler Ins.	Hght., Feet and Ins.	Width, Feet and Ins.	Fire Space, Ins.	Ash Pit, Ins.	Weight, Lbs.
30	4 3	4 2	18	18	900
36	4 4	4 4	19	19	900
42	5 0	5 3	19	19	1,300
48	5 9	5 8	24	22	1,500
54	6 0	6 3	24	22	1,800
60	6 4	6 9	24	22	2,000
66	6 11	7 7	28	24	2,300
72	7 1	8 1	28	24	2,400

The weight given includes liners, bearing bars, one soot door and frame, and one back skeleton arch.



Fig. G

Top Liner Plates

Size of front, inches.....	36	42	48	54	60	66
Weight of 1 top plate, lbs.....	82	85	110	115	115	120



Fig. G

Side Liner Plates

Size of front, inches.....	36	42	48	54	60	66	72
1 side plate lbs.....	46	46	85	85	85	85	85

Front Angle or Dead Plate

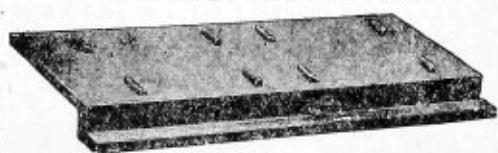


Fig. G

Size of boiler, inches.....	36	42	48	54	60	66	72
Length, inches.....	46	52	58	64	70	82	82
Weight, lbs.....	125	140	225	250	275	325	325

Prices on all items on this page quoted on application.

IMPROVED GRATE BAR



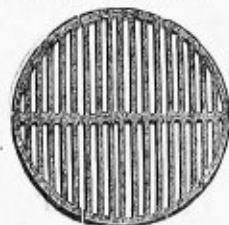
Length, Inches	Width, Inches	Metal, Inches	Air Space, Inches	Weight, Pounds	Price
33	6	1 1/2	1 1/2	65	\$ 5.52
36	6	1 1/2	1 1/2	73	6.20
42	6	1 1/2	1 1/2	86	7.32
48	6	1 1/2	1 1/2	100	8.50
54	6	1 1/2	1 1/2	115	9.78
60	6	1 1/2	1 1/2	130	11.06
66	6	1 1/2	1 1/2	142	12.08
72	6	1 1/2	1 1/2	160	13.60

McGINNISS PATENT GRATE BAR



Length, Inches	Metal, Inches	Air Space, Inches	Weight, Lbs.	Width, Inches
30	1 1/2	1 1/2	13	1
36	1 1/2	1 1/2	18	1
42	1 1/2	1 1/2	18	3/4
48	1 1/2	1 1/2	20	3/4
48	1 1/2	1 1/2	21	1
48	1 1/2	1 1/2	26	1 1/4
52	1 1/2	1 1/2	25	1 1/8
54	1 1/2	1 1/2	24	7/8
54	1 1/2	1 1/2	25	1
54	1 1/2	1 1/2	26	1 1/8
56	1 1/2	1 1/2	27	1 1/8
57	3/4	3/4	43	1 1/8
60	3/8	5/8	38	1

ROUND GRATES FOR UPRIGHT BOILERS



In two parts.

In three parts.

Dia., In.	Lbs.	Price	Dia., In.	Lbs.	Price	Dia., In.	Lbs.	Price
16	45	\$4.28	26	120	\$11.40	34	190	\$18.06
18	50	4.76	27	122	11.60	35	225	21.38
20	75	7.12	28	125	11.88	36	235	22.32
22	85	8.08	29	145	13.78	40	425	40.38
24	95	9.02	30	150	14.26	42	430	40.96
25	100	9.50	32	180	17.10	43	440	41.80

Large Sizes on Short Notice.

FOUNDATION WASHERS



3/4 in.	6x6 in.	7 lbs.	\$0.64
1 "	7x7 "	11 "	1.00
1 1/8 "	7x7 "	11 "	1.00
1 1/2 "	8x8 "	18 "	1.62
1 3/4 "	8x8 "	18 "	1.62

BASES FOR UPRIGHT BOILERS



Diameter, inches...	30	36	42	48	54
Weight, pounds...	218	220	270	420	460
Price.....	\$21.80	\$22.00	\$27.00	\$42.00	\$46.00

MAN-HOLE COLLARS, PLATES AND CRABS

11 1/2 x 15 1/2

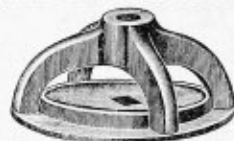


Size, In.	1 Rg. Lbs.	Price	1 Plt. Lbs.	Price	2 Crb. Lbs.	Price	Lug. Lbs.	Price
24	90	\$ 9.56	52	\$4.94	30	\$2.86	22	\$ 2.10
30	90	9.56	52	4.94	30	2.86	22	2.10
36	115	10.92	52	4.94	30	2.86	22	2.10
42	125	11.88	52	4.94	30	2.86	30	2.86
44	130	12.36	52	4.94	30	2.86	38	3.62
48	130	12.36	52	4.94	30	2.86	48	4.56
54	135	12.82	52	4.94	30	2.86	55	5.22
60	130	12.36	52	4.94	30	2.86	60	5.70
66	175	16.62	60	5.70	40	3.80	100	8.70
72	182	17.30	60	5.70	40	3.80	110	10.46
78	190	18.06	.....	.....	40	3.80	110	10.46

LUGS



Size of Boiler, In.	Weight, Pounds	Price	Size of Boiler, In.	Weight, Pounds	Price
36	20	\$2.00	60	60	\$ 6.00
42	31	3.12	66	100	10.00
48	40	4.00	72	110	11.00
54	50	5.00	78	110	11.00

HAND-HOLE
PLATE AND CRAB

Inches.....	3x4	3 1/2 x 5 1/2	4x6	5x7	6x8	6x9
Pounds.....	6	12	14	22	24	25
Price.....	\$0.78	\$1.56	\$1.82	\$2.86	\$3.12	\$3.26

LUG PLATES

Size, 8x15 1/2 inches.
Weight, 15 lbs. each.
Price each \$1.36



Center Bearing Bars



Size of Boiler, in..	36	42	48	54	60	66	72
Length, inches...	42	48	54	60	66	72	78
Weight, pounds...	60	70	95	100	145	175	200
Price each.....	\$5.70	6.66	9.02	9.50	13.78	16.62	19.00

Back Bearing Bars



Size of Boiler, in..	36	42	48	54	60	63	72
Length, inches...	46	52	58	64	70	82	82
Weight, pounds...	47	53	65	70	93	133	133
Price each.....	\$4.70	5.20	6.40	6.90	9.10	13.20	13.20

Back Angle Bars



Thickness	Length, Inches	Weight, Pounds	Price Each	Size, Inches
3/4-inch metal	72	62	\$5.90	2x2
1-inch metal	72	88	8.36	2x2

Back Skeleton Arch



Size of Boiler, In.	Length, Inches	Radius, Inches	Weight, Pounds	Price Each
36	48	18	150	\$15.00
42	48	18	170	17.00
48	58	20	235	23.50
54	68	22	265	26.50
60	68	22	275	27.50
66	78	26	300	30.00
72	78	26	330	33.00

Wall Binders

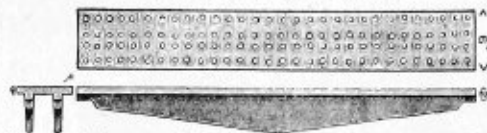


Wall Binders furnished any size or length desired. Please state distance from center to center of holes in ordering.



Size of Boiler, Inches	Weight of Side Binder, Pounds	Price Each	Dist. Betw'n Holes, Ft. In.	Weight of End Binder, Pounds	Dist. Betw'n Holes, Ft. In.	Dist. Betw'n Holes, Ft. In.
36	60	\$ 6.00	4 8	60	2 5	2 11
42	75	7.50	6 0	75	2 6	2 9
48	100	10.00	7 0	90	3 4	3 8
54	109	10.90	8 0	104	3 4	4 2
60	110	11.00	8 4	105	3 7	4 6
66	198	19.80	9 3	160	4 0	4 6
72	198	19.80	9 3	160	4 0	4 6

Shaving Grate Bars



Length, inches...	30	36	42	48	54	60
Width, inches...	6	6	6	6	6	6
Weight, pounds...	32	45	59	72	82	94
Price each.....	\$3.52	\$4.96	\$6.50	\$7.92	\$9.02	\$10.34

Common Grate Bars

Heavy Pattern



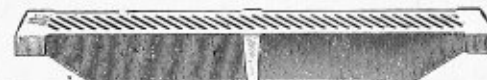
Length, Inches	Width, Inches	Weight, Pounds	Price Each	Air Spaces, Inches
42	3	50	\$4.00	1/2
48	3	61	4.88	1/2
50	3	62	4.96	1/2
54	3	68	5.44	1/2
60	3	83	6.64	1/2
66	3 1/2	104	8.32	1/2
72	3 1/2	114	9.12	1/2

Light Pattern



Length, Inches	Width, Inches	Weight, Pounds	Price Each	Air Space, Inches
24	2 3/4	20	\$1.70	1/2
26	2 3/4	22	1.88	1/2
27	2 3/4	23	1.96	1/2
28	2 3/4	24	2.04	1/2
30	2 3/4	26	2.22	1/2
33	2 3/4	34	2.90	1/2
36	3	36	3.06	1/2
42	3	40	3.40	1/2
48	3	48	4.08	1/2
54	3	54	4.60	1/2
60	3	68	5.78	1/2

Obtuse Grate Bars



Length, Inches	Width, Inches	Weight, Pounds	Price Each	Air Space, Inches	Metal, Inches
30	5	50	\$4.76	3/4	3/4
36	5	60	5.70	3/4	3/4
39	6	86	8.18	3/4	3/4

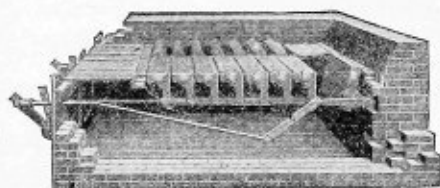
Fine Space Common Grate Bars



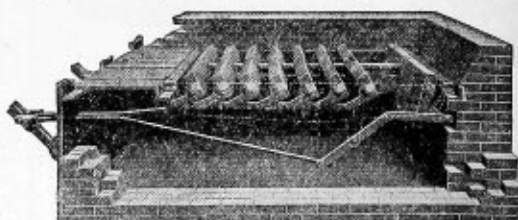
Length, Inches	Width, Inches	Weight, Pounds	Price Each	Air Space, Inches
48	2 1/4	48	\$4.56	3/8
54	2 1/4	54	5.14	3/8
60	2 1/4	71	6.74	3/8
66	2 1/4	76	7.22	3/8

Style B—Kelly Rocking and Dumping Grates

With double width rear dump grate operated independently of front grates



Shows grate surface two sections wide—one section dumped. Note position of the double capacity rear dumping grates.



Shows all grates in dumped position. Side bearing bar shown in outline only to give a clear view of the operating levers.

By referring to the illustrations, it can be seen how convenient and easy it is to clean these grates—especially, the rear portion which ordinarily receives the least attention because it is out of reach of the fireman—but with this wide rear dump feature, it is really the easiest portion to clean and can be done without extra exertion and exposure to heat and dirt.

The combination of the rocking and dumping feature entitles this grate to recognition as a modern and economical device for coal burning furnaces—and, while it is a hand fired device, it embodies three prominent features of a mechanically fed furnace:

First—The agitation and breaking up of the fuel bed by the rocking movement.

Second—The tendency of the rocking motion to shift the fuel toward the rear.

Third—The large dumping grate at the rear of the furnace which enables the operator to dump the accumulation of clinker and ash.

This grate is made to fit any size furnace and with air space best adapted to the kind of fuel used, it is self-contained and does not require any alteration in the ordinary furnace to install.

No fingers to burn off—expands and contracts evenly with less liability to warping.

All parts are in duplicate—no trouble in securing repairs when you need them (see below).

The Class B grate with the double width independent rear dumping feature is especially valuable where grate is over 60 inches deep, or where the coal is inclined to clinker. The Class A grate is sold at the same price and is the same as Class B with the exception of the wide independent rear dump feature.

Price Styles A or B Grates..... \$6.00 per square foot

Style A same as Style B, but is without the double width independent rear dumping grate.

Directions for Ordering—State length of actual grate surface; give width of the dead plate exclusive of the bearing lip; advise kind of fuel used or state air-space desired; give size and location of fire and ash doors; give distance between door jams in center of front; give distance from base of hinge lug to outside edge of grate surface.

Simplex Shaking and Dumping Grates



These grates are made with the proper air space, and made to go into any fire box without making changes. They can be put in by any mechanic. If you are using lump coal, you can use slack at a much less cost. If you are using slack, you can use a great deal less slack and get the same results.

Simplex Grate will pay for itself long before it is worn out, in reducing the time required for cleaning, for while this work is in progress but little steam is

formed, hence the pressure must fall, and it requires a very brisk fire to raise it again, which means rapid consumption of fuel. Any improvement which shortens the time referred to reduces the fall in pressure, hence saves coal.

Price, complete..... \$5.50 per sq. ft.

In ordering Grates be sure to state exact size of furnace and depth of ash-pit.

Wilkes' Water Heaters

Especially adapted for heating water for dwellings, barber shops, bathstudies, carving tables, laundries, conservatories, poultry houses, etc. Easily managed and economical in fuel. Fire is entirely surrounded by water, and so gives it the greatest heating surface and capacity, as motion of water is entirely vertical, affords an active and continuous circulation, commencing as soon as water begins to warm.

The coal magazine is a great labor and fuel saver, as an even and continuous fire from 10 to 12 hours and longer may be maintained without attention. Hard coal, range or chestnut size is best suited for use in magazine. Soft coal may be used by leaving off bottom part of magazine and making it a surface burner.

Self feeding heaters are equipped with a round base, sectional, shaking and dumping grate, which can be removed or replaced without disconnecting heater. Smaller sizes, not self-feeding, are equipped with a shaking and dumping grate with center draw slide, which can be removed through base door.

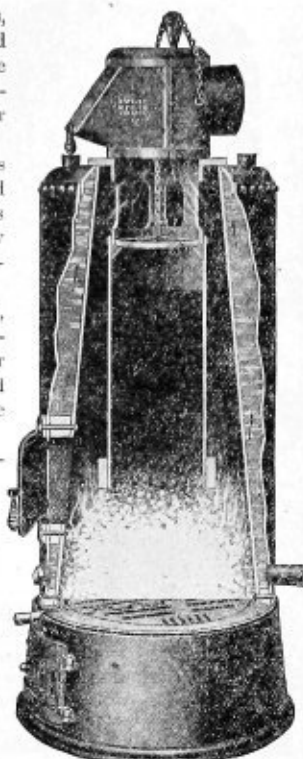
All heaters are carefully tested to 100 pounds hydrostatic pressure.



Small Size Heater. Not Self-Feeding



Round Base, Sectional and Dumping Grate. Furnished with all Self-Feeding Heaters except 36 and 42-inch diameter.



Self-Feeder

Small Sizes not Self-Feeders with Feed Box with or without Fire Door

Fire Door in Shell Extra

Size of Boiler, Inches	Price without Fire Door	Price with Fire Door	Capacity Gallons per Hour	Size of Openings, Inches	Height Over All, Inches	Size of Smoke Pipe, In.	Approx. Weight, Pounds
For Carving Tables, etc. 10 x 18	\$30.00	.....	40	1	32	4	100
..... 12 x 24	36.00	\$46.00	65	1	43	5	160
For Private Residences, etc. 12 x 36	38.00	48.00	80	1	49	5	170
Small Conservatories, Laundries, etc. 14 x 30	44.00	54.00	100	1 1/4	49	5	200
..... 14 x 36	48.00	58.00	120	1 1/4	55	5	235

Price of Self-Feeders with Coal Magazine

Size of Boiler, Inches	Price with Coal Magazine Complete	Capacity Gallons per Hour	Size of Openings, Inches	Height Over All, Inches	Size of Smoke Pipe, Inches	Approximate Weight, Pounds
16 x 30	\$ 72.00	130	1 1/2	52	5	400
16 x 36	76.00	150	1 1/2	58	5	420
20 x 30	90.00	200	2	54	7	520
20 x 36	96.00	250	2	60	7	550
20 x 42	110.00	275	2	66	7	580
24 x 36	126.00	300	2	66	8	780
24 x 42	132.00	350	2	66	8	810
24 x 48	142.00	400	2	72	8	840
30 x 42	160.00	500	3	67	8	1100
30 x 48	168.00	600	3	73	8	1150
30 x 54	178.00	700	3	79	8	1240
36 x 42	224.00	900	3	68	9	1900
36 x 48	236.00	1000	3	74	9	2000
42 x 42	260.00	1200	3	69	9	2400
42 x 48	270.00	1400	3	75	9	2500

Chicago Water Heater and Garbage Burner

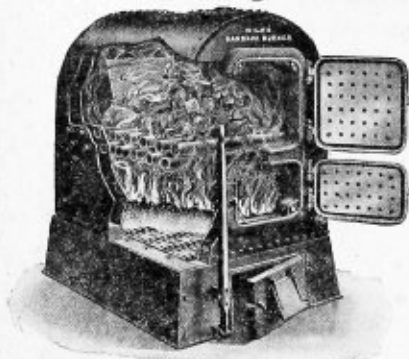


Fig. G.... Nos. 5 to 10



Fig. G.... Nos. 1 to 4

Made of steel boiler plate carefully riveted and braced. Tested to 100 lbs. hydrostatic pressure.

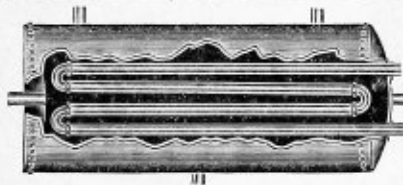
Garbage grate of boiler tubing fastened by being expanded into openings in the inner shell. This grate thus forms part of the heating surface and there is constant circulation of water through the grate tubes, increasing efficiency and preventing injury to tubes.

Removable clean-out plugs in outer shell opposite the ends of each tube for cleaning out sediment and scale. Clean-outs for water jacket also provided in each corner end.

Base has sectional rocking boiler grates so that soft coal can be used successfully.

Staggered arrangement of tubes provides additional heating surface and burning surface for garbage.

Number.....	5	6	7	8	9	10
Capacity per hour, gallons.....	800	1000	1200	1300	1400	1500
Size of building, No. of apartments.....	6 to 9	9 to 15	15 to 21	21 to 30	30 to 36	36 to 42
Height over all, inches.....	56	56	56	56	56	56
Size of openings, flow and return, inches.....	3	3	3	3	3	3
Size of smoke pipe, inches.....	9	9	10	10	10	12
Shipping weight, pounds.....	1800	2000	2200	2300	2500	2700
Price each.....	\$260.00	\$290.00	\$320.00	\$350.00	\$400.00	\$440.00



Standard Storage Tanks

Tested to 100 lbs. Hydrostatic Pressure

For ordinary water storage purposes not to exceed 65 lbs. working pressure—all tanks tested to 100 lbs.

Tapped as shown so that they may be used vertically or horizontally. Made with coils, man-holes, etc., as desired. If special tapings are wanted—send sketch with size and location of openings.

Tanks with brass or copper coils quoted upon application.

Capacity, Gallons	Diam., Inches	Length, Feet	Weight, Pounds	Regular Opening, Inches	Price of Tanks, Plain	Price of Coils Built in Tanks			
						Size Coil		Plain Coil	Galv. Coil
						Pipes	Inches		
66	20	4	250	1 1/2	\$ 43.00	4	1	\$18.00	\$22.00
85	20	5	290	1 1/2	45.00	4	1	19.00	24.00
100	24	4	300	1 1/2	47.00	4	1 1/4	22.00	26.00
120	24	5	350	1 1/2	50.00	4	1 1/4	23.00	28.00
140	24	6	400	1 1/2	54.00	4	1 1/4	24.00	30.00
150	30	4	420	2	56.00	4	1 1/4	22.00	26.00
180	30	5	480	2	60.00	4	1 1/4	23.00	28.00
220	30	6	540	2	66.00	4	1 1/4	24.00	30.00
250	30	7	600	2	72.00	4	1 1/4	25.00	32.00
295	30	8	660	2	78.00	4	1 1/4	26.00	34.00
315	36	6	740	2	82.00	4	1 1/2	32.00	39.00
365	36	7	820	2	90.00	4	1 1/2	34.00	42.00
420	36	8	900	2	98.00	4	1 1/2	36.00	44.00
525	36	10	1060	2	112.00	4	1 1/2	40.00	49.00
430	42	6	890	2	106.00	4	1 1/2	32.00	39.00
500	42	7	1000	2	114.00	4	1 1/2	34.00	42.00
575	42	8	1080	2	124.00	4	1 1/2	36.00	44.00
720	42	10	1260	2	140.00	4	1 1/2	40.00	49.00
865	42	12	1450	2	168.00	4	1 1/2	44.00	53.00
1000	42	14	1650	2	176.00	4	1 1/2	48.00	58.00

Manhole, in head.....	\$20.00
Manhole, in shell.....	30.00
Handhole, in head.....	6.00
Handhole, in shell.....	6.00

FLANGED OPENINGS
EXTRA

Size 2.....	\$5.00
Size 2 1/2.....	5.00
Size 3.....	6.00
Size 3 1/2.....	6.00
Size 4.....	7.00

Prices on tanks for heavier pressures and for larger tanks quoted upon request.

"New Water Tube" Feed Water Heater and Purifier



New Water Tube

Contains a nest of "U" shaped seamless drawn brass tubes—in the smaller sizes incased in a cast iron shell—in the larger sizes shell is of steel.

The exhaust steam enters the shell near the bottom and is discharged from the outlet on the top of the heater. The feed water enters on the side near the bottom and is circulated through the nest of tubes, taking up the heat from the exhaust steam. After it has passed through the entire heating surface, it enters the settling chamber at the bottom, from which impurities may be blown off. The hot water is then discharged to the boilers from the outlet, on the side, near the bottom as shown.

Construction gives positive and rapid water circulation and produces a very high temperature of the feed water.

An Important Feature: The shell, tube sheet and tubes may be removed for cleaning or repairs without disturbing the water, mud blow or drip connections or the supports upon which the heater rests.

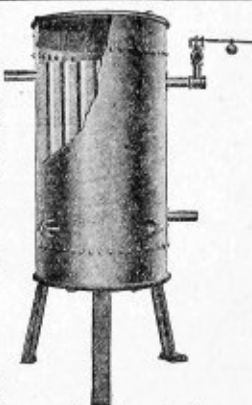
Horse power.....	40	50	60	80	100	150	200	250	400
Size, inches.....	15x37	15x41	20x41	20x45	20x55	24x51	24x62	24x72	34x94
Exhaust, inches.....	5	6	6	7	7	8	10	10	12
Weight, lbs.....	300	350	500	585	660	925	1125	1215	2275

Price each..... \$100.00 \$120.00 \$145.00 \$190.00 \$225.00 \$320.00 \$375.00 \$475.00 \$650.00

Larger sizes quoted upon request.

The "Standard" Feed Water Heater

A simple straight tube closed heater. The inner heads are connected by tubes through which the exhaust steam passes from the lower steam chamber into the upper one, thence to the air without any back pressure on the engine. Handholes are conveniently placed to afford ready access for cleaning. Body of heater is kept constantly full of water surrounding the tubes through which the steam passes.

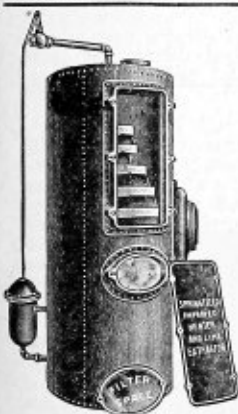


The Standard

Horse power.....	40	50	70	100	150	200	250	350
Size, inches.....	20x48	25x50	25x50	30x61	30x68	36x78	42x85	42x85
Exhaust, inches.....	4	5	5	6	6	8	10	10
Weight, lbs.....	800	950	1000	1400	1600	2100	2700	2900
Price each.....	\$150.00	\$170.00	\$180.00	\$210.00	\$240.00	\$285.00	\$360.00	\$400.00

The "Springfield" Open Heater and Lime Extractor

Water is admitted through the feed pipe in the top, passes over a series of pans surrounded by steam, heating the water to around 212 degrees, condensing nearly all the steam and precipitating the impurities. The water then filters through the lower chamber, which is filled with fine excelsior, from which chamber it is discharged to the pump. Prices include automatic feed water regular and oil extractor.



No.	Approx. Horse Power	Diam., Ins.	Hght., Ins.	Exhaust Inlet and Outlet, Inches	Approx. Wght., Lbs.	Price Each
1	50-75	24	60	4	725	\$190.00
2	75-100	24	72	5	850	200.00
3	100-125	30	72	6	1100	220.00
4	125-150	30	84	6	1250	230.00
5	150-200	36	84	7	1400	275.00
6	200-250	36	96	8	1600	290.00
7	250-300	40	96	10	2200	330.00
8	350-400	48	120	10	2500	425.00

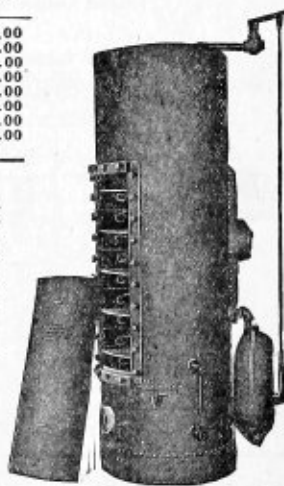
The "Stillwell" Open Feed Water Heater

A combined heater, purifier, filter and lime extractor, with nine large shelves or corrugated pans which rapidly and thoroughly separate and deposit the lime or other earthy salts.

The filter is of the upward type, of large capacity, located under the bottom shelf, convenient for renewing filtering material.

Price includes automatic cold water regulating device, steam and water flanges, water gauge and bibb cock.

Size	Diam., Ins.	Height, Inches	Horse Power	Inside Diam. Exhaust	Hot Water Ins.	Cold Water Ins.	Approx. Weight, Lbs.	Price Each
B	20	65	20-45	3	1 1/4	1	700	\$160.00
C	24	77	50-100	5	2	1 1/4	1000	230.00
D	30	95	75-150	7	3	1 1/4	1525	300.00
E	36	108	125-250	8	3	1 1/2	2400	400.00
E2	42	108	175-350	9	4	1 1/2	3200	500.00
F	48	118	250-500	10	5	2	4000	600.00
G	48	132	275-550	12	5	2	4200	615.00
H	60	138	450-900	14	5	2 1/2	7500	925.00



Boiler Feed Pumps listed elsewhere in Catalog.

Little Giant Steam Feed Cooker



The trimmings include base, grate, hood, steam gauge, glass water gauge, two gauge cocks, blow-off valve, pump or injector fitted for supplying boiler with water, safety valve, 2½ feet of suction hose, 3 feet of steam pipe with valve to convey steam to barrel or vat for cooking feed or boiling water.

Tested to 100 pounds pressure before shipping.

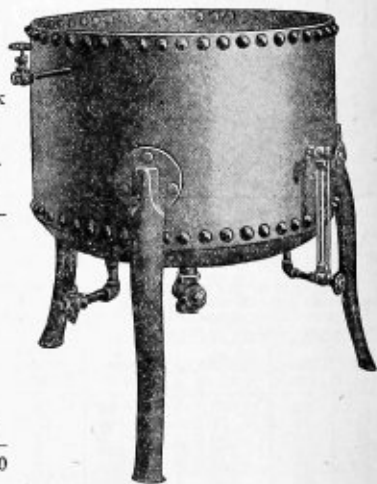
Diameter of boiler, inches.....	20
Height of boiler, inches.....	44
Number of 2-inch tubes.....	13
Length of tubes, inches.....	30
Thickness of shell, inches.....	5/8
Thickness of heads, inches.....	5/8
Height over all, inches.....	58
Weight complete, pounds.....	400
Price of bare cooker with firebox liner.....	\$40.00
Price of safety valve.....	1.30
Price of water gauge.....	1.50
Price of water cocks.....	1.20
Price of steam gauge.....	2.68
Price of blow-off cock.....	1.08
Price of either hand-pump or injector.....	4.60
Price of outlet valve and pipe.....	1.00
Price of grate.....	1.50
Price of hood.....	1.34
Price of base.....	3.80
Price of complete cooker.....	\$60.00

Steam Jacketed Lard Kettles

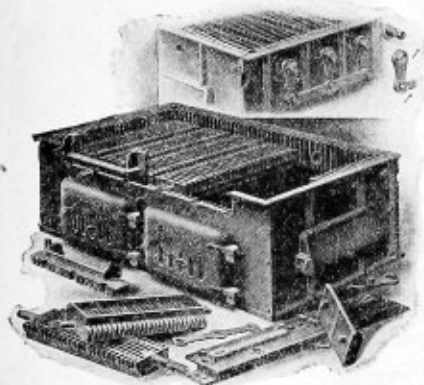
Tested Under 120 Pounds Pressure

Fittings comprise air valve, drip valve, water gauge and stop cock for tapping the lard or other material.

Capacity in gallons.....	25	50	75	100	150	200
Diameter inside, inches...	22	28	28	34	38	44
Diameter outside, inches...	26	33	33	39	43	49
Depth inside, inches.....	18	20	29	27	32	32
Height from floor to bottom of kettle, inches...	18	20	21	21	22	22
Height from floor to top of kettle, inches.....	39	42	52	51	57	57
Thickness of shell, inches...	3/8	3/8	3/8	1/4	1/4	5/8
Thickness of heads, inches...	1/4	1/4	1/4	5/8	5/8	5/8
Approximate shipping weight, pounds.....	360	465	570	655	875	1250
Price complete, as shown.	\$50.00	\$60.00	\$70.00	\$80.00	\$120.00	\$160.00



"Progress" Steam and Hot Water Boilers



The Base

and thorough. Mention should be made, in the interest of fuel economy, of the advantage in temporarily shutting off part of the grate not required in mild weather, by shaking and cleaning only such bars as may be needed. Around the outer edge of the grate is a deeply corrugated base lining which admits a free passage of air to the side of the fire, thus insuring perfect combustion.

Perfect Circulation

By examining the illustration at the right it will be seen that the "Progress" sections are triangular in form. The water passing up the sloping side directly over the fire follows the line of the most intense heat, with no resistance, then flows easily over the crown sheet toward the rear and then down the back port to the bottom of the section, where, again coming in contact with the extreme heat it rises, as before, rapidly discharging its accumulated steam, thus confirming our claim of perfect circulation.

Fire Travel

The fire entirely surrounds the V shaped water-ways, which absorb the greatest amount of the intense heat; then traveling through the lower flues to one end of the boiler the hot gases rise to the super-heating chamber, then pass to the other end of the boiler where, with a downward dive into the return flue, they again traverse the entire length of the boiler, before the final exit into the smoke flue.

Important

The following ratings provide that in estimating the size of boiler required, all piping (mains and risers, flow and return) shall be figured as radiating surface in addition to the direct radiation to be used. The ratings for steam are based on a standard of two pounds pressure at heater; and of water, a temperature of 180 degrees at it leaves the boiler. For indirect work add 75 per cent. greater boiler capacity. For direct indirect add 40 per cent. boiler capacity.

If mains are bare, the number of square feet of radiation they contain should be 50 per cent. additional in computing size of boiler required. For example: If there are 100 square feet of surface in the mains uncovered, the boiler capacity required for the mains will be the same as for 150 square feet of direct cast iron radiation.

The ratings are also based upon the further proviso that sufficient radiation is installed to properly heat the building, that the apparatus is properly installed, that the boiler is attached to a flue of sufficient capacity and draft, and that the boiler after having been placed shall receive proper fuel, care and management.

Our boilers are guaranteed only to the extent of furnishing new castings for any found defective in manufacture.

The foregoing ratings are conservatively made in accordance with accepted standards, but on account of the varying conditions surrounding the installation of boilers we do not guarantee our heaters except as above.

When a pipe coil or cast-iron section is introduced into the fire pot of a boiler, or a steam coil placed in a tank for the purpose of heating water for domestic use, additional capacity must be provided in determining the size of boiler required, namely: 2 square feet of direct radiation for hot water, or 1 1/4 square feet of direct radiation for steam, for each gallon to be thus heated per hour.

The "Progress" Boiler is a distinctly individual type, possessing more points of merit than any other boiler on the market today.

The feed doors, being placed in the side, instead of the front of the boiler, (see illustration on next page), makes it a very easy one to fire and clean, owing to the short depth of the fire chamber.

The wonderful success of the "Progress" is due to thorough combustion of fuel, and the perfect circulation of the water in each section, caused by the unique triangular construction of the sections, coupled with the triple fire travel—advantages which are found only in the "Progress."

The Base

The Base, being 16 inches high, affords ample draught and unusually large space so that ashes may be easily removed. The grate rocking attachment is located on the outside, at the rear, doing away with any possibility of burning or warping these parts.

The Grate

The grate bars are constructed so that by connecting them together in pairs or triplets the shaking and cleaning is easy

Progress Perfect Circulation



"Progress" Steam Boiler
22-Inch Series

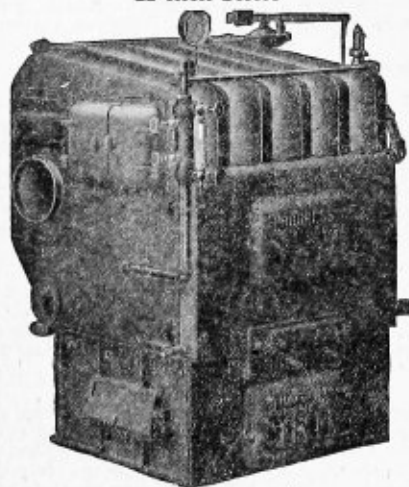


Fig. G

No.	Price Each	Grate Area, Sq. In.	No. of Feed Doors	Rating, Square Feet	Length, Inches
522-S	\$340.00	677	1	800	55
622-S	430.00	836	2	1100	62
722-S	535.00	996	2	1450	69
822-S	640.00	1155	2	1800	76

Height of boiler 53 inches, depth 39 inches. Height of water-line 48 inches. Size of smoke-pipe 10 inches. Flow and return pipes, one each in each end section, 4 inches. Do not bush flow pipe opening. Connect full size of outlet.

"Progress" Hot Water Boiler
22-Inch Series

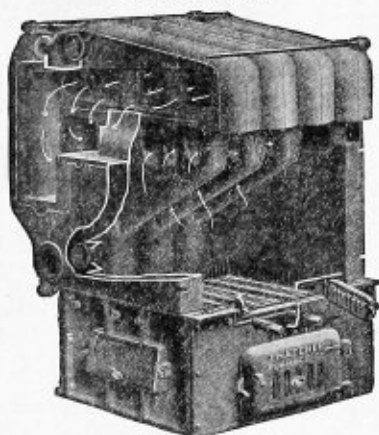


Fig. G

Same as the steam boiler shown at top of page, but built for hot water heating. Dimensions are exactly the same, with the following exceptions:

Number	522 W	622 W	722 W	822 W
Rating, square feet	1300	1850	2400	2975
Price each	\$330.00	\$420.00	\$525.00	\$630.00

"Progress" Steam Boiler
28-Inch Series

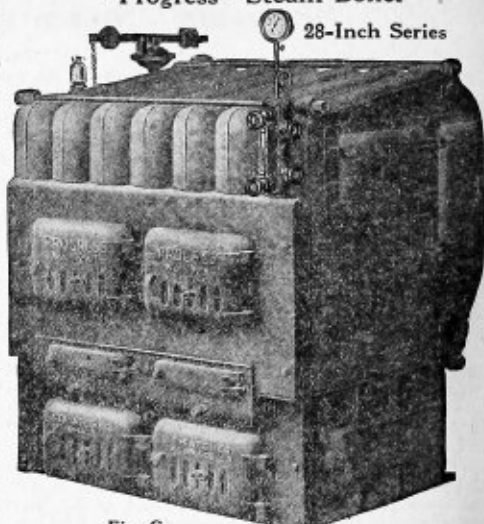


Fig. G

No.	Price Each	Length, Inches	Grate Area, Sq. In.	No. of Feed Doors	Rating Square Feet
528-S	\$ 445.00	55	861	1	1150
628-S	565.00	62	1064	2	1550
728-S	697.00	69	1267	2	2000
828-S	810.00	76	1470	2	2450
* 928-S	915.00	83	1673	2	2900
*1028-S	1021.00	90	1876	2	3350

Height of boiler 55 inches; depth 39 inches. Height of water-line 48 inches. Size of smoke-pipe 12 inches. Flow and return pipes, one each in each end section, 4 inches.

"Progress" Hot Water Boiler
28-Inch Series

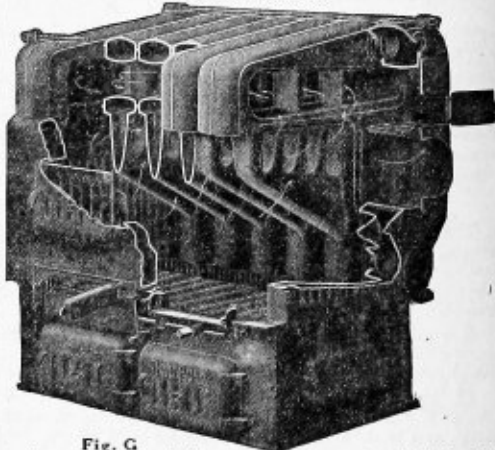


Fig. G

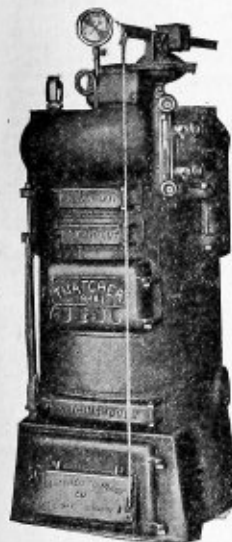
Same as steam boiler at top of page, but built for hot water heating. All dimensions are the same, with the following exceptions:

Number	Rating, Square Feet	Price Each
528-W	1925	\$ 435.00
628-W	2600	555.00
728-W	3350	687.00
* 828-W	4100	800.00
* 928-W	4850	905.00
*1028-W	5650	1011.00

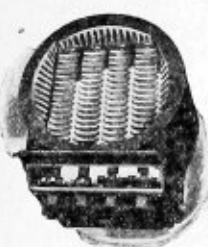
Do not bush flow pipe opening. Connect full size of outlet.

"Highgrade" Round Steam and Hot Water Boiler

Steam Boiler



Base



Wheel Section



Showing Grates Being Removed



Water Boiler



The Thatcher Round Boiler is easy to install and operate, economical in the use of fuel, and its unique construction, embodying many new features, will appeal to owners, architects and contractors who are interested in the installation of first-class heating apparatus.

The Base is high, with ample space under the grates making an ashpit that is easily cleaned.

Wheel Sections are formed with a waterway on the outside of the flues, as fire does not come to the outside surface, except at the cleanout doors. Ports in wheel sections are staggered, and consequently, cleanout doors do not become overheated.

Fuel. Grate is so constructed that hard or soft coal may be burned. Especially adapted for pea coal or may be fitted with burners for natural gas.

Perfect Combustion. By having grate below bottom of firepot, the air comes in at sides as well as from bottom, thereby producing perfect combustion, and all the fuel is consumed, instead of leaving a black ring of unburned coal around edge of firepot, as is the case with other round boilers.

Perfect Circulation. Inside of firepot is corrugated with a deflecting surface at top. As fire rises, it coils around this deflector, and the heat impinges the upper surfaces. The water rises in the thin or narrow waterways of firepot to top, where it flows to the large columns, returning to bottom, thus producing perfect circulation.

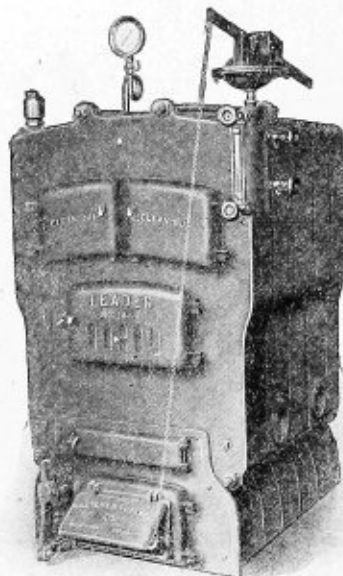
Hot Water Boiler

No. of Boiler	Rating, Sq. Feet	Diam. Grate, Ins.	Height to Top Outlet, Inches	Depth Bottom Feed Door to Grate	Flow and Return Openings	Price, Each
19-0-W	500	19	42	13	2'3"	\$140.50
19-1-W	575	19	46 1/2	13	2'3"	158.00
19-2-W	650	19	51	13	2'3"	184.50
22-0-W	750	22	47 1/2	14	2'3"	197.00
22-1-W	875	22	52	14	2'3"	217.50
22-2-W	950	22	56 1/2	14	2'3"	230.00
25-0-W	900	25	49	15	2'3 1/2"	224.00
25-1-W	1025	25	53 1/2	15	2'3 1/2"	270.00
25-2-W	1150	25	58 1/2	15	2'3 1/2"	290.00
28-0-W	1325	28	51	16	2'4"	321.50
28-2-W	1650	28	61	16	2'4"	380.00

Steam Boiler

No. of Boiler	Rating, Sq. Feet	Diam. Grate, Ins.	Height to Top Outlet, Inches	Depth Bottom Feed Door to Grate	Flow and Return Openings	Price, Each
19-0-S	300	19	46 1/2	13	2'3"	\$149.50
19-1-S	350	19	51	13	2'3"	167.00
19-2-S	400	19	55 1/2	13	2'3"	193.00
22-0-S	450	22	54	14	2'3"	206.50
22-1-S	525	22	58 1/2	14	2'3"	226.00
22-2-S	575	22	63 1/2	14	2'3"	240.00
25-0-S	550	25	55 1/2	15	2'3 1/2"	233.00
25-1-S	625	25	60	15	2'3 1/2"	277.50
25-2-S	700	25	65	15	2'3 1/2"	300.00
28-0-S	800	28	57 1/2	16	2'4"	331.00
28-2-S	1000	28	67 1/2	16	2'4"	389.50

"Leader" Sectional Steam and Hot Water Boiler



The "Leader" Sectional Boiler is intended to be used in place of the large size round boilers. The grate area is much larger, and is much easier to fire and clean. The fire travels twice as long and this, coupled with the evenly proportioned flues and deep overhanging fire surfaces, make the "Leader" Boiler a surprisingly powerful heater. Feed door is unusually wide and high enough above grates to allow a large body of coal to be carried, a great factor in fuel economy and convenience in firing. Grates are heavy oval top pattern, suited to pea or soft coal burning when desired. The Leader is a thoroughly reliable heater, and the sections are easily and quickly erected.

Steam Boiler

No.	Length, Inches	Rating, Sq. Ft.	Grate Area, Sq. In.	No. of Sections	Price
418S	39	400	361	4	\$205.00
518S	45	550	475	5	250.00
618S	51	700	589	6	310.00
718S	57	850	703	7	365.00

Number of flows and returns, 2 size	3 in.
Height of boiler, including trimmings	55 in.
Width of boiler, including trimmings	36 in.
Size of smoke pipe	9 in.
Height of water line	42 in.

Water Boiler

No.	Length, Inches	Rating, Sq. Ft.	Grate Area, Sq. In.	No. of Sections	Price
418W	39	650	361	4	\$195.00
518W	45	900	475	5	240.00
618W	51	1150	589	6	300.00
718W	57	1400	703	7	345.00

Number of flows and returns, 2 size	3 in.
Height of boiler to flow openings	49 in.
Width of boiler	29 in.
Size of smoke pipe	9 in.

Geyser Tank Heater

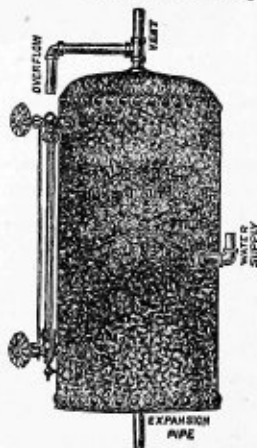


The Geyser Tank Heater is a wonderfully efficient heater. The Flow and Return connections are at the rear on either side of a division plate cast in the body, thus circulating the water completely around the firepot. The inner corrugated surface makes this firepot extremely sensitive to heat and a very quick circulator. The top with two large covers forms an opening large enough for a wash boiler-making it particularly useful in the laundry.

Specifications

Height of Flow from Floor	18 1/4 in.
Height Center of Return from Floor	13 1/2 in.
Inside Diameter Fire Pot	10 in.
Height Fire Pot	8 in.
Size Oval Top	16x25 in.
Total Height of Heater	25 in.
Capacity	60 gallons per hour
Weight, pounds	155
Price	\$30.00

Galvanized Expansion Tanks



Expansion Tanks are placed at the highest point of the heating system to provide for the expansion of the air and water when boiler is first fired.

These tanks are made of refined boiler steel, double riveted, caulked and galvanized and tested to one hundred and fifty pounds pressure.

They are tapped top and bottom for one inch overflow and expansion pipe, and on the side near the top, 1 inch for filling attachment.

They are also tapped on side for 1/4-inch water gauge brasses and 12-inch glass.

Cap., Gals.	Price Each, Complete with Gauge	Size, Inches	Square Feet of Radiation	Price Each	
				Without Trimmings	With Trimmings
8	* \$4.00	10x20	250	* \$7.50	\$10.50
10	4.20	12x20	300	8.00	11.50
15	4.50	12x30	500	9.00	12.00
18	4.80	12x36	600	9.50	12.00
20	6.00	14x30	700	12.50	15.00
26	6.60	16x30	950	14.00	16.50
32	7.00	16x36	1300	15.00	17.50
42	7.60	16x48	2000	16.50	19.00
66	13.40	18x60	3000	31.00	33.50
82	15.80	20x60	5000	37.00	39.50
100	21.40	22x60	6000	51.00	53.50

*On account of the market fluctuations on galvanized material, these prices are subject to change at any time

Minneapolis Heat Regulator

What it Does

The Minneapolis Heat Regulator is a device consisting of

(a) The Thermostat or mechanical thermometer, designed for attaching to the wall of the living room.

(b) The motor which supplies the means of operating and is fixed in the basement.

This Regulator will keep the house at an even temperature, thus preventing the discomforts of having the rooms either too hot or too cold and at the same time saving unnecessary consumption of fuel.

It will prevent destruction of property by fire and prolong the life of a heater by always closing the draft before the fire gains too much headway.

It will relieve the mind entirely of the care of the draft dampers and the fear that at night, or during absence for a few hours, there is danger to life and property through neglect of the heater.

It controls equally well on Hot Water, Steam, Gas, Hot Air and Combination Heaters and will quickly demonstrate that no heating plant can be efficient or complete without it.

The clock time attachment allows a lower temperature at night and at any set hour of the morning will automatically turn the indicator to seventy degrees, or any other predetermined temperature, thereby giving the occupants of the house a warm and comfortable home on arising.

Model No. 35

Thermostat is attached to the wall with concealed wiring running to basement. It is handsomely finished and fitted with a reliable thermometer. Time attachment may be fixed so as to give any desired temperature at a given hour and is fitted with one-day clock.

The motor is of the gravity type and has ample power. Designed for fastening to the ceiling of basement and is very compact. Enclosed in pressed steel case. Brass gears with steel pinions, running in bushed brass bearings. Frames of pressed steel.

The power is furnished by an iron weight of ample size to lift all dampers on the modern type of furnaces and is equipped with patent automatic switch which leaves drafts closed when the motor runs down, thus entirely eliminating all danger of forgetting to wind motor such as hot pipes, chance of fire, etc.

Governor regulates speed of motor and allows drafts to open and close steadily, avoiding all banging and clatter.

Shipping weight approximately 30 pounds.

Price with one-day time attachment.....\$35.00



Thermostat



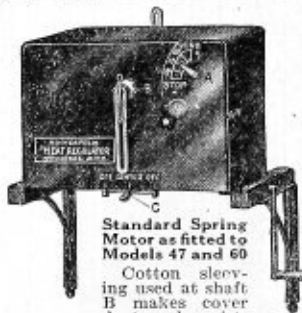
Motor

Model No. 47

Fitted with a reliable clock which is hinged in front and swings in a complete circle for winding. It is easily removed while all arbors may be wound with one key.

No. 47 Heat Regulator is fitted with standard spring motor as shown herewith which is easily wound by means of crank key, and which, when run down leaves the drafts closed.

Approximate shipping weight, 30 pounds. Price complete with motor.....\$47.00



Standard Spring Motor as fitted to Models 47 and 60

Cotton sleeving used at shaft B makes cover dust and moisture proof. Basement switch C enables motor to be operated at will in the basement.



Thermostat

Model No. 60

The timepiece in this model is very high grade and both clock and alarm of same will run eight days at one winding. Clock has solid brass base, repeater alarm, jewel balance and bevel glass front. It swings in a complete circle and does not have to be removed for winding.

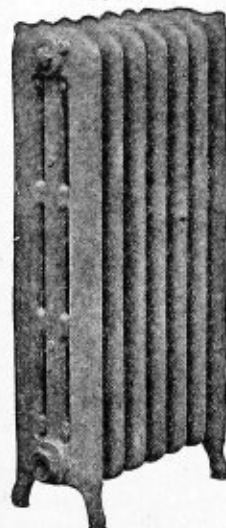
No. 65. Fitted with standard spring motor. Shipping weight approximately 30 pounds. Price.....\$60.00



Thermostat

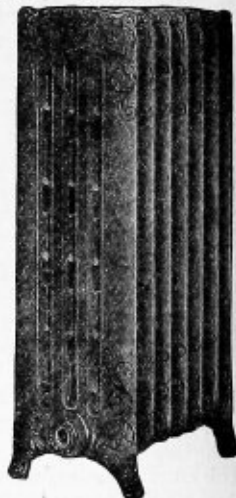
Book of directions and plans for installing are furnished with each Regulator.

Plain



Steam and Hot Water Radiators

Ornamental



Unless otherwise specified, all Three Column Radiators will be tapped as follows:

Steam—One Pipe

27½ square feet and under	1 in.
Above 27½ but not exceeding 60½	1¼ in.
Above 60½ but not exceeding 99	1½ in.
Above 99 square feet	2 in.

Two Pipe

49½ square feet and under	1 x ¾ in.
Above 49½ but not exceeding 99	1¼ x 1 in.
Above 99 square feet	1½ x 1¼ in.

Water—Tapped for Supply and Return

40 square feet and under	1 in.
Above 38½ but not exceeding 71½	1¼ in.
Above 71½ square feet	1½ in.
Width of section, 9½ in. Width of legs, 9½ in. Distance from floor to center of opening, 4½ inches. Tested 80 pounds cold water pressure.	

Unless otherwise specified, all Four Column Radiators will be tapped as follows:

Steam—One Pipe

24 square feet and under	1 in.
Above 24 but not exceeding 60	1¼ in.
Above 60 but not exceeding 100	1½ in.
Above 100 square feet	2 in.

Two Pipe

48 square feet and under	1 x ¾ in.
Above 48 but not exceeding 96	1¼ x 1 in.
Above 96 square feet	1½ x 1¼ in.

Water—Tapped for Supply and Return

40 square feet and under	1 in.
Above 38½ but not exceeding 71½	1¼ in.
Above 71½ square feet	1½ in.
Width of Section, 11¼ in. Width of legs, 12¼ in. Distance from floor to center of opening, 4½ in. Tested 80 pounds cold water pressure.	

Plain and Ornamental take same price

Three Column Radiator

Four Column Radiator

No. of Sections	Length, Inches	Heating Surface						No. of Sections	Length, Inches	Heating Surface					
		4½-inch Height 8 Sq. Ft. per Section	38-inch Height 5 Sq. Ft. per Section	32-inch Height 4½ Sq. Ft. per Section	26-inch Height 3¼ Sq. Ft. per Section	22-inch Height 3 Sq. Ft. per Section	18-inch Height 2¼ Sq. Ft. per Section			44-inch Height 10 Sq. Ft. per Section	38-inch Height 8½ Sq. Ft. per Section	32-inch Height 7 Sq. Ft. per Section	26-inch Height 5½ Sq. Ft. per Section	22-inch Height 4½ Sq. Ft. per Section	18-inch Height 3½ Sq. Ft. per Section
2	5	12	10	9	7½	6	4½	2	6	20	17	14	11	9	7
3	7½	18	15	13½	11¼	9	6¾	3	9	30	25½	21	16½	13½	10½
4	10	24	20	18	15	12	9	4	12	40	34	28	22	18	14
5	12½	30	25	22½	18¾	15	11¼	5	15	50	42½	35	27½	22½	17½
6	15	36	30	27	22½	18	13½	6	18	60	51	42	33	27	21
7	17½	42	35	31½	26¼	21	15¾	7	21	70	59½	49	38½	31½	24½
8	20	48	40	36	30	24	18	8	24	80	68	56	44	36	28
9	22½	54	45	40½	33¾	27	20¼	9	27	90	76½	63	49½	40½	31½
10	25	60	50	45	37½	30	22½	10	30	100	85	70	55	45	35
11	27½	66	55	49½	41¼	33	24¾	11	33	110	93½	77	60½	49½	38½
12	30	72	60	54	45	36	27	12	36	120	102	84	66	54	42
13	32½	78	65	58½	48¾	39	29¼	13	39	130	110½	91	71½	58½	45½
14	35	84	70	63	52½	42	31½	14	42	140	119	98	77	63	49
15	37½	90	75	67½	56¼	45	33¾	15	45	150	127½	105	82½	67½	52½
16	40	96	80	72	60	48	36	16	48	160	136	112	88	72	56
17	42½	102	85	76½	63¾	51	38¼	17	51	170	144½	119	93½	76½	59½
18	45	108	90	81	67½	54	40½	18	54	180	153	126	99	81	63
19	47½	114	95	85½	71¼	57	42¾	19	57	190	161½	133	104½	85½	66½
20	50	120	100	90	75	60	45	20	60	200	170	140	110	90	70
21	52½	126	105	94½	78¾	63	47¼	21	63	210	178½	147	115½	94½	73½
22	55	132	110	99	82½	66	49½	22	66	220	187	154	121	99	77
23	57½	138	115	103½	86¼	69	51¾	23	69	230	195½	161	126½	103½	80½
24	60	144	120	108	90	72	54	24	72	240	204	168	132	108	84
25	62½	150	125	112½	93¾	75	56¼	25	75	250	212½	175	137½	112½	87½
Price per Sq. Ft.		\$0.35	\$0.35	\$0.38	\$0.42	\$0.44	\$0.50	Price per Sq. Ft.		\$0.35	\$0.35	\$0.38	\$0.42	\$0.44	\$0.50

Above radiators tapped 2 inches and bushed.

*Allow ½ inch for each bushing in estimating length of radiators.

Plain

Steam and Hot Water Radiators

Unless otherwise specified, all radiators will be tapped as follows:

STEAM—One Pipe

24 square feet and under.....1 in.
Above 24 but not exceeding 60.....1 1/4 in.
Above 60 but not exceeding 100.....1 1/2 in.
Above 100 square feet.....2 in.

Two Pipe

48 square feet and under.....1 x 3/4 in.
Above 48 but not exceeding 96.....1 1/4 x 1 in.
Above 96 square feet.....1 1/2 x 1 1/4 in.

WATER

Tapped for Supply and Return

40 square feet and under.....1 in.
Above 40 but not exceeding 72.....1 1/4 in.
Above 72 square feet.....1 1/2 in.
Widths of legs, one column, 5 1/4 inches;
two column, 8 1/4 inches. Distance from floor
to center of opening, 4 1/2 inches.
Tested 80 pounds cold water pressure.

Ornamental



Fig.

One Column Radiator

Plain and Ornamental take same list price.

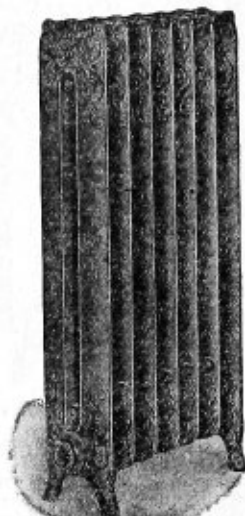


Fig. G

Two Column Radiator

No. of Sections	*Length, Inches	Heating Surface					No. of Sections	*Length, Inches	Heating Surface						
		38-inch Height 3 Sq. Ft. per Section	32-inch Height 2½ Sq. Ft. per Section	26-inch Height 2 Sq. Ft. per Section	22-inch Height 1½ Sq. Ft. per Section	20-inch Height 1¼ Sq. Ft. per Section			45-inch Height 5 Sq. Ft. per Section	38-inch Height 4 Sq. Ft. per Section	32-inch Height 3½ Sq. Ft. per Section	26-inch Height 2½ Sq. Ft. per Section	22-inch Height 2¼ Sq. Ft. per Section	20-inch Height 2 Sq. Ft. per Section	15-inch Height 1½ Sq. Ft. per Section
2	5	6	5	4	3½	3	2	5	10	8	6¾	5½	4½	4	3
3	7½	9	7½	6	5	4½	3	7½	15	12	10	8	6¾	6	4½
4	10	12	10	8	6¾	6	4	10	20	16	13½	10¾	9	8	6
5	12½	15	12½	10	8¾	7½	5	12½	25	20	16¾	13½	11¼	10	7½
6	15	18	15	12	10	9	6	15	30	24	20	16¾	13½	12	9
7	17½	21	17½	14	11¾	10½	7	17½	35	28	23½	18½	15¾	14	10½
8	20	24	20	16	13½	12	8	20	40	32	26¾	21	18	16	12
9	22½	27	22½	18	15	13½	9	22½	45	36	30	24¾	20¼	18	13½
10	25	30	25	20	16¾	15	10	25	50	40	33½	26	22½	20	15
11	27½	33	27½	22	18½	16½	11	27½	55	44	36¾	29½	24¾	22	16½
12	30	36	30	24	20	18	12	30	60	48	40	32	27	24	18
13	32½	39	32½	26	21¾	19½	13	32½	65	52	43½	34¾	29¼	26	19½
14	35	42	35	28	23½	21	14	35	70	56	46¾	37½	31½	28	21
15	37½	45	37½	30	25	22½	15	37½	75	60	50	40	33¾	30	22½
16	40	48	40	32	26¾	24	16	40	80	64	53½	42¾	36	32	24
17	42½	51	42½	34	28½	25½	17	42½	85	68	56¾	45½	38¼	34	25½
18	45	54	45	36	30	27	18	45	90	72	60	48	40½	36	27
19	47½	57	47½	38	31¾	28½	19	47½	95	76	63½	50¾	42¾	38	28½
20	50	60	50	40	33½	30	20	50	100	80	66¾	53½	45	40	30
21	52½	63	52½	42	35	31½	21	52½	105	84	70	56	47¼	42	31½
22	55	66	55	44	36¾	33	22	55	110	88	73½	58¾	49½	44	33
23	57½	69	57½	46	38½	34½	23	57½	115	92	76¾	61½	51¾	46	34½
24	60	72	60	48	40	36	24	60	120	96	80	64	54	48	36
25	62½	75	62½	50	41¾	37½	25	62½	125	100	83½	66¾	56¼	50	37½
Price per Sq. Ft.		\$0.35	\$0.38	\$0.42	\$0.44	\$0.48	Price per Sq. Ft.		\$0.35	\$0.35	\$0.38	\$0.42	\$0.44	\$0.48	\$0.53

Above radiators are tapped 2 inches and bushed.

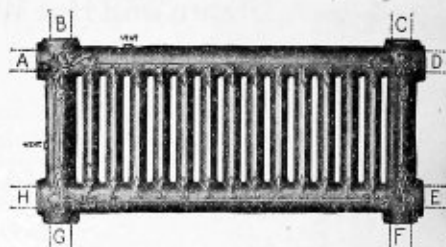
*Allow 1/2 inch for each bushing in estimating length of radiators.

Window Radiators

Plain or Ornamental



Wall Radiator



Wall radiator sections are made for two methods of interconnection, as follows: The vertical section in either size is tapped on the long sides at B, C, G and F; the horizontal section in either size is tapped on the short sides at A, H, D and E. A, B, C and H are right-hand tapings; D, E, F and G are left-hand tapings.

When more than four tapings are required in one section an extra charge is made.

Number of Sections	*Length Inches	Heating Surface		
		20-inch Height 5 1/2 Square Feet per Section	17-inch Height 4 1/2 Square Feet per Section	14-inch Height 4 Square Feet per Section
2	6	11	9 1/2	8
3	9	16 1/2	14 1/4	12
4	12	22	19	16
5	15	27 1/2	23 3/4	20
6	18	33	28 1/2	24
7	21	38 1/2	33 3/4	28
8	24	44	38	32
9	27	49 1/2	42 3/4	36
10	30	55	47 1/2	40
11	33	60 1/2	52 1/4	44
12	36	66	57	48
13	39	71 1/2	61 3/4	52
14	42	77	66 1/2	56
15	45	82 1/2	71 1/4	60
16	48	88	76	64
17	51	93 1/2	80 3/4	68
18	54	99	85 1/2	72
19	57	104 1/2	90 1/4	76
20	60	110	95	80
21	63	115 1/2	99 3/4	84
22	66	121	104 1/2	88
23	69	126 1/2	109 1/4	92
24	72	132	114	96
25	75	137 1/2	118 3/4	100
Price per sq. ft.		\$0.46	\$0.51	\$0.54

Sizes	No. of Sq. Ft. in Each Section	Width of Each Section	Length of Each Section	Thickness of Each Section
Extra Large	9	13 3/4	29 3/4	2 1/4
Standard	7	13 3/4	22 1/4	2 1/4
Small	5	13 3/4	17 1/4	2 1/4

When Ordering Wall Radiators

Give number of 5, 7 or 9 foot sections in each radiator.

How assembled, horizontal or vertical.

Give location of supply and return tapings.

Specify size of tapings.

State whether for water or for one or two pipe steam.

Number and kind of brackets.

Send sketch showing how it is desired they be assembled.

Data For Figuring Direct Radiation

(Based on Cubical Contents)

While the radiating surface that will be required in any room will depend very much upon the exposed wall and glass surface, there must be some relation to the cubical contents of same, and, therefore, as the simplest rule of apportioning radiation, we offer the following, derived from the experience of the best heating engineers.

The proposition being a detached building of good construction and average exposure, with outside temperature at zero. One square foot of direct radiation will heat

Hot Water Cu. Ft. space	Dwellings	Steam Cu. Ft. space
25 to 30	Living Rooms, one side exposed	45 to 50
20 to 30	Living Rooms, two sides exposed	40 to 50
20 to 25	Living Rooms, three sides exposed	40 to 45
30 to 40	Sleeping Rooms	50 to 70
20 to 30	Halls and Bath Rooms	40 to 50
30 to 50	Offices, according to exposure	50 to 75
35 to 50	School Rooms	60 to 80
40 to 60	Factories and Stores	70 to 100
60 to 100	Assembly Halls and Churches	100 to 150

(Continued on next page)

Above radiators are tapped 2 inches and bushed.

Steam—One Pipe

Up to and including 25 feet	1 in.
From 25 to 60 feet	1 1/4 in.
From 60 to 100 feet	1 1/2 in.

Hot Water—Two Pipe

Up to and including 40 feet	1 in.
From 40 to 75 feet	1 1/4 in.
Above 75 feet	1 1/2 in.

Steam—Two Pipe

Up to and including 50 feet	1 x 3/4 in.
From 50 to 95 feet	1 1/4 x 1 in.
Above 95 feet	1 1/2 x 1 1/4 in.

Distance from floor to center of opening is 3 inches.

In estimating length of radiator allow 1/2 inch for each bushing.

Steam Radiator Valves

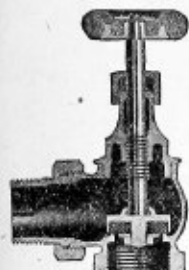


Fig. D1

Our steam radiator valves are fitted with high grade composition discs and are made of the highest quality of steam metal. They are heavy pattern, well proportioned; the openings are full side and not obstructed. All parts are accurately fitted and the unions make up absolutely tight. Each valve is carefully tested before shipment.

Angle With Union Right Hand Corner Left Hand Corner



Fig. D2



Fig. D3



Fig. D4

Composition disc, black enameled wood wheel, rough body, finished trimmings, nickel plated all over. Threaded right hand both outlet and inlet.

Size, inches.....	1/2	3/4	1	1 1/4	1 1/2	2
Angle type						
with union.....	\$3.15	\$3.80	\$4.75	\$6.40	\$8.10	\$13.10
Corner type,						
with union.....	3.45	4.20	5.25	7.05	8.95	14.45

Hot Water Radiator Valves

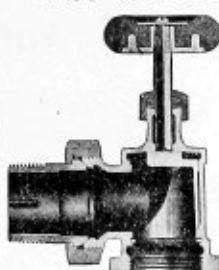


Fig. D5

The bonnet and body of these valves are cast in one piece, making one less joint than in any other radiator valve. Disc and stem are also cast in one piece and extra heavy. The disc affords an unobstructed water way, and the lugs which act as stops for the disc will not shear off.



Fig. D6 with Union



Fig. D7 with Elbow

Metal parts are rough, nickel plated finished trimmings.

Size, inches.....	1/2	3/4	1	1 1/4	1 1/2	2
Hot water valve.....	\$2.40	\$2.85	\$3.65	\$5.05	\$7.10	\$10.85
Union elbow.....	1.75	2.00	2.50	3.20	4.00	7.00

Data for Figuring Direct Radiation

(Continued from preceding page)

Hot Water.—For direct-indirect radiation add 33 1/3 per cent, and for indirect radiation add 75 per cent to the amount of direct surface required to heat premises, to secure equal value of heating surface.

Steam.—For direct-indirect radiation add 25 per cent, and for indirect radiation add 50 per cent to the amount of direct surface required to heat premises, to secure equal value of heating surface.

Note.—Add to sum thus obtained a corresponding percentage to determine additional tax on heater. This sum becomes the capacity of heater for direct radiation required for the work.

Note.—Above information is not guaranteed, but is based on standard authorities.

Data for Figuring Direct Radiation

(Based on Wall and Glass Exposure)

Mills' Rule.—One square foot of radiating surface for each two square feet of glass, and for each twenty square feet of outside wall, and every two hundred cubic feet of space.

Example: Room as above.

Glass exposure, square feet	60, 1 to 2=30
Wall, outside square feet	210, 1 to 20=10 1/2
Cubic contents, cubic feet	2016, 1 to 200=10

Total steam.....50 1/2 sq. ft.

For water, by generally accepted standards, add 60 per cent, equals 80 sq. ft. water.

Carpenter's Rule.—To the square feet of glass surface, add one-quarter of the exposed wall surface; and 1/55 to 3/55 of cubical contents (1/55 for rooms on upper floors, 2/55 for rooms on first floor, and 3/55 for large halls); then for steam multiply by .25; for water by .40.

Example: Room as above.

Glass exposure, 60 square feet, to which add one-quarter of wall 210 ÷ 4 = 52, to which add (room first floor) 2/55 cubical contents — 2/5 × 2016 = 73 +. Thus 60 + 52 + 73 = 185 × .25 (for steam = 46 +; or 185 × .40 for water) = 74 square feet.

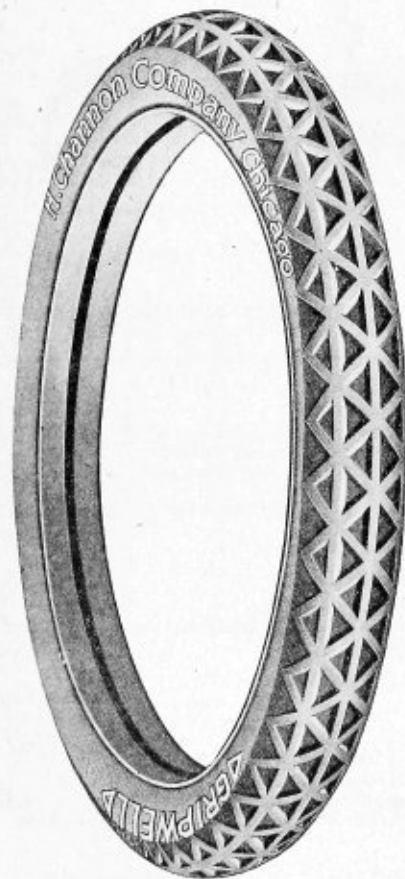
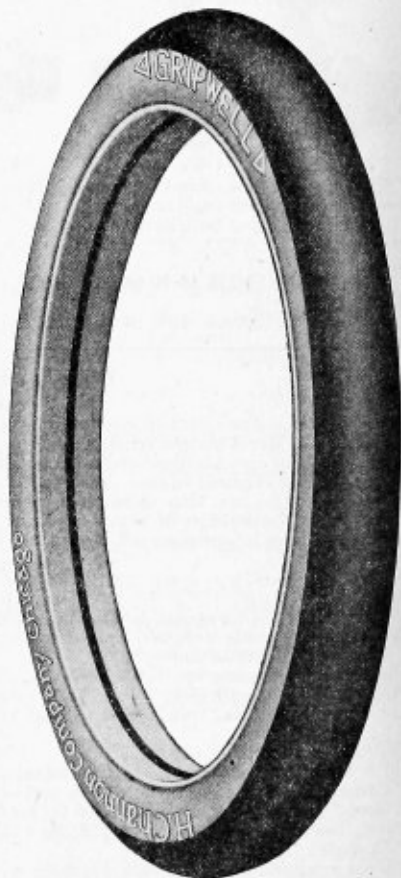
Note.—It will be observed that the ratio of the immediately foregoing practically reinforce those given in tables based on cubical contents.

Note.—Above information is not guaranteed, but is based on standard authorities.

Gripwell Automobile Tires**Guaranteed 3500 Miles**

The inherent exceptional qualities and built-in sturdiness of Gripwell tires have advertised themselves throughout the country.

The multitude of satisfied users are only too pleased to recommend a standard tire of exceptional merit at a reasonable price.

**Non-Skid Casing****Plain Tread Casing**

Gripwell Automobile Tires

Guaranteed

3500

Miles



Most Miles

Per

Dollar

In offering our own brand of automobile tires, the "Gripwell," we are confident they are the best tire value the market affords. They are strictly first quality and are guaranteed against defect in material and workmanship.

Only the very best materials are employed in their construction; genuine Sea Island cotton fabric, the best and strongest tire fabric known. This fabric is impregnated with pure rubber, which surrounds and encases every thread, and prevents fabric disintegration.

Gripwell tires are now manufactured from a new special formula of real resilient rubber which makes them the easiest riding tire on the market. It is of just the correct texture to resist undue wear, and just soft and "bouncy" enough to greatly minimize the dangers of stone bruising.

Our exclusive design, the Gripwell Non-Skid Triangle, we think is absolutely the best non-skid design in use. It is not only a positive non-skid on wet pavements and slippery roads, but possesses remarkable tractive power on muddy and sandy stretches, where the ordinary fancy tread is ineffective.

Notice the width of the center and two outside strips of rubber, how they are tied together, and the source of the actual non-skidding feature, the "Triangles." Notice their deep pockets for digging into the sand and mud, preventing the dangerous side slipping and last but not least notice that for smooth roads and boulevards the center and side corrugations with the triangles, form a continuous rolling and perfectly smooth contact with the roadway.

This, in conjunction with the new tread of real resilient rubber, imbues the rider with a luxurious floating sensation as if riding on air. This is when easy riding tires are appreciated, and one reason why we have so many contented users throughout the country.

In the matter of adjustments, if you have a grievance against any Gripwell tire, which you think has not given entire satisfaction, we sincerely request that you return it to us, so we can make it satisfactory.

All adjustments are made on a basis of 3500 miles service. Most Gripwells will, however, give service far in excess of this amount. The percentages of returns is negligible, the smallest we have ever had.

The weights given below are approximate only to be used in estimating transportation charges. The weight of a tire has nothing to do with its quality or wearing qualities.

Size, Inches	Triangle Non-Skid Tread	Gripwell Smooth Tread	Apprx. Wt., Lbs.	Size, Inches	Triangle Non-Skid Tread	Gripwell Smooth Tread	Apprx. Wt., Lbs.	Size, Inches	Triangle Non-Skid Tread	Gripwell Smooth Tread	Apprx. Wt., Lbs.
28x3	\$19.50	\$12.90	9	30x4	\$32.85	\$31.30	14	33x4 1/2	\$40.60		25
30x3	14.40	13.70	10	31x4	28.65	27.25	15	34x4 1/2	41.45	\$39.45	26
32x3		17.25	11	32x4	29.10	27.70	16	35x4 1/2	43.05	41.00	27
29x3 1/2	21.70	20.65	12	33x4	30.35	28.90	17	36x4 1/2	43.50	41.50	28
30x3 1/2	19.50	17.60	12	34x4	30.95	29.45	18	37x4 1/2	45.20	43.05	29
31x3 1/2	19.30	18.40	13	35x4	32.15	30.65	19	35x5	49.05	46.70	28
32x3 1/2	21.35	20.30	14	36x4	32.70	31.75	20	36x5	49.60	47.25	29
34x3 1/2	23.75	22.65	15	37x4		38.40	21	37x5	67.20	49.05	30
36x3 1/2		28.60	17					38x5 1/2	69.80		35

Gripwell Inner Tubes

Every Tube is Packed in a Waterproof Bag

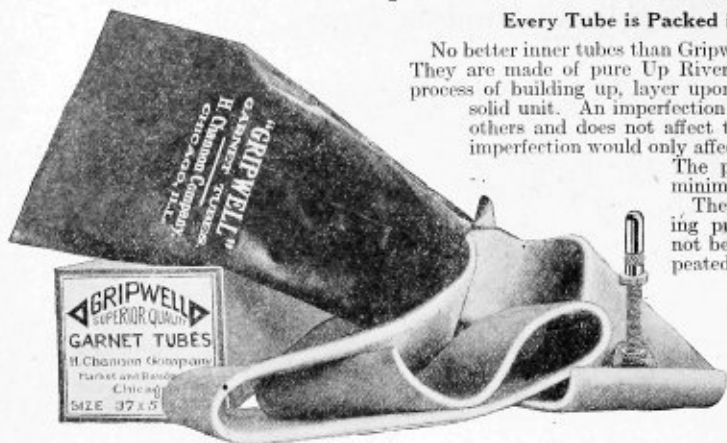
No better inner tubes than Gripwell are made, regardless of price. They are made of pure Up River para rubber by the laminated process of building up, layer upon layer, and curing all into one solid unit. An imperfection in one layer is corrected by the others and does not affect the efficiency of the tube, as an imperfection would only affect the thickness of a single layer.

The possibilities of a slow leak are minimized.

They are dense in texture, minimizing punctures and blowouts and do not become spongy or brittle from repeated vulcanizing.

Garnet tubes have an extra heavy wall and are especially cured to produce toughness and resiliency and to resist heat and hard service.

The gray tubes are also highly satisfactory and the equal of other tubes, except the Garnet.



Prices of Gripwell Inner Tubes

Tire Size	Garnet Tubes	Gray Tubes	Weight, Pounds	Tire Size	Garnet Tubes	Gray Tubes	Weight, Pounds	Tire Size	Garnet Tubes	Gray Tubes	Weight, Pounds
28x3	\$3.85	\$3.45	2 1/2	30x4	\$5.10	\$5.45	3 1/2	33x4 1/2	\$8.35	\$7.50	4 1/2
30x3	4.00	3.55	2 3/8	31x4	6.20	5.60	3 1/2	34x4 1/2	8.40	7.60	4 3/8
32x3	4.20	3.80	2 3/8	32x4	6.45	5.80	3 3/8	35x4 1/2	8.55	7.70	4 3/8
29x3 1/2	4.45	4.05	3	33x4	6.60	5.90	3 3/8	36x4 1/2	8.75	7.90	4 3/8
30x3 1/2	4.55	4.10	3 1/8	34x4	6.80	6.10	3 3/8	37x4 1/2	8.90	8.05	5
31x3 1/2	4.70	4.20	3 1/8	35x4	6.90	6.20	3 3/8	35x5	10.30	9.25	5
32x3 1/2	4.80	4.25	3 1/8	36x4	7.00	6.30	3 3/8	36x5	10.40	9.35	5 1/2
34x3	4.95	4.50	3 1/2	37x4	7.30	6.55	3 3/8	37x5	10.65	9.60	5 1/2
36x3	5.25	4.70	3 1/2					38x5 1/2	11.60	10.40	6

Useful Information Regarding Gripwell Tires

Gripwell Tire Types



Fig. 1

To insure our customers ordering the form of tires adapted to their rims, we illustrate herewith the types we furnish.

Fig. 1. Regular Clincher. This type of tire is designed for use on the standard one-piece clincher rim. It is constructed with a soft bead, to permit stretching of tire over rim when removing or applying.



Fig. 2

Fig. 2. Quick detachable Clincher. This type is very similar to the regular clincher, except that it has a hard bead, enabling the detachable rim to hold the tire with a firm grip and prevent it from being forced over the rim by air pressure. This type is intended for use with standard quick detachable rims.



Fig. 3

Fig. 3. Straight Side Q. D. This tire is built with a straight wall bead, a wire cable extending through the base of its side walls and providing the necessary tension to retain the tire between the side beads of the quick detachable rim.

Many of the medium and higher priced automobiles are now equipped with detachable side and lock rings, enabling the motorist to change his rim equipment from Q. D. clincher to straight side Q. D. (Dunlop) or vice versa.

When ordering tires be sure to state exactly which type of tire is desired and thus do away with unnecessary delay, correspondence and expense.

Over Size Tires

The following sizes of casings may be substituted for regular sizes as indicated without changing rim. For example, a 28x3-inch tire (used on a 28x3-inch rim) is interchangeable with a 29x3 1/2-inch tire. The larger sizes are built heavier throughout and contain 30 to 50 per cent greater cushion of air, thus reducing tire upkeep and adding to easy riding.

A 29x3 1/2-inch tire will fit a 28x3 -inch rim.

A 31x3 1/2-inch tire will fit a 30x3 -inch rim.

A 31x4 -inch tire will fit a 30x3 1/2-inch rim.

A 33x4 -inch tire will fit a 32x3 1/2-inch rim.

A 35x4 -inch tire will fit a 34x3 1/2-inch rim.

A 35x4 1/2-inch tire will fit a 34x4 -inch rim.

A 37x4 1/2-inch tire will fit a 36x4 -inch rim.

A 37x5 -inch tire will fit a 36x4 1/2-inch rim.

Weights Which Tires Should Carry

Without Passengers or Luggage

3-inch tires, all diameters	350 pounds per wheel
28x3 1/2-inch tires	400 pounds per wheel
30x3 1/2-inch tires	450 pounds per wheel
32x3 1/2-inch tires	550 pounds per wheel
34x3 1/2-inch tires	600 pounds per wheel
36x3 1/2-inch tires	600 pounds per wheel
30x4 -inch tires	550 pounds per wheel
32x4 -inch tires	650 pounds per wheel
34x4 -inch tires	700 pounds per wheel
36x4 -inch tires	750 pounds per wheel
32x4 1/2-inch tires	700 pounds per wheel
34x4 1/2-inch tires	800 pounds per wheel
36x4 1/2-inch tires	1000 pounds per wheel
5 -inch tires	over 1000 pounds per wheel

Air Pressures

	Front	Rear
3 -inch tires	60 pounds	65 pounds
3 1/2-inch tires	75 pounds	80 pounds
4 -inch tires	85 pounds	90 pounds
4 1/2-inch tires	90 pounds	95 pounds
5 -inch tires	95 pounds	100 pounds

In all cases tires should stand up round when loaded.

Tire Necessities

Inner Tires

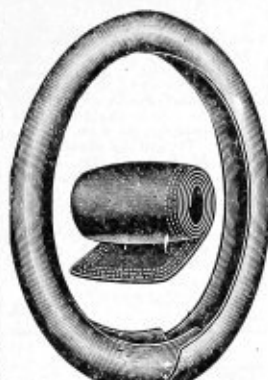


This is the genuine Interlock Inner Tire which has been widely advertised and has made good all over the country in over a quarter million tires. The object of the Interlock is to increase the strength of the tire so as to make it blow-out proof and practically puncture proof. The result of using Interlocks is that new tires will give twice the usual mileage while old or half worn tires will give hundreds and hundreds

miles of extra service. The Interlock is a complete extra inside tire, which is easily placed between the regular casing and inner tube. It is made exactly like a tire, full, round, endless and with flaps locked to the rim so that it cannot heat or chafe and does not interfere with either speed or resilience. The construction of the Interlock makes it take the strain completely from the sides and rim of the tire as well as the tread.

Diameter tire, inches. 3 3 1/2 4 4 1/2 5 5 1/2
Price each..... \$6.10 \$7.30 \$10.80 \$12.50 \$14.20 \$15.00

Gripwell Tire Reliners



Gripwell Reliners will enable the motorist to get hundreds of extra miles of service out of tires which would ordinarily be thrown away. They will prevent blow-outs and punctures in the majority of cases. Gripwell Reliners are made of special tire fabric, several layers of which are cemented together over a mould. Being made in this way, they fit the inside of the tire snugly and do not creep or chafe when properly applied. Made full width to reach from bead to bead, the 4-inch sizes being 4 plies thick and smaller sizes 3 plies. Cement coated and self-vulcanizing when applied to tire.

Diameter tire, inches. 3 3 1/2 4 4 1/2 5 5 1/2
Price each..... \$2.50 \$3.30 \$4.30 \$5.00 \$5.10 \$5.70

Gripwell Lace-On Boot



Made from several plies of heavy tire fabric and high grade rubber stock. Made over a form, and therefore fit casing perfectly. Furnished complete with lacing. Jumbo size is extra heavy, extra strong and 1-3 longer.

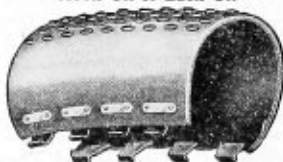
Width Tire, Inches	Regular Size Price Each	Wt., Ounces	Jumbo Size Price Each	Wt., Ounces
3	\$1.10	16	\$1.60	30
3 1/2	1.20	17	1.70	32
4	1.30	27 1/2	1.80	34
4 1/2	1.50	18	1.90	36
5	1.60	18 1/2	2.10	38
5 1/2	1.80	20	2.30	40

Gripwell Hook-On Boot



Made with a hook which is easily adjustable to take care of the difference in size owing to different tread thickness, thus a perfect fit is assured. Has extra outside screw plate and reinforced edges, making it impossible for the hook to pull out. Overcomes every difficulty of all other types of Hook-On Boots. Packed singly in cartons, including inside patch. Jumbo size is extra heavy, extra strong and 1-3 longer.

Width Tire, Inches	Regular Size Price Each	Wt., Ounces	Jumbo Size Price Each	Wt., Ounces
3	\$1.10	16	\$1.60	20
3 1/2	1.20	20	1.70	24
4	1.30	20	1.80	28
4 1/2	1.50	24	1.90	32
5	1.60	28	2.00	36
5 1/2	1.80	32	2.20	40

Gripwell Steel Studded Boots
Hook-On or Lace-On

Is designed to meet the demand for an extra strong, inexpensive outer shoe.

An extra strip of toughest chrome leather is placed over the original layer. This, in addition to the steel studs, gives a shoe that will wear indefinitely.

Width Tire, Inches	Price Each	Width Tire, Inches	Price Each
3	\$1.90	4 1/2	\$2.30
3 1/2	2.00	5	2.50
4	2.20	5 1/2	2.65

Gripwell Floating Flaps



To be placed between tube and rim with Q. D. Clincher and S. S. Tires to prevent pinching of tube. State size of tire when ordering.

Price Each
3 and 3 1/2-inch..... \$2.00
4 and 4 1/2-inch..... 2.60
5 and 5 1/2-inch..... 3.00

Gripwell Tire Tape



A strictly high grade black adhesive tape. Will not dry up rapidly, is strong and very adhesive. Furnished in 1/2-pound rolls, in cartons. Price per roll..... \$0.40

Standard Blow-Out Patch



This is the standard blow-out patch, made of several layers of fabric and good rubber stocks, but does not have the Gripwell Rubber Tip feature. A heavy, strong, vulcanized patch 6 1/2 x 8 inches, made to place over small cracks and breaks in tires.

Price each..... \$0.50

Gripwell Inner Shoes
Rubber Tip

Constructed of several plies of special fabric, to be used between inner tube and outside casing. Rubber tipped ends prevent cutting of inner tube, a common fault of inner shoes. Formed to fit perfectly with flaps to lock over both beads. Jumbo size is extra heavy, strong and 1-3 longer.

Width Tire, Inches	Red Price Each	Fabric Wt., Ounces	White Price Each	White Wt., Ounces
3	\$0.66	14	\$0.48	13
3 1/2	.76	14	.58	13
4	.86	15	.70	14
4 1/2	1.00	15	.80	14
5	1.14	16	.90	15
5 1/2	1.30	17	1.00	16

Miscellaneous Tire Accessories

L. & L. Handy Split Rim Tool



With this tool any make of split demountable rims, either clincher or straight side type, and any size, can be removed or replaced in one minute, even though the tire is slightly undersized or rusted on.

To unlock rim. Place claws over rim flanges and again collapse until lever passes eccentric, where it remains locked until replaced.

To replace rim. Place claw ends of tool against inner surface of rim and adjust notched bar and ratchet and reverse operation until rim is forced into place.

Length, folded, 19 inches. Weight about 6 pounds.

Price each \$2.00



Johnson Tire Tool

A strong, simple, durable, powerful and practical tire tool. Rapid and efficient. Made of drop forged steel with one end designed as a hammer, the other as a grab hook or tire remover. Applies force at head of tire, the logical place and throws tire free from rim.

Furnished complete with full directions.

No. 1. Length 13 inches, weight 2½ lbs. Price \$1.50

No. 2. Length 17 inches, weight 3 lbs. Price 1.90

Springfield Tire Tool

With Rim Hook

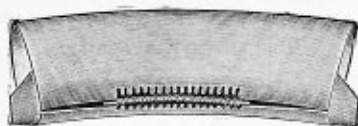


tire. Shipping weight, 2 pounds.

Price each \$1.00

This is a very convenient tool for removing tires from the common clincher rim, detachable rim or demountable rim. Fits any 3 to 5-inch tire. Tire may be removed from a demountable rim while either on or off the wheel. Will not gouge into the rubber or tear the fabric off the

Phillips Patent Blowout Boot



Made of tough Sea Island tire fabric. Thoroughly vulcanized on a tire core and permanently shaped to the form of a tire. It completely encircles the inner tube and is as strong at the head as at any other point. It will not bulge, wrinkle or bump, and is a sure repair for rim cuts.

The lock is of special design and double clinched on the sides of the boot. The edges dovetail and lock with a pin, as shown.

Sizes, inches..... 3 3½ 4 4½ 5

Price, standard 11-inch..... \$0.75 \$0.75 \$1.00 \$1.25 \$1.50

Moisture Proof Tire Covers



This cover is easily and securely applied by simply adjusting the cover snugly about the tire. The cover locks itself, making the cover water and dust proof when placed in any position. Fits practically any make of tire by simply adjusting the buttons. A steel spring used in the construction of this cover adds to its perfect fit. Furnished for all tire sizes. Shipping weight 3 pounds. Made of black enameled duck, first quality. When ordering state size and type of tire.

Price each \$3.00

Extra for demountable or bolt-on type50

Inner Tube Bags

These bags are made of heavy duck, enameled black, and should not be confused with the light weight tube bags made of drill. Inner tubes should be kept in bags when not in use to prevent them from being chafed or cut by rubbing against sharp edged tools.

For one tube. Price each \$0.50

For two tubes. Price each80

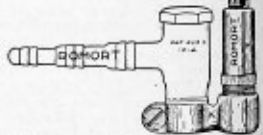


Romort Tire Tester Attachment

Attach the Schrader tire tester to the Romort automatic air valve model "A" or "B" shown on another page.

It consists of only two parts, the barrel and cap.

Price each, without Romort valve \$1.00



Gripwell Tire Talc and Tire Mica



Gripwell tire talc is the highest grade American talc procurable for tire lubrication. When sprinkled inside the casing after making a repair, it prevents tube from sticking and eliminates all friction. Price per can \$0.20

Gripwell tire mica will not cake, harden or absorb moisture. Used to lubricate inner tubes and is undoubtedly the best powder that can be used for this purpose. Furnished in convenient sifter top cans with cap.

Price per can \$0.30



Tire-It Tire Preservative

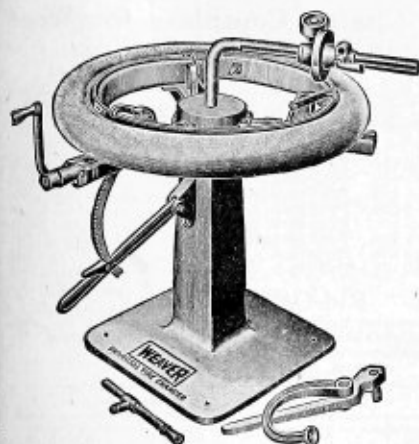
Tire-It is a pure white rubber tire preservative, containing no oils, turpentine, benzine or any petroleum product which is highly injurious to rubber. It is easily applied with a brush, dries quickly and will not peel, blister or rub off. Adds to the appearance, preserves and protects tires.

Price per Can

1 pint \$1.00 2 quarts \$3.50

1 quart 1.90 1 gallon 7.00





Weaver Universal Tire Changer

Make a profit on your tire changes by using a Weaver Universal tire changer.

The only mechanical means ever perfected for dismounting and remounting all styles and sizes of pneumatic automobile tires.

Will handle any size and style of auto tire or rim. The most difficult tires can be changed in a small fraction of the time required by the primitive methods usually employed.

The saving in time and labor will pay for the equipment in a very short time. The more prompt and efficient service which you will be able to give your trade will soon double your patronage.

No Injury to Tires

Every operation in the handling of tires by this Universal tire changer is done by means of smooth, polished rollers. There is positively no possibility of injuring either casing or tube even in the most stubborn cases. No pounding, no jamming, no cutting.

Printed directions accompanying each machine give detailed suggestions for performing each operation on the various types of tires and rims.
Shipping weight, 275 pounds.
List price, complete.....\$44.00

"Wallace" Steel Tire Rack

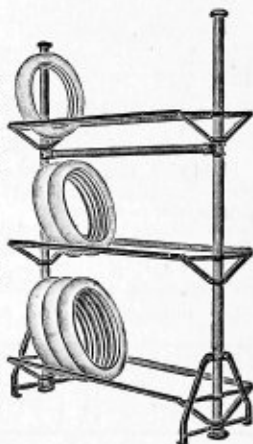
A most attractive and convenient rack for storing tires of all sizes. Tires can be spaced to suit your own needs, as the moving upward or downward of the end supporting brackets is the work of but a few moments. Tires are supported on rails made of angle iron with a large flat surface to prevent flattening or injuring the tires from continued storage in one position. Additional sections or units may be added.

Made entirely of steel with upright stanchions of 2-inch tubing.

Height over all, 10 feet, 8 inches. Length over all of first section, 5 feet, 4 inches. Length over all of each additional section, 5 feet, 2 inches. Weight of first section with two uprights, 160 pounds net or 185 pounds crated. Weight of extra sections with one upright, 130 pounds net or 145 pounds crated.

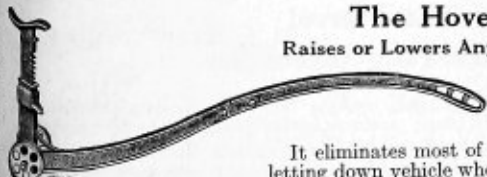
Price List

First section, 3 tiers, two uprights as shown.....\$20.00
Extra sections, for extensions, 3 tiers and one upright only.....15.00
Shipments will be made knocked down.



The Hovey Automoblie Jack

Raises or Lowers Any Wheel of Any Car in One Second



This jack operates on an entirely new mechanical principle, namely, the "wheel and axle" and "shifting fulcrum" as distinguished from the screw or lever of the old style jack.

It eliminates most of the time and labor ordinarily consumed in jacking up and letting down vehicle wheels.

It operates by merely "kicking up" movable head and depressing handle.

Locks by gravity.

Lets down by merely lifting the handle.

Adjustment is made by the foot and not the hands.

Four foot handle gives ample leverage.

No screwing or lever-pumping on hands and knees.

Not conveniently carried away as a "souvenir."

Built to last a lifetime.

No springs or delicate parts to break or wear.

Made of malleable iron and open hearth steel.

Price each.....\$7.00



Weed Chain Tire Grips

The feature of weed chains is in their freedom to creep. They continually shift their position on the tire. Weed chains are attached without the use of jack or other tools. Do not wire any loose ends of side chains under the felly—cut them off.

Best material, best workmanship, carefully hardened, accurately sized, prevent skidding, afford traction, cannot injure tires.

Price List per Pair

Tire Diam., Ins.	Cross Section Diameters—Inches							
	2½	3	3½	4	4½	5	5½	6
28	\$3.50	\$4.00	\$4.50					
30	3.75	4.50	5.00	\$5.50	\$6.50			
31			5.50	6.00				
32		5.00	5.50	6.00	7.00			
33		6.00	6.50	7.00				
34		5.50	6.00	7.00	7.50	\$ 8.50		
35				7.50	8.00	9.00		
36		6.00	6.50	7.50	8.00	9.00	\$12.00	
37				8.00	8.75	9.75	13.00	
38				9.00	9.50	10.50	14.00	\$14.00
39						11.25		
40				10.00	11.00	12.00		15.00
42					12.00	13.50		

Cross Chains Complete for Weed and Rid-O-Skid Chains



For 2½-inch tire.	Price each	\$0.06
For 3 -inch tire.	Price each	.06
For 3½-inch tire.	Price each	.08
For 4 -inch tire.	Price each	.09
For 4½-inch tire.	Price each	.10
For 5 -inch tire.	Price each	.12
For 5½-inch tire.	Price each	.16
For 6 -inch tire.	Price each	.16

Rid-O-Skid Chains

While these are made by the Weed people, they are much lighter in weight than Weed chains and are not guaranteed. We do not recommend them.

Price List per Pair

Tire Diam., Ins.	Cross Section Diameters—Inches							
	2½	3	3½	4	4½	5	5½	6
28	\$1.95	\$2.40	\$2.50					
30	2.10	2.50	2.65	\$2.80	\$3.00			
31			2.80	2.90				
32		2.60	2.80	3.00	3.25			
33				3.10				
34		2.75	2.95	3.20	3.40	\$4.10		
35				3.30	3.50			
36			2.90	3.10	3.40	3.60	4.50	\$5.20
37				3.50	3.75	4.70	5.40	
38				3.75	3.90	4.90	5.60	\$6.50
39						5.10		
40				4.00	4.25	5.25		6.75
42					4.50			

Automobile Steering Wheels

Tilting or Stationary

Steering wheels supplied with Ford cars are only 15 inches in diameter. This wheel is 17 inches in diameter and correspondingly easier to operate.

The tilting wheel is easily tilted out of the way when the driver enters or leaves the car.

Price List

Car	Diam., Ins.	Style	No.	Price Plain	No.	Price Corrugated
Ford	17	Stationary	20	\$2.50	21	\$3.25
Ford	17	Tilting	22	3.50	23	4.25
Chevrolet	17	Stationary	24	2.75	25	3.50
Chevrolet	17	Tilting	26	3.75	27	4.50



The Marvel Spark Plug Intensifier

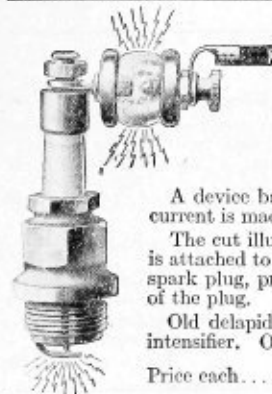
Positively overcomes all spark plug troubles. Prevents the accumulation of carbon in cylinders and spark plugs, produces hotter sparks and perfect explosion.

A device based on the well known principle of the wireless telegraph, that when an electric current is made to leap a gap it must gather additional force to make the leap.

The cut illustrates how the current is here made to leap from the point to which the terminal is attached to the point opposite. From there it passes with increased energy to the point of the spark plug, producing a spark of such intensity as to cause ignition regardless of the condition of the plug.

Old delapidated spark plugs with broken porcelain will spark perfectly when aided by this intensifier. One needed with each plug.

Price each.....\$1.20



We can furnish chains for single and dual solid truck tires.

Automobile Accessories

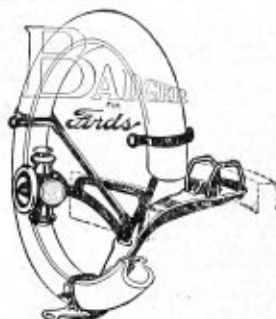
Rear Tire Holder for Ford Cars



The best rear tire holder ever made for a Ford car. It will hold two casings, or two demountable rims with casings. It is made of the best extra heavy malleable iron and steel. Will last a lifetime. Can be attached in a few minutes. Full directions for attaching to car are sent with each holder. Finished in the best grade black rubber finish. Adds to the appearance of the car by giving additional length to the machine. Strap included with each outfit.

Price.....\$5.50

Combination Rear Tire Holder for Ford Cars



An improved design with combination bracket for carrying lamp and license plate. Either tires or demountable rims may be carried, the arms positively and permanently holding them in a vertical position. The license bracket is carried firmly on the hook, and there is no possibility of breakage due to vibration. Arms made from a square steel rod, and set into bottomed sockets in the hooks. Held firmly by set screws. They cannot slip out of position. Fits both roadster and touring models, and carries either one or two tires or demountable rims. Black enamel finish. Complete with straps and lamp license brackets.

Price.....\$6.00

"Badger" Chain Lock

Every automobile should be equipped with a lock of some kind. This "Badger Chain Lock" is the most practical on the market. It may also be used to protect spare tires. Made of the best case hardened, electric welded chain, covered with a thick genuine leather casing that prevents any chafing on the finish of the car. Lock furnished is either the Yale or the American Keyless lock. Made in three lengths.

No. 11. 30-inch. Price...\$1.00

No. 12. 36-inch. Price...1.05

No. 13. 42-inch. Price...1.10

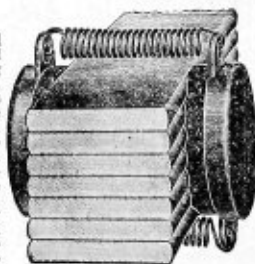


Sterling Spring Oilers

The lubricant is contained in an absorbent material held against the leaves of the spring by metal caps on each side. Two oilers, each placed about 6 inches from the center are required for ordinary springs. Very long springs of the cantilever type require 4 oilers. Most oilers should be so attached as to cover end of the shortest leaf.

This oiler is not unsightly and does not interfere with washing the car. It has proven very efficient and satisfactory.

Price each.....\$0.40



Tomahawk Spring Lubricant



It consists of a container to hold the lubricant and a double wedge spring separator. To operate, place the wedge between two leaves of the spring, and a gentle tap with a hammer drives it in. Then a turn of the container handle forces the lubricant through the wedge into the exact place it is needed. No waste of effort or lubricant.

Price, complete.....\$1.00

Tomahawk Graphit Spring Lubricant

The best for spring lubrication. Comes in tube form, convenient for filling the Tomahawk Grease Container. Positively will not evaporate. Each tube contains enough lubricant to last a car for two thousand miles.

Price, per tube.....\$0.40

Running Board Tire Holder



A Ford necessity. For carrying one or two tires and demountable rims. Supported on running board only. Finished in black enamel. Packed in individual cartons, complete with bolts, straps and clamps.

No. 0. Price each, for 1 tire...\$3.40

No. 1. Price each, for 2 tires...3.80

Automobile Springs



These springs are made of the highest quality carbon automobile spring steel. They are always equal and in most cases superior to the original springs on your car. We are in a position to make prompt deliveries and can quote very attractive prices. When ordering, state name of car, model and year of manufacture. Prices upon application.

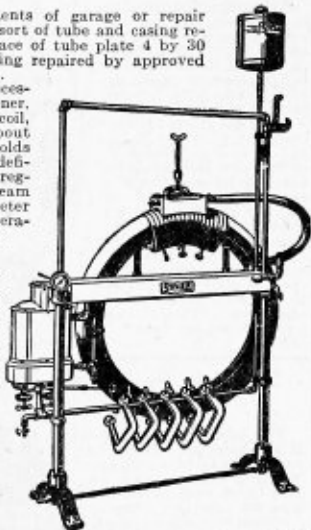
Shaler Vulcanizers

Steam Heated Plant

Meets all requirements of garage or repair shop. Handles every sort of tube and casing repairs. Machined surface of tube plate 4 by 30 inches. Any size casing repaired by approved wrapped tread method.

No attention is necessary after lighting burner. The boiler, a copper coil, raises steam in about twenty minutes and holds it at right pressure indefinitely, a thermostat regulating the flame. Steam gauge and thermometer keep a check on the operation by indicating both pressure and temperature.

Gasoline burner furnished unless gas burner is specified. Type NPR contains complete outfit, six clamps and blocks for tube work, bead strips for rim cuts, casing clamps, tube for wrapping treads, thermometer, steam gauge and safety valve. Type N is same as above, but equipped for tube work only.



Type NPR No. 41.....\$60.00
Type N No. 41.....\$55.00

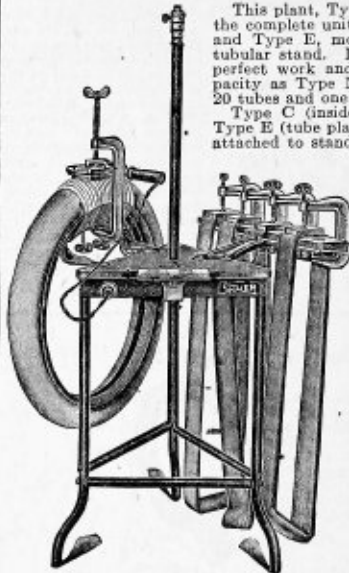
Electric Heated Plant

This plant, Type ACE, consists of the complete units Type A, Type C, and Type E, mounted on a strong tubular stand. It will do the same perfect work and has the same capacity as Type NPR steam plant—20 tubes and one casing per hour.

Type C (inside casing form) and Type E (tube plate) are permanently attached to stand and have switches to permit independent heating. Type A (outside casing form) has five feet of conducting cord with a plug which fits a socket in the stand or any lamp socket if work is to be done elsewhere on inflated tires. No special wiring needed, as the entire apparatus uses less current than a flatiron.

Simple, portable, quick heating. Each unit may be purchased and used separately.

Type ACE No. 101, weight 115 pounds.....\$60.00
For thermostat controlled D. C. equipment add.....\$10.00



Ford Tube Kit



Light and compact for easy portability. It may be carried in the tool box and used for all emergency patches. It mends quickly and permanently. The lamp will burn alcohol or gasoline, does not produce smoke or soot. If accidentally overturned it would not cause trouble. Any tube can be mended without pinching the edges. Vulcanizing surface ten square inches. Handle is detachable. Outfit is packed in a small box for carrying in car. Complete with repair material. Nickel plated.

Price each.....\$1.75

Ford Combination Kit



Compact, reliable and efficient, mending all cuts and injuries as perfectly as the most elaborate outfit. Tire can be mended while inflated. Simply fill the cut with new rubber, clamp on the vulcanizer, fill the generator with gasoline or alcohol and light it. No watching or regulating. No smoke, no soot, no exposed blaze. Can be used close under the fender without damaging the paint. Permanent repairs are made as quickly as a patch. Detachable handle, always cool. Furnished with repair rubber and cement. Nickel plated.

Price each.....\$2.75

Tube-Kit Vulcanizer

For Inner Tubes Only



To be carried in the tool box for emergency repairs; mends all tube injuries quickly and permanently. As simple and easy to use as a temporary patch. The correct amount of heat is produced by a lamp which burns gasoline or alcohol, without smoke, soot or exposed flame. Accidental tipping over of the vulcanizer when in use would not cause trouble. A measure graduated to give the proper charge is furnished with the vulcanizer so that no watching or regulating is necessary. Vulcanizes a surface 10 inches square. Complete with repair material. Weight 4 pounds.

Price complete.....\$2.00

Vul-Kit Vulcanizer

For Tubes and Casings



Besides making every practical kind of tube repairs, the Vul-Kit has a 3 1/2 x 4-inch surface curved to fit any sized casing. This is very valuable because while tubes are only mended when the tire goes flat, casings always need attention. It is easy to mend a small cut while tire is on the wheel. Simply fill the cut with rubber, clamp on the vulcanizer, and in a few minutes you have a permanent repair. This vulcanizer produces no exposed blaze, it can be used close under a fender without scorching the paint. It is nicked and polished, packed with repair material in a strong box for carrying in tool box of car. Weight about 5 pounds.

Price complete.....\$3.50



Positive Combination Steam Vulcanizer

Repairs Both Tubes and Casings

A complete steam vulcanizing plant, put up in a box, so that it may be carried in a tool kit of most any car. It is a high grade vulcanizer and repairs blowouts, stone bruises and glass cuts in any size casing or inner tube as perfectly as a large steam plant. The same scientific method of vulcanizing by steam is used that all tire manufacturers employ and it can not burn or undercure.

The outfit consists of a metal body with a compartment for water and another for fuel. The water compartment is between the tire and flame, where it equalizes the heat generated and vulcanizes a patch that actually becomes a part of the tire. It is absolutely automatic and extinguishes itself after the work is completed. It is safe, clean and so simple that there is nothing to wear out or get out of order. Can be used anywhere, along the roadside or in the garage. The tire need not be removed from the wheel, nor deflated to repair casing.

To operate, place repair rubber in place and clamp on vulcanizer into which is put a measure of water and a measure of gasoline. Light the gasoline. In 20 minutes the fuel will be burned out and the repair is made. Repairs a damage up to 7 inches square.

A complete vulcanizing outfit is furnished with each vulcanizer, including a measuring cup, steel protector hood, special wood block for repairing tubes, scissors and a quantity of tube and casing rubber.

Price complete as described above, weight 4 pounds.....\$5.00

Positive Steam Tube Vulcanizer

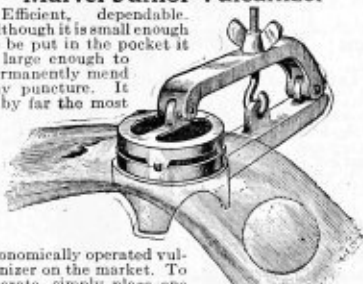


Repairs automobile, cycle car, motor-cycle and bicycle tubes. This is the only small steam vulcanizer made expressly for tubes. Will repair a hole up to 12 square inches in any size of tube, in one operation. A water compartment between tube and fuel compartment insures perfect repairs and eliminates all danger of burning, overcuring or undercuring. Outfit is packed in a box with measuring cup, screw, sand, paper, scissors and repair gum. Weight 3 pounds.

Price complete.....\$2.25

Marvel Junior Vulcanizer

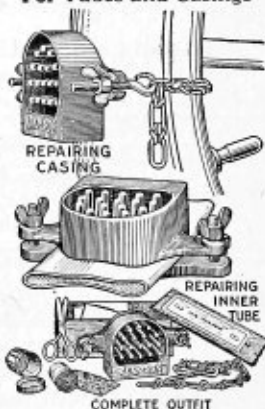
Efficient, dependable. Although it is small enough to be put in the pocket it is large enough to permanently mend any puncture. It is by far the most



economically operated vulcanizer on the market. To operate, simply place one of the cartridges in the holder, light it with a match and go away and leave it. In fifteen minutes the tube is perfectly vulcanized. Six rubber patches and 6 cartridges supplied with each vulcanizer. Price each.....\$2.00 Box of 12 extra patches and cartridges.....1.50

Adamson Universal Vulcanizer

For Tubes and Casings



A practical vulcanizing outfit complete with repair gum ready for instant use. Tire is repaired without deflating or removing it from wheel. Absolutely automatic. Place the patch, clamp the vulcanizer, put in the gasoline and light it. When fuel is burned out, repair has been made. Model U, weight 4 pounds.

Price.....\$5.00

Adamson Model T Vulcanizer

For Inner Tubes Only



No cement or acid is used. The repair gum is placed on the tube according to directions supplied with each outfit. The vulcanizer is applied by simply clamping it centrally over the gum and tube as illustrated. To vulcanize the repair, one ounce of gasoline is placed in the vulcanizer and ignited. The fuel is allowed to burn itself out and the repair is completed. Furnished with complete outfit as illustrated.

Model T. Weight 4 pounds. Price.....\$3.50

Marvel Senior Vulcanizer

For Repairing Tubes and Casings

Puts on a patch as easy as you light a match.



A chemicalized heating element used as a fuel furnishes the right amount of heat to make a perfect repair. Works under all conditions. Wind cannot blow it out. Repairs a cut in a casing in half the time it takes to remove it from the wheel. Repairs a tube in five minutes. Money back if you can afford to be without it. Complete with instructions and sufficient material to make a large number of repairs.

Price each.....\$4.00

Gums, Patches, Cement and Vulcanizing Supplies



Gripwell Raw Gum Repair Stocks for Tubes and Casings

It is useless to spend time and money making repairs to casings and inner tubes by using inferior raw gum stocks, as they will not be permanent. The Gripwell gums will enable the vulcanizer to make the very best repair possible. They are higher in price than some gums on the market, but we only care to compete in quality. They are strictly first quality and will give entire satisfaction.

ket, but we only care to compete in quality. They are strictly first quality and will give entire satisfaction.

Gripwell Tread Gum

For repairing tread cuts, putting in new sections of tread or complete retreading. Furnished in $\frac{1}{4}$ and $\frac{1}{2}$ -pound rolls in air tight cartons.

	Price per Roll	
$\frac{1}{4}$ -pound.....	\$0.54	$\frac{1}{2}$ -pound.....\$0.90

Gripwell Combination Tube Gum

When a tube is so injured as to require a large patch, the repair should be vulcanized. Gripwell Combination Gum is so called because one side is semi-cured and the other cured. The semi-cured side forms the inner surface of the patch. No sticking to the other side of the tube. The advantage of this is apparent to the repair man at once. Furnished in $\frac{1}{4}$ and $\frac{1}{2}$ -pound rolls packed in air tight cartons.

	Price per Roll	
$\frac{1}{4}$ -pound.....	\$0.65	$\frac{1}{2}$ -pound.....\$1.20

Gripwell Tube Gum

This gum is used mostly in connection with the Combination Gum described above. It is uncured. When the inside patch has been made with the semi-cured gum, the cavity or outside depression is filled with this gum and the complete patch then vulcanized. A tube so repaired is stronger at this point than the undamaged part of the tire. Furnished in $\frac{1}{4}$ and $\frac{1}{2}$ -pound rolls in air tight cartons.

	Price per Roll	
$\frac{1}{4}$ -pound.....	\$0.65	$\frac{1}{2}$ -pound.....\$1.15

Gripwell Cementless Tube Patches

These patches are red in color and made of high quality para rubber. They may be attached without the use of cement. Simply moisten one side with a little gasoline, press firmly over place to be repaired, allow to dry for a few minutes and tube is ready for use. There are 12 patches in a box in varying sizes from which the suitable size for the injury is selected. Made with feather edges, lined with coating of self-vulcanizing rubber protected with muslin to prevent rubber from drying out. Weight, 5 ounces.

Price per can.....	\$0.90
--------------------	--------



Gripwell Breaker Fabric

This strong fabric is of open weave, filled with gum of great adhesive quality. Its use is a strong insurance against tread separation, forming a weld between tread and lower layers that make the sections a perfect unit of strength. This breaker fabric also acts as a shock absorber and distributor, protecting carcass from concentrated strains.

No. 2098. Frictioned on two sides. Price per 1-lb. can. \$2.20

Oval Valve Bases

These valve bases, when cemented down properly, will prevent valve leakage. Small size is intended for 3 and $3\frac{1}{2}$ -inch tires. Larger size is for 4, $4\frac{1}{2}$, 5 and $5\frac{1}{2}$ -inch tires.

Large size, price each.....	\$0.30
Small size, price each.....	.20



Gripwell Pure Gum Vulcanizing Cement

Made of raw para rubber and contains absolutely no rosin. Cures quickly and secures perfect results with any vulcanizing method. The best patch or repair stock and the most expert repair men are helpless, if cheap commercial or homemade cement, both made by guess work, are used. Gripwell cement will give entire satisfaction if properly used. Furnished in $\frac{1}{4}$ and $\frac{1}{2}$ -pint cans.



Price per Can

$\frac{1}{4}$ -pint.....	\$0.20	$\frac{1}{2}$ -pint.....\$0.30
--------------------------	--------	--------------------------------



Gripwell Rebuilding Fabric

Light in weight, but is stronger than any requirement of service will demand. Frictioned with extra high quality rubber compound. Packed in 1-

pound air-tight cans.

No. 8498. Frictioned on two sides, skim coat on one side. Price per 1-pound can.....\$1.80

No. 8498BB. Frictioned on one side. Price per 1-pound can.....\$1.80

No. 8482BB. Frictioned on one side. Price per 1-pound can.....\$1.80

Loctite Canvas Patch



Before Patching



After Patching

A cold patch that will repair any size cut in tube and can be used as an emergency repair for broken fabric in casings.

Loctite is built to resist the highest air pressures and hottest roads. Can be applied by anyone in five minutes. No experience. No tools needed to repair with loctite. Cut patch to fit your puncture and just stick it on. The tube can be used immediately. Will not dry off when carried in car.



Outfit No. 1—Contains one sheet of Loctite, 6x18 inches, tube of cement, emery paper, etc., sufficient to repair 250 nail punctures. Price complete.....\$1.60

Outfit No. 2—Contains 54 square inches of Loctite, sufficient for 100 repairs. Price.....\$0.90

Outfit No. 3—Contains 27 square inches of Loctite. Price.....\$0.50

Dutch Brand Products

Dutch brand rubber and rim cements are made of the finest grade of pure Para rubber combined correctly with the highest quality chemicals obtainable. The exclusive and patented system of closing the tubes insure them against leakage and evaporation.



Rubber Seal

The most efficient medium for repairing cuts, gouges and blow-outs in casings, punctures in inner tubes, etc. Can also be used on rubber boots and shoes, garden hose and rubber articles of all kinds.

Outfit consists of a 2-ounce can of high grade rubber cement and a sheet of emery paper, put up in a neat metal box bearing full directions for use.

Rubber Seal outfit complete. Price each.....\$1.20

Two-ounce can of Rubber Seal cement only. Price each.....\$0.60

Price per dozen.....5.70



Valve Grinding Compound

Free from magnetic iron or injurious ingredients of any kind. Cuts quickly. Furnished in coarse, for roughing, and fine for giving a mirror-like surface.

1-pound can, coarse or fine. Price each.....\$1.00

Heal-O Puncture Cement

Made from a perfect formula for the production of a plugging cement.

An absolutely reliable preparation for sealing small punctures without the use of a plug or for holding plugs in place.

Prices

	Dozen	Each
3/4x4-inch tubes with needle point.....	\$ 1.60	\$0.20
1/4-pint can.....	5.40	.55
1/2-pint can.....	16.00	1.60
1-pint can.....	30.00	3.00



2 in 1 Tread Filler

A semi-liquid rubber compound for repairing small cuts in casings. It is a scientific combination of pure gum and rubber cement, so that in one operation results are obtained which ordinarily require the application of two materials.

On exposure to the air it dries very quickly, producing a tough but resilient plug, or patch, equal in strength to the tire itself.

Put up in 1x6-inch tubes with nozzle point.

Price per dozen.....\$5.70
Price each......60

Tire Fluid

Stops Leaks in Tires

It makes tires puncture proof. For small leaks it works like magic. Do not wait for a puncture. Insert the contents of one tube in each tire.

It will not crystallize, freeze nor decompose. It is suitable for use in all climates and renders the tire practically puncture proof.

Put up in 4-ounce collapsible tubes.

Price per dozen.....\$3.20
Price each......35



Bicycle Rim Cement For Wood and Metal Rims

	Dozen	Each
3/4x4-inch tubes.....	\$0.80	\$0.10
1x4-inch tubes.....	1.50	.15
2-ounce bottles.....	2.00	.20
1/4-pint cans.....	2.70	.30
1/2-pint cans.....	4.80	.50
1-pint cans.....	9.00	.90

Bicycle Rubber Cement

A highly efficient bicycle tire cement, which fully conforms to high standard of quality established for all Dutch brand products.

Prices

	Doz.	Each
3/4x4-in. tubes.....	\$0.80	\$0.10
1x4-in. tubes.....	1.50	.15
2-oz. bottle.....	2.00	.20
1/4-pt. cans.....	2.70	.30
1/2-pt. cans.....	4.80	.50
1-pt. cans.....	9.00	.90



H. Channon Company Chicago



Dutch Brand Varni-Brite

Cleans and polishes thoroughly and quickly—little rubbing necessary. It removes dirt and grease, mud spots and other stains. It gives the car new life, bringing out the original effect of the varnish; harmless to the most highly polished surfaces to which it may be applied.

1-pint cans. Price per dozen.....	\$ 7.00
Price each.....	.70
1-quart cans. Price per dozen.....	11.00
Price each.....	1.10
1-gallon cans. Price each.....	3.00



Dutch Brand Engine Paint

Protects engine and radiator against rust and keeps them looking neat and clean. Dries with a hard, smooth, waterproof finish. Will not crack or chip. Made in gloss black, dull black and gray.

1-pint cans. Price per dozen.....	\$13.90
Price each.....	1.30

Dutch Brand Carbo-Cide

An Excellent Compound for Cleaning Motorcycle and Automobile Engines

Clean machinery means smooth running, economy of fuel and increase of wearing power. An effective solvent for rapidly and thoroughly disintegrating and vaporizing carbon in oil and gas engine cylinders.

1-quart cans. Price per dozen.....	\$12.00
Price each.....	1.20



Dutch Brand Radiator Seal Compound

An instantaneous and permanent repair for leaky automobile radiators.

Any autoist can use it—no mechanic necessary.

Does not interfere with water circulation or cooling system.

Every autoist should always have a can for emergency use.

8-ounce cans. Price per dozen.....	\$6.00
Price each.....	.60



Dutch Brand Auto Coating

For giving worn and weather beaten auto and carriage tops a smooth black and elastic waterproof finish. Preserves leather or fabric, makes old tops look like new. Applied easily, dries quickly.

1-pint cans. Price per dozen.....	\$13.00
Price each.....	1.30
1-quart cans. Price per dozen.....	24.00
Price each.....	2.40



Dutch Brand Aluminum Paint

The best paint for automobile and motorcycle engines, radiators, mufflers, exhaust pipes and all other parts subjected to intense heat or water corrosion. Nothing better for protection against rust and for improving the appearance of metal objects of all descriptions. It produces a brilliant and lasting finish wherever used.

1-pint cans. Price per dozen.....	\$4.00
Price each.....	.40
1-quart cans. Price per dozen.....	7.50
Price each.....	.80



Hy-Pol Body Polish

Hy-Pol is a high grade piano and furniture polish and is absolutely non-injurious. It is composed largely of such oils as are employed in the manufacture of varnish, thus serving as a food to old finishes.

An ideal polish for pianos, furniture, auto bodies, floors, interior woodwork, bathtubs, leathers, etc., in fact for all varnished, waxed, enameled or japanned surfaces.

Dries quickly and leaves no greasy deposit.

5-gallon cans. Price each.....	\$5.30
1-gallon cans. Price each.....	5.50
1-quart cans. Price each.....	3.00
1-pint cans. Price each.....	2.00
12-ounce cans. Price each.....	1.00
5-ounce cans. Price each.....	.50

Semdac Liquid Gloss

Semdac liquid gloss is the most efficient dusting, cleaning and polishing agent. It cleans woodwork, auto bodies, metal and enamel surfaces better and quicker than soap and water. It softens and removes every trace of dirt and grime, leaving the surface treated clean, bright and with a lustrous polish. It cannot harm the finish, but can and does restore the original polish, making the object treated like new.

5-gallon cans. Price each.....	\$5.50
1-gallon cans. Price each.....	2.50
1-quart cans. Price each.....	1.50
1-pint cans. Price each.....	1.00
1/2-pint cans. Price each.....	.70
1/4-pint cans. Price each.....	.40

Mat's Body Polish

A scientific preparation especially adapted to preserve and protect the finish of the bodies of automobiles and highest grade furniture, from all climatic changes.

It is not only a real preservative but the best preparation to clean and polish all finished surfaces; it is also a leather dressing and preserver. It keeps leather soft, clean and prevents cracking. Renders it waterproof.

1-gallon cans. Price each.....	\$5.00
1/2-gallon cans. Price each.....	3.00
Quart cans. Price each.....	2.00
Pint cans. Price each.....	1.00
1/2-pint cans. Price each.....	.50
Sprayer, extra.....	.50



Misto Klean

The finest of cleansers.

It absorbs dust and dirt.

It feeds the varnish and

makes it lastingly lustrous.

A pint out of the sprayer

is enough for 25 touring

cars—and it will clean a

car in 15 minutes.

The whole outfit—ready

filled, and a Misto Kloth in

a sealed carton.

Misto Klean outfit with

Misto Kloth.....

\$2.50

Misto Klean, quart can,

for refilling.....

\$3.00



Misto Kloth

These soft, scratchless, ready-cut Kloths bring out the hidden lustre of the finest finish. They make the finest finish more lasting. They make cleaning and polishing easier, quicker.

Package of 12 pieces. Price per package.....

\$1.00



Channon's Neatsfoot Oil

For oiling, softening and preserving automobile clutches. Keeps clutches soft and pliable, prevents slipping and possible accidents. Keeps clutches in a safety first condition. Also fine for preserving leather, harness, straps and cushions and all leather articles.

1-pint cans. Price each.....\$0.70

Channon Signal Oil

Especially prepared for auto side and tail lamps. Will not blow or jar out easily. More economical to use than kerosene oil. Safe and reliable. Gives a bright and penetrating light. Used by the railroads for switch and signal lights.

1-quart cans. Price each.....\$0.70



Channon Spring Leaf Lubricant

Composed of finely powdered graphite, ground mica and a special lubricant that sticks to the leaves of the springs while under pressure. Does not squeeze out. Made on the same principle as the "Spring Insert" lubricant, but not so hard, making it easy to use.

4-ounce tin box. Price each.....\$0.80

Channon Valve Grinding Compound

Ready for use as it comes in the box. This is a fast cutting compound and will give first class results if used as directed. Leaves no marks or rings on the valve seats. Put up in duplex cans. Medium and fine.

4-oz. can. Price net.....\$0.60



Channon Carbon Remover



Positively harmless, no matter how often used; attacks nothing but carbon and baked grease; cleans cylinders, piston rods, spark plugs and valves; no heat no burn cylinders; cheaper than burning with oxygen; gives immediate increase in power and speed—never fails.

1-quart cans. Price each.....\$2.00

1-pint cans. Price each.....1.00

Dustless Auto Duster

Made of chemically treated yarn, strongly twisted in between two galvanized wires of great strength, and mounted in a substantial handle enameled black. Instead of spreading the dust this dustless duster gathers and holds it. Can be washed without injury. Duster part 10 inches long, width, 8 inches; length overall, 16 inches.

Price each.....\$1.50



Flash Hand Cleaner



For removing dirt, grease, oil, paint, ink and stains of all kinds from the hands.

Cleans better and quicker than soap and leaves the skin absolutely clean and free from injurious and unhealthy matter.

Paste form, in tin cans weighing one pound.

Cases, 3 dozen cans, each full 18 ounces. Per case.....\$5.50

Cases, 1 dozen cans, each full 16 ounces. Per case.....2.00

Single cans, full 16 ounces per case. Price each......20

In ordering single cans send postage for mailing via parcel post.

Blue Ribbon Metal Polish

It requires no shaking, always remaining in suspension. Is sufficiently thick to prevent waste.

Used on all parts made of copper, brass, etc.

	Dozen	Each
1-gallon cans.....	\$24.00	\$3.00
1/2-gallon cans.....	13.00	1.50
1-quart cans.....	9.00	1.30
1-pint cans.....	5.00	.70
1/2-pint cans.....	3.00	.50



Puritan Metal Polish



Gives a brilliant and lasting lustre with minimum rubbing. It cleans by solution, or decolorization and not by friction. Contains no grease or acid. Best for use on automobiles and by housewives.

1-gallon can.....\$1.00 1-pint can.....\$0.30

1/2-gallon can......75 1/2-pint can......20

1-quart can......50 1/4-pint can......10

Puritan Oil Soap

A pure neutral oil soap for washing automobile bodies, gears, etc. It contains no adulterants.

	Dozen	Each
5-pound pails.....	\$12.00	\$1.50
10-pound pails.....	24.00	3.00
25-pound pails.....	6.50	



C. E. Z. Celluloid Cleaner



The only preparation which will effectively remove dirt scratches or discolorations without injury to the celluloid. Also a preservative. Consistent use will prevent the celluloid from cracking, frosting or aging.

It also cleans glass.

Price per can.....\$1.00

Adelite Motor Carbon Remover

Insures absolutely free, clean cylinders. Reduces consumption of gas and oil. Gives maximum power and speed with least fuel. It makes your car run quiet and steady, gives your engine new life and enables it to climb hills.

1-quart cans. Price each.....\$3.00

1-pint cans. Price each.....1.60

Tite-It Tire Preservative



Adds life and beauty to a tire besides giving it greater strength. Contains no oil, benzene, turpentine or any product injurious to tires. Easily applied with brush, dries quickly and will not peel, blister or rub off.

1-gallon	\$7.00
1/2-gallon	3.60
1/4-gallon	1.90
1/8-gallon	1.00

Automobile Colored Varnish



Boughton automobile colored varnish is made of the best colors procurable and best wearing automobile varnish combined. It will resist the action of oils and water, and a good washing with soap and water and the stiff stream from the hose will not dull its lustre. It is exceptionally hard and shows no spots or streaks and will not fade. Applied very easily. Used for automobile and carriage bodies, bicycles, wagons, motorcycles, etc. Made of exclusive grays, lavenders, greens, reds, blues, yellows, browns, maroons, etc. Write for color card.

1-gallon cans. Price each	\$8.00
1/2-gallon cans. Price each	4.10
Quart cans. Price each	2.20
Pint cans. Price each	1.20
Permanent red, per gallon additional .....	.80

Boughton Fender Enamel

Boughton fender enamel for automobiles has a high glossy finish, dries hard and is absolutely waterproof. If properly applied will not crack or peel. Write for color card.

1-gallon cans. Price each	\$4.70
1/2-gallon cans. Price each	2.40
Quarts. Price each	1.30
Pints. Price each .....	.70

Boughton Auto-Top Reviver

Boughton auto top reviver will waterproof and preserve auto tops, sides, curtains and cushions. It leaves the fabric, canvas or leather very soft and pliable, besides giving it a new appearance.

1-gallon cans. Price each	\$4.50
1/2-gallon cans. Price each	2.50
Quarts. Price each	1.30
Pints. Price each .....	.70

Channon's Mohair Top Dye and Waterproofer



For dressing mohair tops, top linings and curtains. Renews and waterproofs in one application. Guaranteed not to stiffen mohair. The old style leather dressings on mohair stiffens the fabric, causing it to crack and break. One application will make top look like new. Can also be used on leather and pantsote. Guaranteed to be indelible. Easy to apply, dries in ten minutes.

Pint cans. Price each	\$1.50
Quart cans. Price each	2.80

Channon Automobile Engine Starter

Volatilizes in coldest weather and starts the balkiest engine easily. Guaranteed free from all harmful substances. Just pour a few drops through pet cock and turn engine over. It starts at once.

Pint cans. Price each	\$1.20
Quart cans. Price each	2.00



Channon Engine Enamel



This is an enamel that sticks and stands the heat on auto cylinders, engines, etc. Strictly heat-proof. For refinishing motors, exhaust pipes, nipples, etc. Will not check or peel off. Dries quick in a lustrous finish and makes motors look like new. Prevents rust and scale. Makes it easy to keep motor clean and neat appearing. Furnished in glossy black or gray.

1/2-pint cans. Price each	\$0.80
1-pint cans. Price each	1.50
1-quart cans. Price each	2.80

Channon Brass and Copper Lacquer

After brass and copper surfaces are polished they will quickly re-tarnish unless protected with a good brass and copper lacquer. This is colorless and transparent. Dries in ten minutes. Can be removed at any time with denatured or wood alcohol. Put up in glass containers.

4-ounce container. Price each	\$1.30
1/2-pint container. Price each	2.00
1-pint container. Price each	3.50



Channon Aluminum Enamel



Produces a real silvery aluminum gloss which protects the surface and prevents rust. Makes motor look like new. Guaranteed to be heat-proof and wear well and give entire satisfaction.

1/2-pint can. Price each	\$1.00
1-pint can. Price each	1.80

Channon Gasket Shellac

Made from selected Calcutta orange shellac. Extra quick drying—free from resin and all adulterants. 100 per cent pure. For shellacking gaskets, connections and joints, coating carburetor floats. Positively impervious to gas, oil, water and grease, etc. Prepared especially for the automobile trade and is 100 per cent pure.

1/2-pint cans. Price each	\$0.60
1-pint cans. Price each	1.00
1-quart cans. Price each	1.80
1-gallon can. Price each	6.00



Channon Radiator Cement



When radiators spring a leak it is not always convenient to take them to a radiator repair man to have them re-soldered. This cement is perfect. Does the work and guaranteed not to clog the circulating system or seal anything but the leak.

1/2-pint cans. (trial size). Price each ..	\$0.25
1/2-pint cans. Price each .....	.50

Channon Castor Oil Compound

Pure castor oil is not adapted for motor car lubrication because of its heaviness and peculiar adhesive properties, but when combined in the correct proportions with other oils it makes one of the best auto lubricants. Castor Motor Oil gives great compression and positive lubrication at all speeds and temperatures. Having no close affinity for gasoline, it does not soon burn up and carbonize. One pint treats 5 gallons oil.

1-pint cans. Price each	\$1.50
-------------------------------	--------

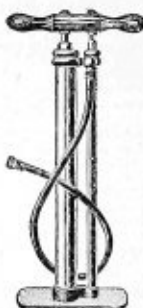


Bullock Tire Pumps



Single Cylinder Tire Pump

This is one of the most powerful single cylinder pumps manufactured. It will force air against a higher pressure than most pumps of its type. This power is secured by the use of an injector cylinder of special design, equipped with two plungers. An ideal pump for 3-inch tires. Length over all, 25 inches. Connection, 20-inch 3-ply hose and auto nipple. Weight 4½ lbs. Price each.....\$2.00



Two Cylinder Tire Pump

A special pump of stocky design that will pump air almost twice as fast as a one-cylinder pump with the same effort. Workmanship, material and design are of the highest quality. Length over all 20 inches. Connection 24-inch 5-ply rubber tubing and auto nipple. Weight 6 pounds. Price each.....\$2.75

Three Cylinder Tire Pump

This pump will inflate tires in 30 seconds. Works easily against full tire pressure. The air flows into the tire in a constant stream with infinitely less effort than almost any other pump on the market. Length over all 22 inches. Connection—30-inch 5-ply rubber hose and a special quick operating auto nipple. Weight 8 pounds. Price each.....\$6.00



Bell Plunger Tire Pumps



Single Cylinder

This long, single cylinder pump is sure to give satisfaction wherever placed. It is a well known fact among garage men and mechanics that a single action pump is the most practical kind when it has a perfect plunger. The Bell plunger is mechanically perfect, and never fails to give the maximum of service at all times. Has 22 in., 20 gauge cylinder, brass top, heavy cast base with folding stirrup, 2 feet of 5-ply hose with nipple. Black enamel finish. Price.....\$3.75

Single Cylinder, Jr.

This pump is a duplicate of the Bell Pump, but is made shorter for convenience in putting into tool box. It is designed for emergency work, and the quality of its material insures long and satisfactory service. The advanced principles in plunger construction used on this pump are unexcelled.

18 in. 1¼ in. by 20 gauge cylinders. Brass cast top and base, Bell expanding plunger, 18 in. 3-ply hose and nipple. Finished in black enamel.

Price.....\$2.50

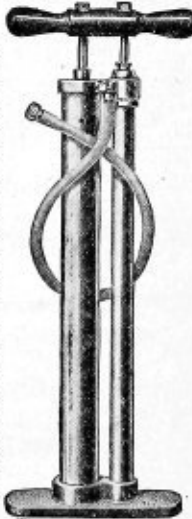


Double Cylinder

This compound cylinder model is one of the most substantially built pumps made. Being supplied with the Bell Expanding Plunger, it will outwear the best. Produces nearly twice the pressure of a single cylinder pump with the same amount of effort.

20 in. high, with 2 cylinders 1½ in. and ¾ in. by 18 in. long. Heavy cast top and base. 18 in., 3-ply hose and nipple. Finished in black enamel.

Price.....\$3.00



Pitner Pumps

Single Action

The only means of inflating tires that is dependable at all times and at all places. Every other method has its weakness. Examine the features of this pump and try to find one. The handle is a piece of hard wood, driven into a solid brass collar, then the piston is screwed through both of them—the strongest possible construction. Tempered tool steel bearing in the cap around the piston rod—an exclusive feature that compels piston to run square with barrel, working easily, always air tight. The leather piston rings fit into a groove around the piston instead of the old-fashioned cup washers. The air cushion formed after the piston passes the outlet holes insures an easy finish to the stroke and prevents jars. The oil retaining pad at bottom of barrel keeps oil from rotting hose or tires. Length 22 inches.



Price each.....

\$4.50

Double Action

To those who prefer a more powerful pump, that will inflate a tire more quickly than a single action pump, we recommend the double action pump. No other hand tire pump will produce a volume of air equal to that delivered by the Pitner Double Action Pump. You will be astonished by the ease with which high pressure can be reached with this pump, without the straining and jerking common to most compound pumps. That's because its construction is mechanically correct—it is different from all other pumps. It throws air on both up and down strokes, making a continuous stream. Finished the same as the single action pump and containing all the same improved features. Length over all, 22 inches. Stroke 18 inches.

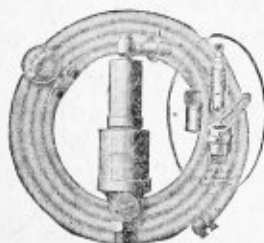


Price each.....

\$5.00

Automobile Tire Pumps

Mayo Spark Plug Pump

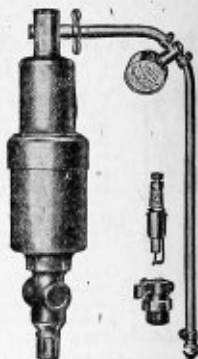


A thoroughly reliable pumping plant which can be instantly attached to all four-cycle motors of two, four, six, or eight cylinders and will inflate the tire with fresh, pure air in from two to four minutes, depending upon size of tire and pressure. Guaranteed pressure obtainable of 100 pounds and over. Can be attached to any car in an instant and the cost of the pump is the last cost; there are no further supplies to be bought. It is small, compact and light, weighs but 2 1/2 pounds and can be carried anywhere. Noiseless in operation, non-adjustable, requires no attention whatever. Outfit consists of pump with adapter to fit any car, 12 feet of hose with connections and guaranteed accurate pressure gauge installed in the hose, everything ready for use. Price complete.....\$16.70

Price each.....\$21.00

Brown Impulse Tire Spark Plug Pump

This pump works on the compound principle, inflating the tire with absolutely pure, cool air. The action which prevents the taking in of gases is due to the breaking up of the vacuum of the motor by the special breather valve. This has a tension of 3 ounces, the ordinary motor having about 5 feet of vacuum. The atmospheric pressure of 15 pounds per square inch immediately overcomes the vacuum and the pure air rushing into the cylinder takes the place of the gasoline vapor. It requires but half a minute to attach the Brown Air Pump to the engine. Suitable for any four-cycle engine. Furnished complete with pump, gauge, hose and connections. Price each.....\$21.00



Brown Q. D. Spark Plug

This spark plug is made especially for use with the Brown Tire Spark Plug Pump. Can be instantly removed and inserted. Makes a fine priming spark plug. When ordering state size wanted. Price each.....\$2.00

Brown Jr. Impulse Tire Pump

This pump operates exactly on the same principle as the Brown Pump described above, in fact is identical in every respect, except in size and length of hose; and does not have an air gauge. Specially adapted for use on small cars, such as the Ford, Saxon, Metz, etc. Price complete.....\$9.90

Mayo Ford Pump



A diminutive Mayo Spark Plug Pump built especially for the Ford car. A real power tire pump which inflates tires with pure, fresh air; 32x3 size to 65 pounds pressure in 2 minutes; 32x3 1/2 size to 70 pounds in 3 minutes. Attached and used exactly like the standard Mayo Spark plug Pump. No wearing parts to break or get out of order. Fitted with 1/2-inch connection, 10 feet of good hose, accurate gauge and connections. Price complete.....\$12.50

Price complete.....\$12.50

Stewart One Cylinder Air Pump

Furnished Complete with Gears and Brackets for Any Make of Car

This pump is mounted right on the motor and operated by moving one lever. It is light in weight, the base being made of aluminum. The bore is 1 1/4 inches; stroke 2 1/2 inches; length of piston 1 1/4 inches, making an extra long bearing. Crank shaft is hardened and runs in hardened steel, not bronze bearings. It is fitted with oil conductors but requires no surplus oil in the crank case. The piston is lubricated by means of a wick or wiper system, the oil being applied from the outside of the pump. The bottom of the crank case is open so that in case there should be the least amount of free oil it will immediately drop out. Note will be carried up with the air into the tires. The cylinder is not a casting, but a machined job and is constructed with lines to insure plenty of cooling surface. The air is protected with a double ball valve, so that in the event that dirt should hold one of the valves open the other valve would be sure to act and in this way cause no loss of air. With the pump is furnished a gear shift, all necessary gearing and brackets for attaching to any make of car, 13 feet of hose, a tire gauge and connections. Dimensions: Length 6 inches; height 6 1/4 inches; width 4 inches. Weight 5 1/2 pounds. When ordering state the make, model and year of manufacture of car for which pump is desired, so that the proper gearing may be furnished. Price complete as described above.....\$12.00

Price complete as described above.....\$12.00

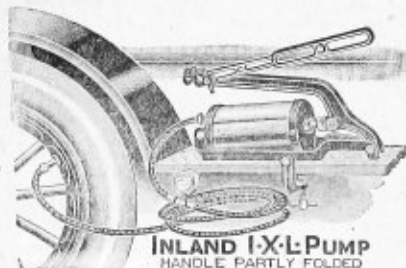


Inland Lever Auto Pumps

The Inland is strong, durable and efficient. Constructed of the best grade materials throughout, it will withstand any strain or rough usage and will last a life time. It is the only pump made with folding handle and clamp. Simplicity itself, the pump has screw locked cylinder cap, which can be instantly removed, if necessary, by making half a turn to clean the piston.

The cylinder, size 3 by 6 1/4 inches, is brass. Piston stroke 5 1/4 inches. Frame and handle made of malleable iron, which cannot snap off. Thumb screws are made of steel as well as all bearings.

To operate, attach hose to pump valve with the gauge right before you, enabling you to know the exact tire pressure. Throw the weight of your body on the handle with extended arm, and in this manner even a frail person or child can easily inflate a tire to ninety pounds pressure. This will mean increased mileage for the tires, and money saved. Carry an "Inland Lever Pump" with you and occasionally register the air pressure. It will do this so quickly and easily that the cost of the pump becomes a mere fraction of the money you save. Fold up compactly to go in tool box. Eight feet of heavy Mercuro hose furnished with pump. Price with gauge.....\$6.00 Price without gauge.....\$5.00



INLAND I-X-L PUMP
HANDLE PARTLY FOLDED

Automobile Accessories

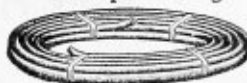
Twitchell Tire Gauge



Also known as the pencil gauge, as it is very small in thickness. It can be used when the wheel is in any position. It is provided with a new positive lock stop and stays up so that the pressure may be read after gauge has been taken off the valve. The Twitchell Gauge will indicate the true pressure or none. Sent postpaid anywhere.

Price each \$2.00

Pump Tubing



First quality rubber and fabric construction pump tubing, furnished in the sizes priced below.

Price per ft., $\frac{1}{2}$ -in. \$0.20

Price per ft. $\frac{1}{4}$ -in. .24

Hose Bands



To fit small pump hose.

Made of all brass.

Price per doz., $\frac{3}{4}$ in. \$0.60

Price per doz., $\frac{1}{2}$ in. .66

Price per doz., $\frac{1}{4}$ in. .70

Combination Tire Tester and Shut-Off Connection



This gauge is designed for use in connection with a storage tank. Attach to end of air hose. To obtain correct reading close shut-off cock thereby shutting off air supply. Gauge will then show pressure in tire.

Price each \$3.00



Schraeder Valve Parts

Too well known to require description.

Price Each

Complete \$0.80

Cap10

Cap washer02

Inside, complete .08

Dust cap18

Pump Gauge



Attaches to pump usually at the bottom for permanent use. Dial is $1\frac{1}{2}$ inch diameter, registers to 150 lbs. Back or bottom connection furnished; $\frac{1}{2}$ -in.

I. P. Thru. Nickel plated.

Weight 6 ounces.

Price each \$1.75

Power Pump Gauge

For power and spark plug pumps. To attach, cut hose and insert gauge about 18 in. from tire valve connection. Hose should have a connection like our No.

46. Weight 6 ounces.

Price each \$1.75



Combination Tire Tester and Pump Gauge

To use as a tire tester, simply press gauge down over tire valve and pressure will be indicated. To use as a tire gauge simply unscrew the little cap off the extending arm and attach hose connection. This is a very accurate and sensitive gauge, well made throughout. Highly nickel plated finish. Dial $1\frac{1}{2}$ inches in diameter. Weight 8 ounces.

Price each \$2.50



A heavy substantial screw connection with fibre washer which cannot be lost or blown out, but can be replaced when worn out. For $\frac{1}{4}$ -inch air pump tubing

Price each \$0.15

Romort Automatic Air Valves

Style A

The Romort valve, style "A", is the most



popular valve in use for heavy work. It is made to fit any size tubing. It is practically indestructible, being made of solid bronze. Positively air tight. Instantaneous in opening and closing. All parts (with exception of rubber gasket) guaranteed to wear one year.

Weight, 9 ounces.

Price each \$3.00

Style B



This is a high grade valve constructed to meet the popular demand for a light and inexpensive automatic air device. Solid bronze, one piece casting, universal stem will fit any size tubing. Automatic opening and closing. Suitable for public service stations, repair shops, etc.

Weight 5 ounces.

Price each \$1.00

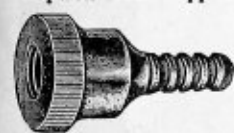
Romort Angle Pump Connection Not Automatic



Solid bronze casting made for direct connected air compressors of all types power, tire and spark plug pumps attached to automobiles. Stem fits tubing from $\frac{1}{4}$ to $\frac{3}{4}$ of an inch.

Price each \$0.40

Gripwell Hose Nipple



A perfect slip-on connection that stays on. When applied to tire valve, a quarter turn locks it on valve and it will not pull off until intentionally released. Made extra heavy of all brass.

Price each \$0.50

Straight Pump Connection



One piece casting of solid bronze. For use on direct connected air pumps, hand and foot pumps. Fits tubing from $\frac{1}{4}$ to $\frac{3}{4}$ of an inch. Rubber washer.

Price each \$0.25



Invincible Tire Tester

The Invincible Tire Pressure Tester is the only one made that shows the pressure that should be maintained in tires of various sizes. The dial is engraved for that purpose. Made on the principle of a steam gauge with a seamless bourdon brass tube. Shaped like a watch to fit your vest pocket.

Price each \$2.50

Channon Samson Spark Plugs

A real spark plug that sparks always and never fails. Made with real stone tops—not porcelain—and practically unbreakable.

Has double gap always insuring a stream of fire that is more than a spark.

Guaranteed forever against imperfections in manufacture.

Made in all sizes and for all makes of cars. Equal to any plug on the market, regardless of price.

Equip your car with Channon Samson, everlasting, sure shot spark plugs, and avoid sparking troubles.

Price each \$1.00



Overland 1/2-inch Standard



3/8-inch Standard Buick

Golden Giant Spark Plugs The Gold Plated Plug

There's 14 years' experience behind this great plug—that's why it's the leader of them all!

Features of the Golden Giant are as follows:

1. **Blue Adamant.** This is the name of the insulator; it is a name that means strength to the very last. The blue adamant won't break—it won't be affected by heat, and it'll last forever.
2. **Special Copper Asbestos Gaskets** that hold the heaviest compression, never leaking.
3. **Pure Nickel Electrodes** that will never burn, corrode or warp.
4. **A Life Time Guarantee** that goes with every plug we sell.

Because the Golden Giant is made so good, we gold plate every one, thereby distinguishing it from the ordinary spark plug.

Every plug packed in a handsome, individual metal container.

Price..... \$1.00

Sizes: 1/2-inch—Metric—3/8-inch x 18.

Special sizes for Overland and Buick motors.

Regular 3/8-inch plug adaptable for Ford motors.



Champion X Spark Plugs Special 3/8-inch

The Champion X is a special Ford plug with gun metal finish. Adopted as standard factory equipment on the Ford car since 1911.

Price each..... \$0.75

Regular 1/2-inch, 3/8-inch, and metric.

Price each..... \$1.00

The Herz Plug

The insulator is of blue enamel stone in two parts. The inner is tapered and ground, gas-tight, into the steel fitting. No packing is used. The inner stone slightly tapers toward the electrode, forming an explosion chamber behind the electrode. The soot is blown out by each explosion, making it self-cleaning.



Bougie Mercedes



Ford Pro-Mo-Tor

Bougie Mercedes. Each..... \$1.50

Ford Pro-Mo-Tor. Each..... 1.25

Rex Spark Plugs

The insulating cores are of the best imported materials and are absolutely guaranteed under all conditions of gasoline engine service. The electrodes are of imported meter wire on which heat has no effect and are guaranteed against fusing and corroding.

An absolutely gas tight joint is guaranteed.

Owing to large air chamber, sooting or fouling is impossible.

Can be furnished in 1/2-inch Standard, 1/2-inch Ford, 3/8-inch, 18, etc.

Price 1/2-inch Ford..... \$1.00

All other sizes..... 1.25



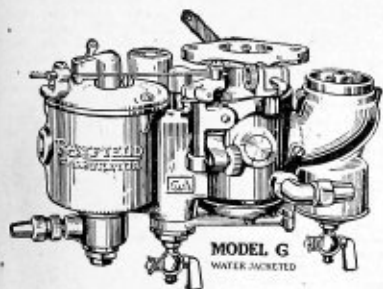
3/8-18 A.S.M.E.



1/2-inch Ford

Rayfield Carburetors

The best carburetor on the market. All workmanship and material of the highest class. Two simple adjustments, one for low, and one for high speed, control the supply of gasoline. Model "G" has three air intakes—the constant, or fixed air opening, and two automatically controlled air valves. These are interconnected, and operate together in harmony with the motor suction. Fuel is supplied through two nozzles. Designed to meet the requirements of low quality gasoline now sold. It makes easier starting, a lower throttled motor, a faster getaway, more speed, greater power on the hills, more flexible motor, and saves from ten to fifty per cent fuel. Easily adjusted to any car.



Model	Size, Inches	Price	Model	Size, Inches	Price
G-2 and GL-2	1	\$50.00	AA-5	1 1/4	\$80.00
G-3 and GL-3	1 1/4	60.00	AA-6	2	90.00
G-4 and GL-4	1 1/2	70.00	L-2 and LL-2	1	40.00
G-5	1 3/4	80.00	L-3 and LL-3	1 1/4	45.00
G-6	2	90.00	L-4	1 1/2	50.00
A-2	1 1/4	50.00	B-2	1	40.00
A-3	1 1/2	60.00	B-3	1 1/4	45.00
A-4	1 3/4	70.00	B-4	1 1/2	50.00
AA-3 Double Jet	1 1/2	65.00	BB-3 Double Jet	1 1/4	50.00
AA-4	1 3/4	75.00	BB-4 Double Jet	1 1/2	55.00

Sunderman Vacuum Carburetor

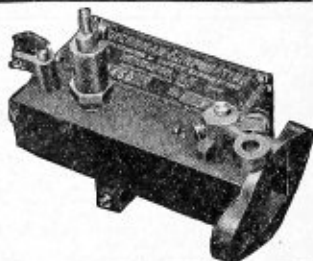
A highly efficient low priced, carburetor of universal application designed to take care of the low quality of gasoline now used. The vacuum principle of carburetion is scientifically correct.

The Sunderman carburetor produces a pure, dry gas, leaving no carbon deposit, eliminating valve grinding and the fouling of spark plugs. It gives a uniform mixture and unvarying results.

Has no wearing parts. Simple in construction—20 parts, as against 100 to 150 parts in other carburetors.

Price, for Ford cars.....\$5.00

Price, for other cars.....6.50



Farmer Mixing Valve

For stationary and portable gasoline farm engines—bit and miss type. The valve body is made of bronze, the disc or poppet valve of a special composition to prevent breakage.

The illustration shows right hand valve. Left hand valve is furnished at same price.

All valves are furnished with 1/4-inch female pipe at "D" unless otherwise order.

Size, inches.....	3/4	1	1 1/4	1 1/2	2
Price each.....	\$2.00	\$3.00	\$3.80	\$4.50	\$5.70

Straight Mixing Valve

These mixing valves are preferable to carburetors, being more reliable in every way. They overcome objectionable features found in other makes and are provided with a large opening through port. There is ample area on valve seat to prevent flooding of gasoline when starting engine, gasoline valve being provided with an index lever. The wheel can be marked when proper adjustment is obtained.

Size, inches.....	3/4	1	1 1/4	1 1/2	2
Price each.....	\$2.86	\$3.62	\$4.40	\$5.24	\$6.60



Pet Shock Absorbers

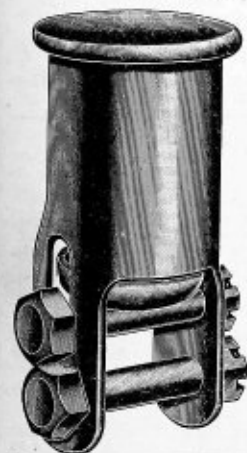
For Ford Cars

Designed especially for the Ford car—time tested and efficient.

It is extremely simple—a slotted spring cage with two bolts, displacing the Ford shackle bolts, makes the attachment. Inside the spring cage is a sturdy helical spring of finely tempered steel carrying the weight of the car, cushioning, and smoothing out every irregularity of the road. Inside the big spring is a smaller compensating spring—wound in the opposite direction and assisting the main spring.

When the Ford receives a severe jolt, the rebound is checked by a spur so designed that it brings the entire capacity of both springs into action, absorbing the rebound and giving the occupants of the car practically a floating sensation. All working parts are of heat treated steel made to stand abuse.

Per set, rear only.....\$10.00



C. C. Shock Absorbers

Cut Down Your Tire Expense

By equipping your car with a set of C. C. shock absorbers you effect an immediate saving in tire expense; you can keep your tires inflated to standard pressure—keep them always on the road, not bouncing up and down, wearing and tearing. A motor pulls stronger with well rounded tires, but the car owner invariably cuts down the pressure to add to his comfort, increasing his tire expense and strain on the motor. In addition to this, your car is freed from the continual rattle and strain on all parts.

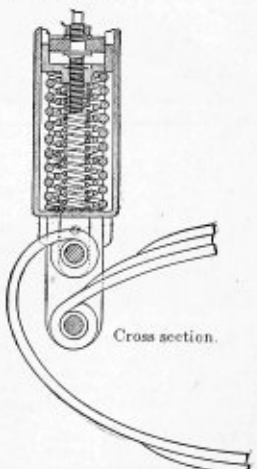
For Ford cars:

Price per set of two.....\$4.50

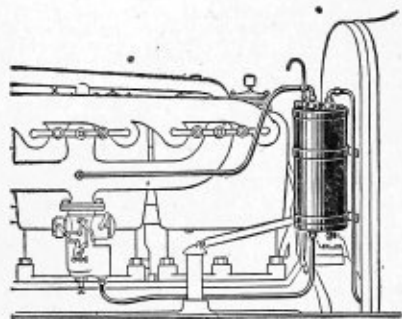
Price per set of four.....8.00

For other cars:

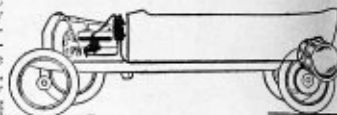
Price per set of two.....\$10.00



Stewart Vacuum Gasoline System



The Stewart Vacuum gasoline system consists of a small tank, 4 1/2 inches high; installed under the hood on the dash or motor and connected to the manifold, carburetor and gasoline reservoir supply. The suction of the motor through the manifold draws the gasoline from the rear reservoir to the small tank under the hood, from which the gasoline falls in a positive, even flow to the carburetor. No preliminary hand-pumping air into gasoline tank before starting car. No depending upon a motor-driven air pump to keep up the pressure after starting. No air gauge to watch; no air lines to keep tight; no air tight connections necessary anywhere. Supplies gasoline to the carburetor unaidingly, under all conditions, even on the steepest grades, because of its being located so close to and above carburetor. Actually saves 10 to 15 per cent gasoline. Requires absolutely no attention after being installed. The Stewart Vacuum gasoline system can be installed on your present car, whether new or old, by any garage man. When ordering always state make, model and year of car.



Showing the System Installed

Price complete.....\$10.00

Monarch Timer for Ford Cars

This is the only guaranteed timer manufactured today. The big point of superiority in the 1916 timer is in the construction of the interior. The old pivoted style has been discontinued as it will skip on uneven contacts, forming waves. Our new patented interior makes a direct drive against the contacts, giving a positive contact. The Monarch interior takes up any unevenness, passes smoothly over all contacts, and gets the greatest power out of your motor. Wearing parts are made of extra fine materials and the greatest care is used throughout.

Extra interiors can be furnished if necessary.

List price.....\$1.25



L & L Grease Retainer

For Ford Cars

This device is one of the most important and essential that has been invented for automobile improvement—it prevents accidents. It keeps grease from the brake shoes and drum. It prevents grease from splashing tires, which causes costly deterioration. It gives assurance that the



differential case is full of grease, relieving the constant fear that gears may go dry. It prevents grease from running down through the brake drums and splashing over the body giving a dirty and untidy appearance to the whole car.

It will never need to be replaced—will outlive the car. Can be easily and quickly installed.

For medium grease use one pair, one on either side of the car. For light grease use two pairs, two on each side of the car.

Price per pair.....\$1.60

Running Board Steel Mat



The spring attachments are so arranged that by lifting off the ends of the springs the mat can be rolled over and the running board thoroughly cleaned and dried. This insures the running board underneath from becoming smeared, discolored or rotted, as is so liable in using cocoan and other stiff mats.

Don't soil the rug and robes inside your car.

Use an Acme running board steel mat, clean and sanitary.

Two sizes:

No. A. 7 1/2 x 9 1/2 inches.....\$1.00

No. B. 8 1/2 x 14 1/2 inches.....1.35

Heissler Starting and Lighting Batteries

For Gasoline Cars

"A battery with the troubles left in the factory." These batteries have a much greater capacity than that of ordinary makes, and a very liberal acid space in conjunction with an excellent splash chamber which positively prevents slopping and leaking of electrolyte.

Plates are an improved type, and have proven superior to anything that has been offered for starting and lighting purposes. Buckling, abnormal sulphating and the shedding of active material have been entirely eliminated.

All connections lead burned and the elements carefully locked in high grade rubber jars. These are completely surrounded with a cushion of resilient and acid resisting sealing compound. The outside container is constructed of an especially prepared and treated wood. All materials used in the construction of these batteries are of the highest grade obtainable on the American market.



Name	Year	Model	Type	Price	Name	Year	Model	Type	Price
Abbott-Detroit	1913-14-15	All models	6-H19-B	\$ 44.00	King	1915	All models	6-TL13-B	\$38.50
Apperson	1913-14-15	All models	6-K11-B	38.50	Kissel	1913-14-15	6-48	6-L19-B	44.00
Auburn	1913	All models	30-A5-B	118.80	Kissel	1913	All models except 6-48	12-H11-X	52.80
Auburn	1914	All models	6-L19-B	44.00	Kissel	1914-15	6-60	6-L19-B	44.00
Auburn	1915	4-40 and 6-47	6-L19-B	44.00	Kissel	1915	6-42	6-L15-B	35.20
Auburn	1915	4-36 and 6-40	6-L13-B	31.90	Krit.	1913-14	All models	6-H13-B	31.90
Buick	1914	B-24-25-36-37	6-A13-C	49.50	Krit.	1915	M. & O.	12-H7-B	44.00
Buick	1915	C-24-25	6-A13-C	49.50	Locomobile	1914-15	All models	6-H19-B	44.00
Buick	1915	C-36-37	6-L13-B	31.90	Logier	1913-14	82 and 84	6-TL13-B	38.50
Buick	1915	C-54-55	6-L13-B	31.90	Marmen	1913	All models	16-L9-B	77.00
Cadillac	1912	All models	24-H5-XD	82.50	Marmen	1914	Model 48	16-L9-B	77.00
Cadillac	1913	All models	6-A13-ZD	49.50	Marmen	1914	Model 41	12-L9-B	48.40
Cadillac	1914	All models	6-A13-C	55.00	Marmen	1915	All models	12-L9-B	48.40
Case	1913-14	Model 0	6-H13-B	31.90	Maxwell	1915	All models	12-H7-B	44.00
Case	1914	Model 25	6-H13-B	31.90	Mercer	1913-14	Touring car	6-L19-B	44.00
Case	1914	Model 35	6-H15-B	35.20	Mercer	1913-14	Roadster	6-H19-B	44.00
Case	1915	Model 25	6-H13-B	31.90	Meta	1914	All models	24-L5-B	74.80
Chandler	1914	All models	6-H13-B	31.90	Mitchell	1913	All models	6-L19-B	44.00
Chandler	1915	All models	6-H13-B	31.90	Mitchell	1914	All models	6-L19-B	44.00
Chalmers	1914-15	All models except No. 2	18-A5-B	72.00	Mitchell	1915	5-35	12-L9-B	48.40
Chalmers	1915	Model 32	6-TL13-B	38.50	Mitchell	1915	6-45	12-K9-B	55.00
Chevrolet	1914-15	Model L	6-L15-B	35.20	Moline Dread-	1913-14-15		6-L15-B	35.20
Chevrolet	1914-15	Model C	6-H19-B	44.00	nought	1914-15		12-L11-B	52.80
Chevrolet	1914-15	Model H-2 and H-4	6-L13-B	31.90	Moon	1913	All models	12-L9-B	48.40
Cole	1913	All models	24-H5-XD	82.50	Moon	1914	All models	6-A15-C	55.00
Cole	1914	All models	6-H19-C	44.00	Moon	1915	4-38 and 4-60	6-L13-B	31.90
Fiat	1914-15		6-H19-B	44.00	Moon	1915	6-50	6-A15-C	55.00
Franklin	1914	All models	18-H7-C	88.00	Oakland	1913	4-35	6-L13-B	31.90
Franklin	1915	All models	12-H11-B	52.80	Oakland	1913	4-42 and 6-60	24-H5-XD	74.80
Haynes	1913	All models	12-H15-C	81.40	Oakland	1914	4-36 and 4-43	6-L13-B	31.90
Haynes	1914	All models	12-L11-B	52.80	Oakland	1914	6-48 and 6-62	6-A13-Z	49.50
Haynes	1915	Model 31-32	12-L11-B	52.80	Oakland	1915	4-37 and 6-49	6-L13-B	31.90
Haynes	1915	Model 30	6-H15-B	35.20	Oldsmobile	1913	All models	24-H5-XD	74.80
Hudson	1913	All models	24-H5-XD	74.80	Oldsmobile	1914	All models	6-A13-Z	49.50
Hudson	1914	Model 54	6-H19-C	44.00	Overland	1913	All models	24-A5-B	74.80
Hudson	1914	Model 6-40	6-L13-B	31.90	Overland	1914	All models	6-TL13-B	38.50
Hudson	1915	Model 6-40	6-L13-B	31.90	Overland	1915	All models	6-TL13-C	38.50
Hudson	1915	Model 54	6-H19-C	44.00	Packard	1913-14	All models	6-K15-D	53.90
Hupmobile	1914	All models	6-L15-B	35.20	Packard	1915	All models	6-L19-B	44.00
Hupmobile	1915	H	6-L15-B	35.20	Paige-Detroit	1913	Model 36	6-K11-B	41.80
Hupmobile	1915	K	12-L9-B	48.40	Paige-Detroit	1913	Model 25	12-L7-B	44.00
Imperial	1914	Model 47	16-L7-B	63.89	Paige-Detroit	1914	Model 36	6-K11-B	41.80
Imperial	1915	Model 64	6-TL13-B	38.50	Paige-Detroit	1914	Model 25	12-L7-B	44.00
Jeffery	1914	"Four" cross country	24-A5-B	96.80	Pathfinder	1913	All models	6-K11-B	41.80
Jeffery	1915	Chesterfield six	6-L15-B	35.20	Pathfinder	1914	4 cyl.	6-K11-B	41.80
Keeton	1914	All models	6-L13-B	31.90	Pathfinder	1914	6 cyl.	6-L13-B	31.90
					Pathfinder	1915	6 cyl.	6-L19-B	44.00

Prices for other makes of cars upon application.

No. 6 Dry Storage Battery



It has greater output in watt hours per pound and has longer life in cycles of charge and discharge than any other battery known.

Battery troubles characteristic of all other makes are eliminated.

A comparative test between the No. 6 dry carbon battery and No. 6 dry storage battery shows that the latter is ten times better in watt hours. It is superior for all uses, especially for heavy duty.

It holds its charge longer and can be recharged indefinitely for much less than the cost of a carbon battery. It has 50 per cent higher working voltage, 600 per cent greater watt hour output, ten times greater working capacity.

Price.....\$4.00

Break-Not Battery Syringe Hydrometer



It enables you to determine the exact condition of battery and is also useful in transferring the liquid to and from battery and adding fresh water or acid.

It will not break if dropped to the floor and is easily taken apart and cleaned.

Its accuracy is guaranteed. The bulb is made of best red rubber and of ample capacity. Shipped in a strong non-collapse mailing tube.

Price each.....\$1.00

Security Switch Lock

For Ford Cars



High class construction.
Absolute protection of the car.

Simple and easy to install.
The most efficient and attractive protecting device we have to offer.

The regular Ford switch is retained without disconnecting or changing any electrical connections, or removing bolts.

It is installed by removing the name plate and attaching with three screws which are concealed and protected. It is impossible to remove the lock or switch in any manner. Two keys are supplied, and the switch, together with plate, are heavily nickel plated.

Price each.....\$3.00

No. 6 American Ignition Dry Cell Battery



These cells are scientifically made under the supervision of experts, and carefully inspected and tested several times before leaving the factory. Can be furnished in round or square cartons.

Price each.....\$0.70
12 to 50......64
50 to 125......60
Bbl. lots (125)......52

Ford Crank Case Oil Gauge

Indicates the height of oil in crank case. Remove the lower pet cock in case, insert the pipe nipple and attach gauge on other side of nipple. Insert pet cock in front opening and gauge is ready for use.

Heavy glass, not easily broken, $\frac{3}{8}$ inches diameter.

No. 41. Brass protected glass.....\$0.50
No. 40. Without brass protection......40



No. 41

Valveless Bucket Pump

A necessity in every well equipped garage, oil station or repair shop.

Its valveless construction permits lubricants to be handled in "three ways."

First.—The lubricant can be forced out of the bucket and into the desired receptacle.

Second.—Grease or oils can be sucked out of the differential, transmission housing, etc.

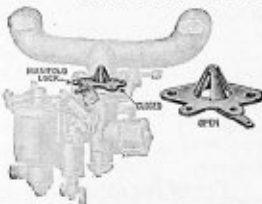
Third.—The barrel or chamber of the bucket may be sucked full of foreign lubricant and discharged again through the hose into a third receptacle without disturbing the contents of the bucket.

Self-measuring, ten full strokes of the lever handle discharge exactly one quart of light lubricating oil. Bucket is made of sheet iron. Barrel is of brass tubing. Equipped with $\frac{3}{4}$ -inch flexible steel hose. Capacity 25 pounds of grease.



Price.....\$12.00

Walker Auto Manifold Lock



Absolutely prevents any mixture from entering the manifold from the carburetor, making it impossible to run the car. When open it acts as a mixer in breaking up the gasoline and allowing only the desired quantity to be used. Specify make, model and year of car.

Price.....\$2.00

Sterling Pocket Battery Meters

A reliable battery meter is indispensable to owners of home electric lighting outfits and to users of gas or gasoline engines, whether in the operation of machinery or motor cars. The battery tester is invaluable whether dry or storage batteries are used. These are the latest improved magnet type.

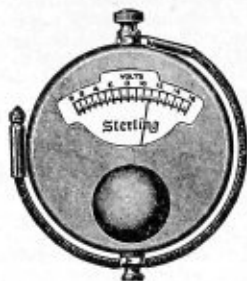
Ammeter No. 24



When a group of dry batteries are discarded several good cells may be thrown away unless each is tested separately. One weak battery might otherwise condemn all.

Scale 0-30 amperes. One ampere divisions.
Price.....\$1.50

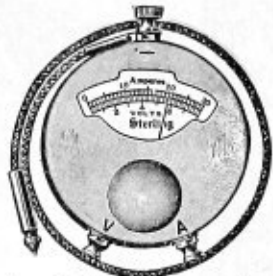
Volt Meter



Applied when a storage battery is furnishing current, it gives just as reliable indication of voltage and condition of battery as an expensive dashboard voltmeter.

No. 34. 0-18 volts. Price.....\$1.25
No. 34A. 0-16 volts.....1.75
No. 34B. 0-30 volts.....2.00

Voltammeter



A combination of the ammeter and voltmeter. Invaluable when it is necessary to test both dry and storage batteries.

Prices
No. 44. 0-30 amperes, 0-8 volts...\$1.50
No. 44A. 0-35 amperes, 0-16 volt. 2.00

Trescot Battery Meter



The only practical vest pocket battery tester.

It serves the same purpose as the Sterling.

Diameter 1 3/4 inches; weight, 2 ounces; depth, 1 1/2 inches.

No. 124. Ammeter 0-40 amperes.

Price.....\$1.00

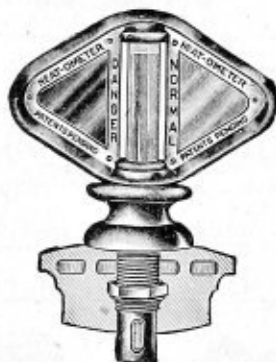
No. 134. Voltmeter 0-10 volts.

Price.....\$1.25

No. 144. Volt ammeter 0-40 volts, 0-10 amperes.

Price.....\$1.50

Heat-ometer



Attached to radiator cap it tells instantly of a dangerously overheated condition of the motor, lack of water, poor oil or water circulation. Broken fan belt or other conditions causing the motor to overheat are instantly revealed.

A large central tube of specially prepared glass contains a fluid which is normally pink in color, but changes to a deep purple when the motor temperature becomes dangerous.

When the temperature becomes normal it resumes its pink hue. This power of change is everlasting.

All enclosed in a solid metal frame handsomely nickel-plated and very ornamental.

Standard size, 3 3/4 x 5 inches.

Price each.....\$3.80

Junior size, 3 1/2 x 4 1/2 inches.

Price each.....\$2.00

Boyce Motometer



Mounted on the radiator cap. The temperature of the radiator is plainly visible from the driver's seat. It prevents damage to motor from overheating.

Tells instantly if water is needed, if lubrication is poor, if the fan belt breaks, etc.

Standard Model
No. 67050. Finished in beautiful black enamel with brass or nickel trimming. Glass crystals on both sides.

Price.....\$10.00

Junior Model

No. 68050. Black dial with nickel or brass finish.

Price.....\$5.00

Ford Special

No. 69050. Same as Junior, but including handsome special radiator cap.

Price.....\$2.50

Official Gasoline Gauge for Fords

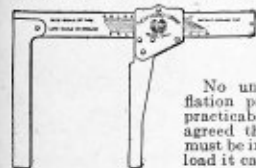
Simply remove filler cap and replace with gauge. You can tell at a glance just how much gasoline you have by raising corner of cushion.

It consists of a float fitted to a spiral upright which indicates contents by a needle on an easily read white enamel dial.

Nothing to get out of order, durable accurate. Made with round or hexagon tubing.
Price.....\$1.00



The Goodrich Tire Caliper



No uniform inflation pressure is practicable. It is agreed that a tire must be inflated for load it carries.

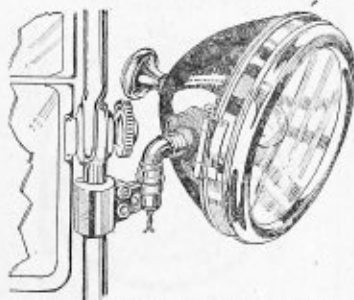
This caliper measures a tire for the actual load. It is scientifically correct and accurate.

Price.....\$1.00

Automobile Necessities

Howe Spot Lights

"The Lamp with the Wonderful Bracket"



Throws a powerful beam of light where it is most needed. Invaluable for country roads at night. Clamps firmly on windshield within easy reach of driver. Can be tilted to any angle desired, to read road signs, street numbers, etc. The light can be thrown down, directly in front of the car, stopping all glare or dazzle—prevents accidents due to insufficient light, and allows cars to pass one another with perfect safety.

It is adjusted on coil springs to give an even, never varying

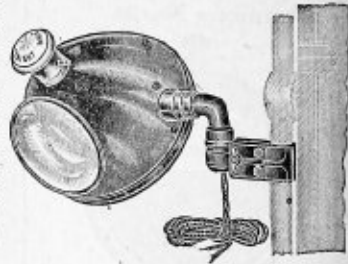
tension, which holds the lamp firmly in place, yet allows it to be easily turned in all directions. Can be turned on both joints at the same time. Cannot become locked in one direction. Concealed wire is contained in the bracket, preventing worn and broken wiring, besides keeping the wire out of the way. Fastened to windshield by two-piece clamp, making it possible to remove the light by simply unscrewing a wing nut. This enables one to use it for a trouble lamp anywhere around the car. Nitrogen burner, giving a powerful white light. Front diameter, over all, 7½ inches. 6 volt, 21 candle power.

Price each, without mirror.....

\$7.50

Price each, with 4-inch mirror for rear view.....

8.00



Rear View, Showing Mirror

Side View
OLD SOL
SPOTLIGHT
No. 77



"Old Sol" Windshield Spot Light

A light where you need it.

This spot light obviates the necessity of operating large, expensive head lamps, that consume a large amount of current. The latter are forbidden by ordinances in most large cities, unless dimmers are used. This light serves the same purpose, but is much more flexible—throws the light just where you want it.

A large, handsome lamp, finished in black enamel. Adds to the appearance of any car. Can be attached to either side of windshield. Made entirely from the highest quality steel. It is supplied with a silver plated reflector. A 3-inch mirror on the back.

No. 70. 7-inch door, 4-inch adjustable diminishing mirrorscope.....\$7.00

No. 77. 6-inch door, adjustable mirrorscope. Price..... 8.00

Mirrorscopes



No. 7 Oblong
Plain bevel, French plate.
5x7 inches.....\$4.00



Round Reducing
No. 4. 5-inch.....\$2.25



No. 12 Oval
No. 12. 5x7-inch.....\$4.00

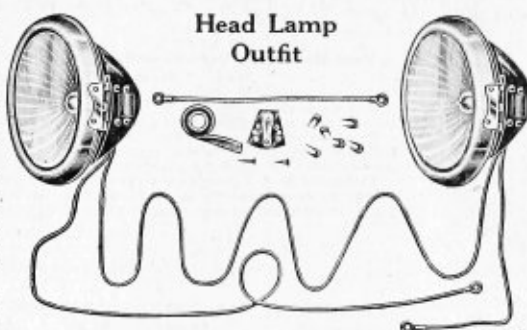


No. 38 For Trucks
Six inches in diameter.
Designed for heavy wear
and vibration.
Price each.....\$4.00

These Mirrorscopes are furnished in black, or black and nickel.

Automobile Lamps

This outfit is for use on Ford cars, operating on direct current from the magneto. Can also be used on any car with a storage battery or with low tension magneto. Consists of one pair torpedo shape headlights with genuine tungsten 12 c. p. bulbs, complete with switch and necessary wiring already assembled.



Full directions and diagram furnished, so that anyone can connect the lamps.

For 1912-13-14 Ford cars, diameter 9 inches, with dimmer bulbs \$11.50

For 1916 Ford cars only, diameter 10 inches, with dimmer bulbs 12.50

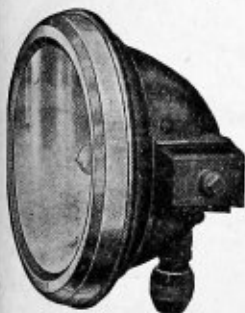
Electric Head Lamps

This electric head lamp is the latest model, bullet shape. Throws a brilliant white light that allows rapid running over country roads at night with perfect safety. Finished in three different styles, all black, black and brass, and black and nickel. All-black lamps always look new. They will not tarnish as quickly as the brass or nickel. The all black finish will match up with a car trimmed in nickel or brass. Unless specified, they will be six volt, double contact, so please state correct data to avoid delay. Dimmer bulbs furnished upon request.

Number.....	114	115	105*
Front diameter, inches.....	11	10	9
Extreme depth, inches.....	6½	5½	4½
Between props, inches.....	9	8	7
Diameter of reflector, inches.....	8	7½	7½
Price per pair.....	\$11.50	\$ 9.00	\$ 8.00
With dimmer bulbs.....	13.50	11.00	10.00

*Number 105 has 12 c. p. bulb.

Electric Side Lamp



Black, brass and black, and black and nickel finish. 4 c. p. bulbs. We can furnish bolt for Ford cars, and props for flat bracket.
Front diameter, inches. . . 6¼
Extreme depth, inches. . . 3½
Diam. reflector, inches. . . 4½
Price per pair \$7.50

Side Lamp



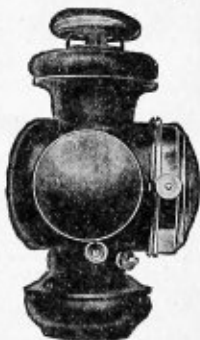
These lamps are for Ford cars. They are equipped with 2 c. p. bulbs. White semaphore glass door. We can furnish green celluloid for the side if desired. Finished in all black, black and brass or black and nickel. Front diameter 4 inches, extreme depth 2½ inches.
Price per pair \$3.50

Electric Tail Lamp

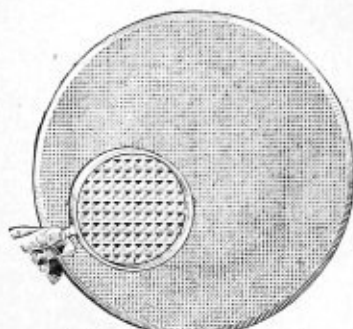


This lamp is supplied with 2 c. p. bulbs. It has Edison connector screws in lamp, making it easy to replace bulb. All black finish only. Red ruby glass, diameter 3½ in.
Price each \$1.50

Oil Tail Lamp



Diameter of door 4 inches. Height over all 9 inches. All black finish only. Price each, \$3.00. With fittings for combination oil and electric, no bulb. \$4.00



20,000 of these prismatic surfaces insure you against night driving troubles. 64 perfect prisms to the square inch—the first convex diffusing lens ever produced.

Prismolite

The Perfected Lens

A Very Handsome Lens Complying with the Inspection Laws and Giving Plenty of Driving Light.

Avoids driving confusion by light diffusion. Thousands of these perfect prisms pressed into a scientific convex lens—take the glare out of every ray of light.

You can use powerful lamps and strong reflectors and get the best of driving light—without interference of police—flooding the road for 300 feet with a bright perfect light—without the stabbing glare that causes accidents and confusion.

Prismolite is a plate glass—treated by an exclusive process—formed by special machinery—and made from the finest materials known to glass manufacture. It is tough enough and strong enough to bear your weight.

Prices per Pair

Diameter, inches	8 to 8½	8½ to 9½	9½ to 10½	10½ to 11½	Over 11½
Price per pair	\$3.00	\$3.50	\$4.00	\$4.50	\$5.00



Frosted Pyralin Head Light Dimmers

Attached to glass by vacuum cup.

	Price per pair
No. 1. 5-inch diam.	\$0.50
No. 2. 6-inch diam.	.60
No. 3. 7-inch diam.	.75

Stik-Tite Roof Patches

For Repairing Ford and all Other Roofs.

Stik-Tite Roof Patches. The only satisfactory system for repairing leaky roofs. Applied same as any "cold patch." Guaranteed to stick.

Packed eleven patches, assorted in a box.
5 large round patches for tops.
5 small round patches for pin holes in tops.
1 long patching strip for tops.

No. A. Stik-Tite patches made of auto rubber, particularly adapted for repairing Ford cars, and applied like any cold patch; box of 11 patches, assorted, per box.....\$0.60

No. B. Stik-Tite repair patches for mending mohair tops, box of 11, assorted, per box.....\$0.80



"Stik-Tite" Back Curtain Window Complete



No. 1

No. 1. Fits 1916 and all earlier models of Ford cars.

No. 3. Fits all Overland, Buick and Maxwell, and many other cars that have oval windows.



No. 3

Stick it on like a postage stamp and it sticks forever.

"Stik-Tite" window enables anyone to replace his own back curtain window in a few minutes. When once replaced it will hold forever as there are no stitches or fasteners used in any part of this window. It will never break unless by severe accident. It is attractive in appearance and when once attached it practically becomes a part of your back curtain.

No. 1. Plain Stik-Tite back curtain window made of auto rubber, for Fords, 1916 and all earlier models, complete ready to attach, with full instructions. Price each.....\$1.50

No. 17. Stik-Tite back curtain window to fit Ford early 1917 models having three small windows in each curtain. Price each, small window.....\$1.20

No. 3. Oval Stik-Tite back curtain window, made of standard mohair, to fit Overland, Buick, Maxwell, Chevrolet, El-Car, Crow-Elkhart, Metz, Briscoe, Regal and many other cars with oval window. Will fit any oval opening 8½ inches deep or less and 18½ inches long or less. Price each.....\$3.00

No. 4. Stik-Tite oval back curtain window to fit all 1916-1917 Studebaker touring cars with oval windows. Will also fit any oval opening 9 inches deep or less and 22¾ inches long or less. Price each.....\$4.00

No. 3-0. Same size as No. 3, but made of silk mohair. Price each.....\$4.00

No. 33 F. Same size as No. 3, but made of genuine drednaut or never leak material to match Willys-Knight, King and other cars fitted with these finer materials. Price each.....\$4.00

No. 6 JM. To fit either side or back curtains of Dodge 1916-1917 cars. Price each.....\$1.20

Automobile Warning Signals

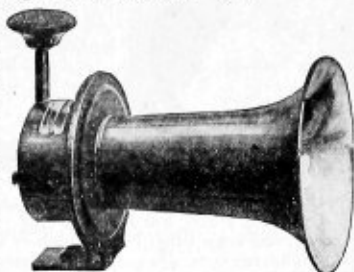
Sparton Hand Operated Warning Signal



nothing to get out of order, all wearing parts being glass hard and each instrument fully guaranteed. Each horn is packed in a separate box with supporting arm and screws for attaching. The tone can be varied by adjusting a screw. Price complete, ready to attach \$8.00

This warning signal has a voice that is almost a duplicate of the high priced electric motor driven horns and the price is very reasonable. It is extremely simple of construction with

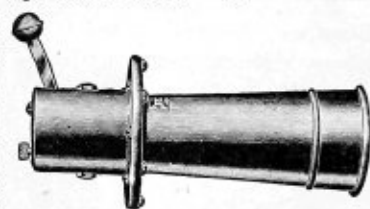
Long Horn Model "J"



The most durable hand operated horn on the market. Gives a quality and volume of tone unexcelled by many high priced motor driven horns. Finished in black and nickel; black and brass, or all black. Attaches to door or side of seat. Length of bell 6 1/4 inches.

Price each \$10.00

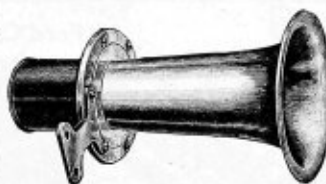
Sparton Model "G"



This horn is remarkable for its simplicity of construction. There is nothing to get out of order. Made of best grade materials. Diaphragm is hand hammered. Gives sufficient warning to be heard two blocks away. Each horn furnished with rigid supporting arm for fastening to car. One-third larger than any other hand operated horn. Price each.....

\$14.00

Samson Electric Motor Driven Horn



Operate from any 6-volt storage battery or from dry cells. Five cells may be used with the No. 123, one set frequently lasting an entire season. Gives a loud clear and penetrating warning, without being harsh and offensive.

Strictly high grade throughout and fully equal to widely advertised signals selling at twice the price we ask. Finished in black enamel, three coats baked on or with polished bell. Furnished complete with cord and push button ready to attach to car.

No. 111. Length 12 3/4 in., wt. 10 lbs., price..... \$15.00

No. 123. Length 10 in., wt. 6 lbs., price..... 10.00

Radiator Cap Ornaments

Substantially made from solid metal. Beautifully plated in bright gold finish or hand enameled in colors. Provided with bolt, nut and washer for a simple and permanent attachment to any car.

Winged Wheel



	Size	No.	Price
America First.....	3 1/2 x 5	8006	\$2.50
Winged Wheel.....	3 1/2 x 4 1/2	6935	2.30
Eagle.....	4 x 6	5405	2.50
Eagle.....	6 x 11	5311	5.00
Bull Dog.....	3 x 4 1/2	5274	3.00
Single Flag.....	4 1/2 x 8 1/2	8085	2.50
Uncle Sam (full figure).....	8 1/2 x 3 1/2	8032	2.50
K. of C.....	4 x 3	8053	2.50
K. of P.....	4 x 3	8054	2.50
Shriner Tiger Claw.....		8065	2.50
Doctor's Red Cross.....		8063	2.50
Peace Angel.....		8132	2.50

America First



Electric Heater For Automobile Engines and Radiators

A Warm Automobile in a Cold Garage

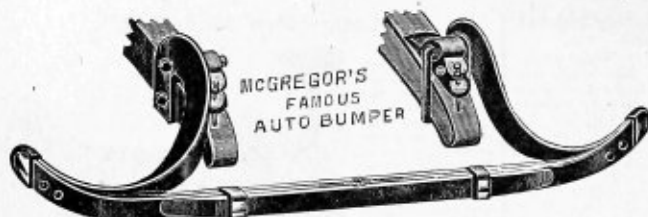
Invaluable in unheated garages. Why run the risk of a frozen radiator and burst pipes? Why take the trouble to drain the water out of the radiator every night? Why spend half an hour starting a cold engine?

None of these inconveniences need be borne after this little electric heater is installed. It is not necessary to have a steam heating system for the entire garage when all that is necessary is just the right amount of heat in just the right place—under the hood. It costs less than one cent an hour to keep this heater running. Simply attach heater to your electric light socket. It keeps up a powerful, uniform heat as long as desired.

Price each..... \$3.50



Automobile Bumpers

Flexible Spring
Bumper No. 2

Extremely strong, maximum spring resistance, easy to adjust, Universal fittings. The most satisfactory bumper made. The steel spring arms extend forward, and outward, forming a complete curve from the frame of the car to the front bar. These are so

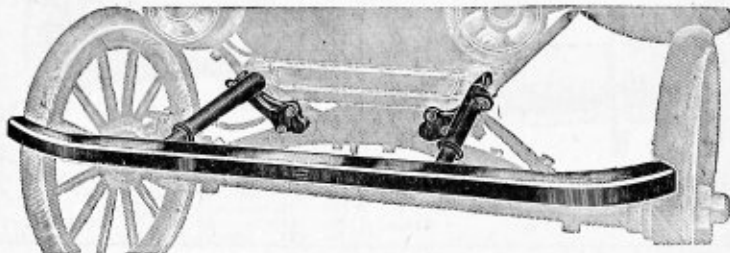
formed and placed as to provide a maximum of resistance and elasticity.

The front spring bar has three leaves in the center with single leaf at ends. This feature in combination with the curved arms provides the highest obtainable degree of spring resistance. This bumper will fit on the rear of the following cars when only one spare tire is carried: Hudson, Haynes, Cole, Chandler, Mercer and Allen 1916 and 1917 models.

No. S30. All black enamel. Price each \$10.50

No. S40. Black arms and end leaves. Nickel center leaves of front bar. Price each 12.50

Ford Car Bumper



This bumper can be attached to any type of Ford car in twenty minutes, without drilling any holes in any part of the car. It clamps to the front in a secure manner, and will not rattle.

With Channel Bar

F3330. Black (all black enamel) \$7.50

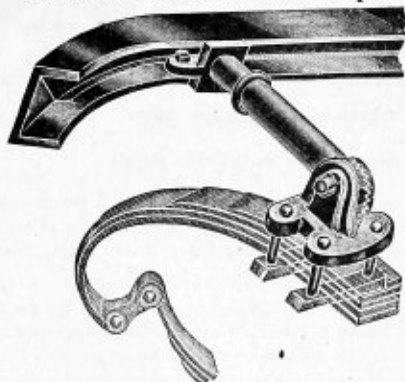
F3340. Black and nickel (black arms and nickeled bar) \$9.00

With 1 1/4-Inch Round Bar

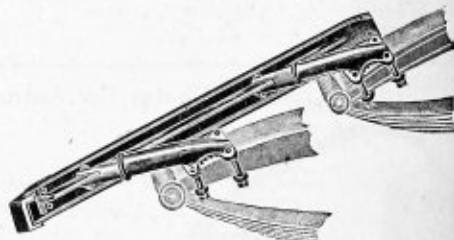
F3350. Black (all black enamel) \$6.00

F3360. Black and nickel (black fittings and nickeled bar) \$7.50

Rear End Channel-Bar Bumper



Reinforced Channel Bar Bumper



The channel bar is reinforced with a piece of T-shaped steel riveted on the inside. Have the same attachments as the "T" bar bumper.

No. R 80. All black enamel finish. Price each \$10.00

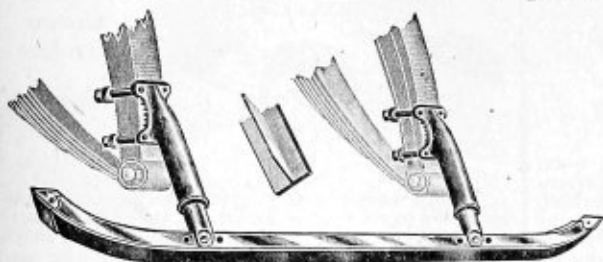
No. R 90. Nickel bar, black fittings. Price each \$12.00

No. R110. All nickel plated finish. Price each 17.00

No. K70. All black enamel. Price each \$6.50

No. K80. Black fittings, nickeled bar. Price each \$7.50

Bumpers

**"T" Bar Bumper**

Its light appearance makes it very attractive. The "T" form of steel bar makes a very strong bumper.

No. T 40. All black enamel finish. Price each.....\$10.00

No. T 50. Nickel bar, black fittings. Price each.....\$12.00

No. T 70. All nickel plated finish. Price each.....\$17.00

No. C210. Special for Cadillac, nickel bar, black fittings. Price each....\$12.00

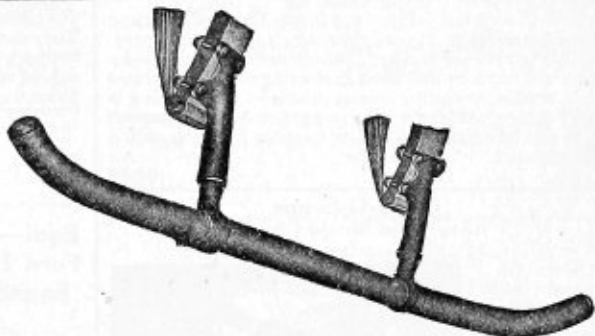
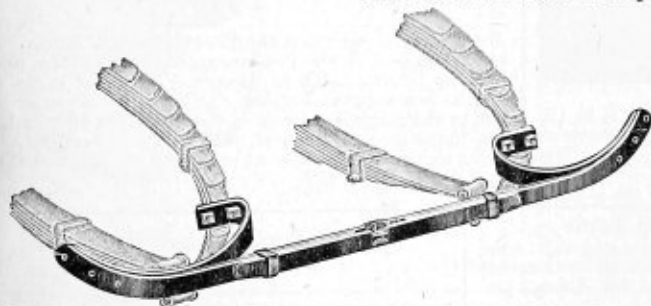
2-inch Round Bar Bumper

A massive and fine appearing bumper. The fittings have a coil spring concealed in a barrel, while the plunger that holds the bumper bar works inside the barrel against the coil spring, giving the bumper two inches resistance against the spring.

No. P190. All black enamel finish. Price each.....\$13.00

No. P200. Nickel bar, black fittings. Price each.....\$15.00

No. P210. All nickel plated finish. Price each.....\$17.50

**Rear End Flexible Bumper**

For $\frac{3}{4}$ elliptic spring as shown in cut. Suitable for gas and electric cars.

No. K90. All black enamel. Price each.....\$12.50

No. K100. Black arms, and end of bar, with nickered center leaves of spring bar. Price each...\$15.00

Common Sense Bumper

With $1\frac{1}{4}$ -inch round bar only.

No. C140. All black enamel. Price each.....\$5.00

No. C150. Black enamel fittings and nickered bar. Price each.....\$6.00

**Flexible Spring Bumper No. 1**

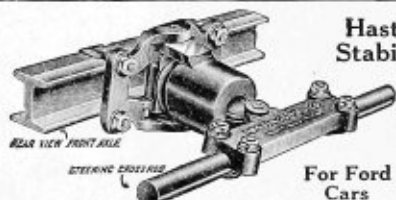
No. S-000. All black enamel finish. Price each.....\$10.50

No. S- 10. Nickel bar, black fittings. Price each.....\$12.50

No. S- 20. Nickel (fittings and front bar nickered, the back always black enamel). Price each.....\$17.50

Owing to the great flexibility of the double steel spring this bumper will take all ordinary bumps with no injury to either the car or the bumper. Made of the finest spring steel, hinged at ends and extending back the full length of the bar on inside, making a double steel spring. Arms are one piece "clamp-on" type.

H. Channon Company Chicago



Hastings Stabilizer

For Ford Cars

Unlike higher priced cars, the Ford has no worm and sector steering gear, consequently it is almost as sensitive to a turn of the road wheels as of the steering wheel.

The Ford is so quick on its feet that it may be ditched in an instant if the front wheel should strike an obstruction when the hands are momentarily removed from the steering wheel.

The driver is thus subjected to a constant muscular and mental strain which greatly detracts from his enjoyment.

This stabilizer is a very simple and effective device attached to the front axle and steering rod. It operates on a simple oscillating spring principle. The spring is single acting, working only by compression and expansion. It can be attached in a few minutes by using only a light wrench.

Price.....\$3.75

Clear-O-Scope Auto Wind Shield Cleaner

Clears rain or snow from wind shield.

Simple and easy to operate. Highly effective. Indestructible.



When you want a clear glass, just move it to the right or left and the work is done. No nuts, bolts or screws. Slips on or off any wind shield instantly. Held by spring tension. No rattle.

Price.....\$1.00

Motor Luncheon Case and Table



Made in three styles and sizes, Nos. 3 and 4 being for from 4 to 6 persons and No. 6 for 2 persons.

The No. 4, which is the most popular outfit, consists of three hinged extension food boxes. Removable cover clasped to top of case and resting on food boxes, forming a good-sized table.

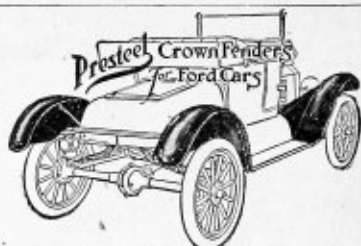
When in car or boat the case is held firmly but is easily and quickly removed for use.

It also has spaces for cutlery, dishes, etc., and for three quart thermo bottles, or six quart Mason fruit jars.

The outfit includes six each knives, forks, spoons, enameled cups and plates and paper napkins, one each salt and pepper shaker.

The case is made of seasoned basswood lined and covered with artificial leather. Catches, lock and handle can be washed easily and kept sweet and clean.

Number.....	3	4	6
Price.....	\$25.00	\$15.00	\$7.50



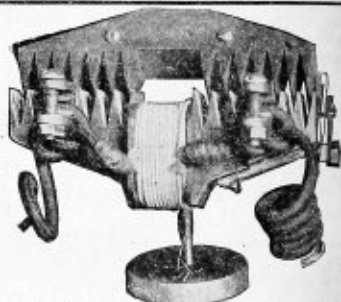
Presteel Crown Fenders

For Ford Cars

"Crown" fenders vastly improve the looks of a Ford car. "Presteel" fenders are artistic and the very best construction. Made of 20 gauge special fender steel. Completely ironed with 16 gauge toe "irons" for fastening, and given three coats of black enamel, baked on. No unsightly rivets, all joints being electrically welded. They have a 3-inch visor, 3/4-inch crown and are 9 inches wide. Designed to extend an extra inch beyond side of wheel.

Price.....\$16.00

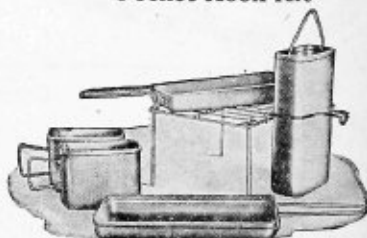
Equi—The Ford Light Equalizer



A reactance coil which regulates the current supplied to the lights upon the Ford magneto, causing them to burn up to almost full candle power when car is running at lowest possible speed. At low speed a variable gap in the magnetic circuit of the "Equi" is open and the inductions of the resistance coil are negligible, being united to the ohmic resistance of the wire wound in the coil.

Price.....\$6.00

Pocket Kook Kit



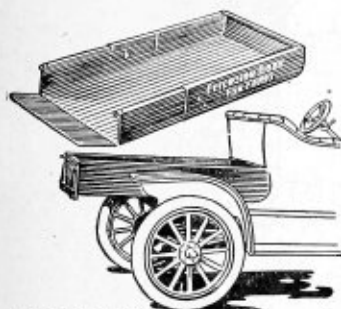
Folding broiler and toaster. Grate pans for boiling, roasting and frying and two drinking cups, nested. 9 1/4 x 4 1/2 x 2 1/4 inches

Price.....\$2.50

Camp Cooking Crates Only

As illustrated above, size 12x24 inches.
Price each.....\$1.00

Dunham Commercial Extension Body for Ford Runabout



This extension body makes a truck of your Ford. Ideal for small loads. Catches on the side for lumber, pipe, ladders, etc. Body may be lengthened up to seven feet for such loads. Tail board swings out and down to permit easy loading and may be held straight out for a further increase of nine inches. The body is made of heavy fourteen

gauge steel, making it equal to carrying any load the car will pull without denting or bending out of shape. Made from one piece of steel. Perfectly finished at the front to the curves of the seat and at the side by having the steel bent over one inch. Finished in black enamel. Height of sides, nine inches.

Without extension	\$32.00
With extension	\$42.00

Lindsay Demountable Rim Wire Wheels

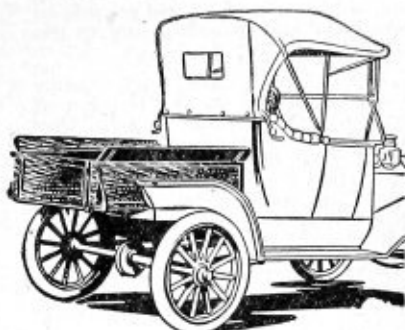


Lighter, stronger, more durable, and better appearing than wooden wheels. By their light weight and easy running qualities they effect a very considerable saving in tire cost. A set of wire wheels will save their cost in a year by the lowered expense in tires alone. Furnished complete with brake drum, balls and hub cap. Can be put on in a few minutes. Spokes are made of heavy drawn steel wire, swaged and threaded to give the nipple the strongest possible grip. Laced and crossed for strength. Rims of high grade, heavy pressed steel. Set

of four wheels, shipping weight, 150 pounds.

Price per set	\$60.00
---------------------	---------

Dunham Wood Commercial Body for Ford Roadster



A body for light delivery work. There is an increasing demand for a body of this kind that sells at a moderate price. Made of hard wood, strongly bound with iron. Tail gate swings under and is hung on heavy hinges that have a single long bolt through both. Furnished in two sizes to meet different requirements.

Size 54x31, price	\$32.00
Size 66x31, price	\$42.00

Firestone Demountable Rims

Firestone demountable rims have been adopted as part of the equipment of nearly every high class automobile now manufactured. Built by tire makers and designed to conserve time and the life of tires. No complicated parts to get out of order—simply loosen the six retaining clamps and the tire comes off. The time saved in this way soon pays for the cost of the rims, besides saving back breaking work and costly delays. Each part of the rim comes in contact with the others at an angle, thus avoiding any possibility of the parts rusting together. The tightened valve sleeve, by keeping the metal spreader on the inside of the casing firmly in place, securely locks the tire in the rim, making it impossible to throw a deflated tire.



Can be used with either clincher or straight side tires.	
Price per set	\$40.00

Piston Rings

Piston rings, in order to be efficient, must be flexible. They must expand or contract to maintain an even pressure against the cylinder wall. If they fail to do this, lack of compression and consequent incomplete combustion of the fuel charge results. In addition to this, the piston rings must prevent the leakage of oil into the combustion chamber, which causes deposits of carbon. "Anti-leak" piston rings are designed especially to fit the walls of the cylinders even after they are worn by long use. They have no unsealed openings or faulty bearings.



This close fitting quality is accomplished by the use of tapered seat (see illustration) which allows the top ring to conform to the shape of the cylinder walls. A full set of these rings installed in any motor will cut down the cost of gasoline and increase the power. Made of a special metal to insure strength and flexibility. Perfect in workmanship and material. Absolutely guaranteed to give satisfaction. Made in all sizes. Sizes 2 1/2 inches diameter by 3 1/4 inches width up to 6 inches diameter by 3 1/2 inches width. Price

\$1.00
Prices for larger sizes upon application.

Use Gripwell Tires—They Grip the Road.

Ford Detachable Freight Carrier

You can haul five hundred pounds on a Ford Roadster without injury to the car.

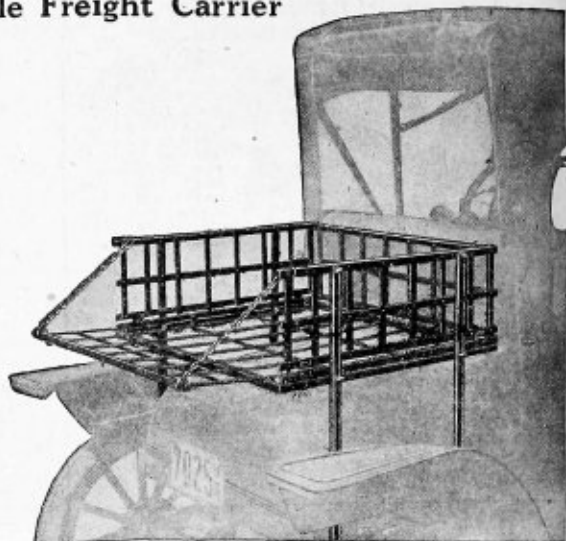
A substantial, all steel, handy, roomy carrier, which can be attached or taken off a Ford runabout in a few minutes. Does not scratch or mar the body of the car. Carrier folds or collapses into about 33 x 30 x 3 inches. The value of this collapsible feature is readily apparent for storing the carrier when not in use or for convenient, inexpensive shipping. It weighs only 51 pounds.

Used on salesman's cars for carrying samples, by merchants for special deliveries, farmers for supplies, and tourists for luggage.

Costs less than small truck.

Box attached to a Ford runabout and does not limit the use of car to business purposes.

Price each.....\$20.00



Steel Automobile Creeper



The best creeper on the market for repair shops and garages. Substantially built, with reinforced solid steel centre, well riveted and roller bearing castors, leatherette covered head rest, black Japanned. Tested to 400 pounds capacity and will stand the roughest usage. More comfortable and cleaner than a wood creeper. Costs very little more than a wood creeper, to which it is superior in every way. Easily cleaned, practically indestructible; 36½ inches long, 12½ inches wide and 2 inches high. Shipping weight 12 pounds. Price Each.....\$4.00

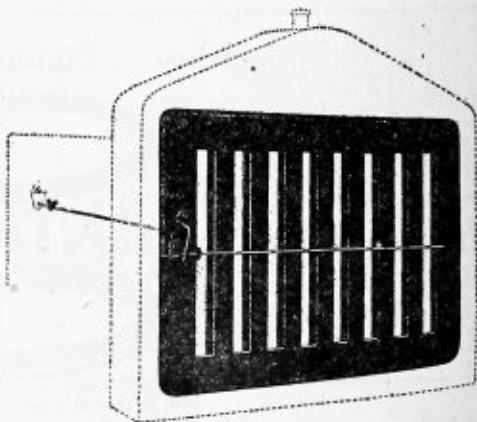
H-M-Metal Radiator Shield

Protects the motor cooling apparatus from excessive winter cold. Operates directly from dash board by means of a quadrant device extending through radiator shield. The shuttle arrangement of moving panels in the shield permits three distinct phases of motor heat control; 1st, completely open for moderate weather; 2nd, one-half open for long runs in intensely cold weather; 3rd, completely closed for standing or short runs in especially cold weather.

Shield weighs two pounds, is constructed of sheet metal, swaged so that it lays over swaged edge of radiator.

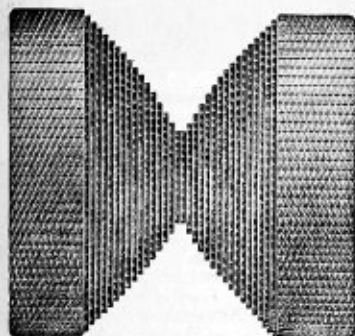
Only a small hole in the dash near the floor board is necessary to install quadrant and shift lever. Can be installed in any radiator in a short time by an untrained mechanic.

Price each.....\$3.50



Brake Lining

Gripwell



Made of the longest and purest Canadian asbestos fibre. The toughest and most durable lining on the market. Saturated with a chemical solution that makes it heat-proof and almost wear-proof.

Widths, Inches	Thickness			
	$\frac{1}{8}$ -in. per ft.	$\frac{3}{8}$ -in. per ft.	$\frac{1}{2}$ -in. per ft.	$\frac{3}{4}$ -in. per ft.
$\frac{1}{8}$	\$0.32	\$0.36	\$0.42	\$0.56
$\frac{1}{4}$	.40	.45	.50	.70
$\frac{3}{8}$	.50	.55	.60	.80
$\frac{1}{2}$	.60	.65	.70	.90
$\frac{3}{4}$	.70	.75	.80	1.00
1	.80	.85	.90	1.20
1 $\frac{1}{4}$	.90	.95	1.00	1.30
1 $\frac{1}{2}$	1.00	1.05	1.10	1.50
1 $\frac{3}{4}$	1.10	1.15	1.20	1.60
2	1.20	1.25	1.30	1.70
4	1.40	1.55	1.70	2.20

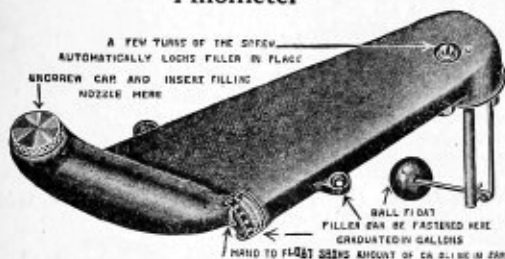
Fordbestos



Each set contains 3 pieces of lining. No wire. Each piece is 23 in. long. Size $1\frac{1}{2}$ inches by 5-32 in. Split brass rivets furnished with each set.

Price per set.....\$1.20

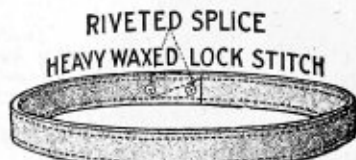
Fillometer



The fillometer is a combined gasoline tank filler and gauge. It fastens permanently in place under the cushion of a Ford car. Made of high grade cast iron, and finished in black enamel. By means of a partition extending through the body of the fillometer, it forms a separate air duct to release the air from the tank while the latter is being filled. It prevents any vapor from blowing out in spray. The gauge can easily be read from the seat and shows correctly the amount of gasoline in the tank while driving or filling. A great convenience in stormy weather.

Price each, complete.....\$4.50

Ford Fan Belt



"Real live ones that won't die"

Made of the finest quality leather, tanned by a special process in which no minerals or acids used. Well lapped and glued with waterproof glue, giving them their non-breakable and non-slipping features. Impervious to water, heat or oil, and cannot be hardened or cracked by friction.

Price.....\$0.70

Tool Boxes



The strongest and most durable tool box manufactured. Made of the best quality steel. Handsome gun metal finish. Can be fastened to running board and used for a step. Equipped with Yale lock.

Regular Sizes

Style	Length, Inches	Width, Inches	Height, Inches	Price
A-1.....	12	8	6	\$4.10
B-2.....	14	8	9 $\frac{1}{2}$	4.35
B-4.....	16	8	8	4.35
186-Ford.....	18	8	6	4.50
T-9.....	18	8	10 $\frac{3}{4}$	4.85
220-Ford.....	22	9	6 $\frac{3}{4}$	4.85
T-13.....	22	9	8	5.50
T-17.....	24	10	12	6.35

Overhead Auto Washer

A necessity in every public or private garage. The most practical device of the kind in use.

Washer is all brass with the exception of piping and ceiling plate. For this reason it will not deteriorate from the constant contact with water as iron does. Will never leak, as it grinds its own seats as it revolves. It does away with having long lengths of hose lying about the garage floor, where it gets in the way and is sure to deteriorate from the effects of the gasoline and oil. Only a short section of hose is required with this washer, and that is clear from the floor.



Washer complete, as shown in illustration, without supply pipe or hose, but with one five foot length of $\frac{3}{4}$ -inch extension pipe, brace, and ceiling flange.....\$13.00
Best grade rubber hose, per foot......28
Adjustable brass nozzle......60

All prices in this catalog are list. Refer to our discount guide.

Channon Auto Tow Lines

"Don't Get Caught
Without One"



One of the most important parts of a touring kit is a tow rope of some kind—without it you can neither tow nor be towed.

Touring trouble should be anticipated—one can never tell when some unsuspected flaw may appear, particularly on new cars, and it is extremely unpleasant to be caught miles from nowhere on a road where few cars pass.

One can usually borrow or buy enough gasoline to get to the next town, but for a breakdown a tow rope is necessary. The investment is but a trifle and our **Steel Tow Line** with the new reel and holder occupies little space in the tool box.

Method of Attachment. Pass one Manila sling around axle of one car and catch one of the rope hooks through the loops. Attach sling and other rope end to the other car and you are ready to tow or be towed.

The tow line can also be used to pull a car out of a hole or ditch by the car's own power. Loop one of the Manila slings around the rim of a rear wheel; attach the rope with a hook and turn the rope once around the hub of the wheel. Fasten the free end of the rope to the nearest tree, pole or strong fence post, start the car, and since the tree or similar anchor will not give, the wheel turns and winding the rope up on its hub pulls the car out of its position.



Showing Tow Line Complete

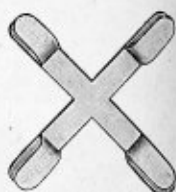
A small compact unit fitting into any tool box. The rope cannot kink or snarl up.



The Rope Slings

The Reel or Holder

Don't underestimate the value of the holder—a wire tow line is stronger and less bulky than one made of Manila hemp rope—but it has a habit of twisting like a snake and getting tangled up with everything in the tool box. This holder does away with snarling, also kinking of the rope, which is harmful.



The Reel or Holder

The Tow Rope

Twenty-five feet of $\frac{5}{16}$ -inch flexible steel wire cable with hook carefully spliced into each end. We guarantee these splices to never pull out. If they do we will furnish you with a new rope.

The Slings

These are two endless loops made of good strong Manila rope, spliced very carefully—our splices will never pull out. These slings are looped over the axles of both cars, will not damage the paint and give a certain degree of flexibility which helps to take off part of the shock when starting.



The Wire Rope

Prices

No. 3 Auto Tow Line, French style with metal reel and two Manila rope slings. Weight, 6 pounds. Price each.....\$5.00
No. 4 Truck Tow Line. Made like No. 3, but without holder. $\frac{3}{4}$ -inch steel cable 30 feet long and extra flexible. Price each.....\$6.50

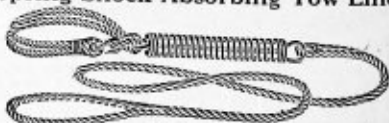
Manila Hemp Rope Tow Line



Some prefer a plain tow line of this type which can be wrapped around the wheels and used like a skid chain to pull out of mud. A superior grade of rope with galvanized hooks secured by strong splices.

No. 1. $\frac{1}{2}$ -inch x 30 feet for light cars. Price.....\$2.00
No. 2. $\frac{3}{4}$ -inch x 40 feet for heavy touring cars. Price.....\$4.00

Spring Shock Absorbing Tow Lines



The Spring Takes All Jerk and Jar

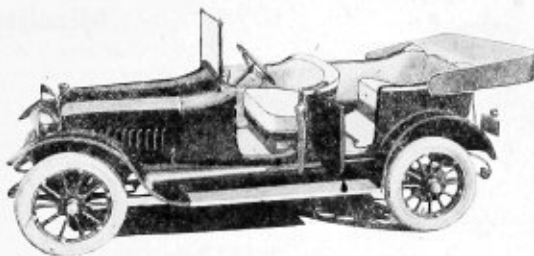
The coil compression spring is of $\frac{5}{16}$ -inch round steel, 2-inch diameter, 10 inches long. Fitted with cap and double draw bars. The rope is $1\frac{3}{4}$ inches x 18 feet and is hand spliced into drawbar eye over an iron thimble. The other end of spring is fitted with strong endless sling which is doubled around axle. Adapts itself to any weight of car. Spring is indestructible. Price complete, ready to attach.....\$5.00

Gordon Seat Covers

"Tailored to Fit"

Used On A Thousand
Models of Auto-
mobiles

Presents a smooth, clean surface to the occupants. Protects clothing from streaks and spots. Saves expense of dry cleaner. Prolongs the life of the upholstery. Adds to the appearance of the ma-



chine. Can be brushed clean in a few seconds or washed with soap and water any time it is desirable. Adds to the sale value of a used car. Fits any car perfectly. The trimmings are the best to be had. The cover can be firmly attached to the seat in a few moments, due to our patent glove fasteners. Comes in tan, gray, black and white.

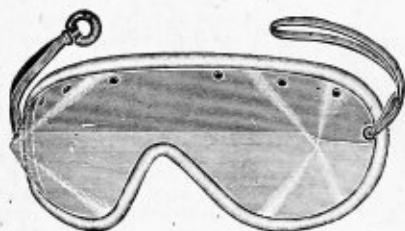
Car	Model	Year	1046	1000	1032 1050 1074
Buick	"B25"-5-p.	1914	\$13.50	\$15.50	\$18.50
Buick	"B37"-5-p.	1914	15.00	17.00	20.00
Buick	"B55"-7-p.	1914	20.00	22.00	26.00
Buick	"C24"-2-p.	1915	7.00	8.00	10.00
Buick	"C36"-2-p.	1915	8.00	9.00	11.00
Buick	"C54"-2-p.	1915	10.00	11.00	13.00
Buick	"C55"-5-p.	1915	13.00	15.00	18.00
Buick	"C37"-5-p.	1915	14.00	16.00	19.00
Buick	"C55"-7-p.	1915	18.00	20.00	24.00
Buick	"D44"-2-p.	1916	7.50	8.50	10.50
Buick	"D54"-2-p.	1916	8.00	9.00	11.00
Buick	"D46"-3-p.	1916	8.00	9.00	11.00
Buick	"D47"-5-p.	1916	14.00	16.00	19.00
Buick	"D45"-5-p.	1916	13.00	15.00	18.00
Buick	"D55"-7-p.	1916	17.00	19.00	23.00
Cadillac	Tor-4-p.	1912	18.00	20.00	25.00
Cadillac	T. C.-5-p.	1912	18.00	20.00	25.00
Cadillac	Tor-4-p.	1913	18.00	20.00	25.00
Cadillac	Phaeton-4-p.	1913	18.00	20.00	25.00
Cadillac	T. C.-5-p.	1913	18.00	20.00	25.00
Cadillac	T. C.-6-p.	1913	22.00	24.00	29.00
Cadillac	Phaeton-4-p.	1914	18.00	20.00	25.00
Cadillac	T. C.-5-p.	1914	18.00	20.00	25.00
Cadillac	T. C.-7-p.	1914	22.00	24.00	29.00
Cadillac	5-p.	1915	10.00	11.00	13.50
Cadillac	T. C.-5-p.	1915	17.00	19.00	23.00
Cadillac	T. C.-7-p.	1915	20.00	22.00	26.00
Cadillac	5-p.	1916	9.00	10.00	12.50
Cadillac	5-p.	1916	15.00	17.00	21.00
Cadillac	7-p.	1916	18.00	20.00	24.00
Chalmers	2-p.	1913	11.00	12.00	14.00
Chalmers	"36"-4-p.	1913	18.00	20.00	25.00
Chalmers	"Six"-4-p.	1913	18.00	20.00	25.00
Chalmers	"36"-5-p.	1913	18.00	20.00	25.00
Chalmers	"Six"-5-p.	1913	18.00	20.00	25.00
Chalmers	"36"-7-p.	1913	21.00	24.00	29.00
Chalmers	"Six"-7-p.	1913	21.00	24.00	29.00
Chalmers	"36"-19 4-p.	1914	18.00	20.00	25.00
Chalmers	"6"-24 4-p.	1914	19.00	21.00	26.00
Chalmers	"36"-19 5-p.	1914	18.00	20.00	25.00
Chalmers	"6"-26 5-p.	1914	18.00	20.00	25.00
Chalmers	"6"-24 5-p.	1914	19.00	21.00	26.00
Chalmers	"6"-24 6-p.	1914	20.00	22.00	27.00
Chalmers	"29"-4-p.	1915	19.00	21.00	26.00
Chalmers	"26B"-5-p.	1915	17.00	19.00	24.00
Chalmers	"32"-5-p.	1915	17.00	19.00	24.00
Chalmers	"29"-5-p.	1915	19.00	21.00	26.00
Chalmers	"6"-26B-6-p.	1915	18.00	20.00	25.00
Chalmers	"29"-7-p.	1915	20.00	22.00	27.00
Chalmers	"32"-6-40"-5-p.	1916	15.00	17.00	21.00
Chalmers	"29" Mas. 6"-5-p.	1916	17.00	19.00	24.00
Chalmers	"32"-6-40"-7-p.	1916	17.00	19.00	24.00
Oakland	"35"-5-p.	1913	16.00	18.00	22.00
Oakland	"42"-5-p.	1913	18.00	20.00	25.00
Oakland	"6-60"-7-p.	1913	20.00	22.00	27.00
Oakland	"36"-2-p.	1914	9.00	10.00	12.00
Oakland	"36"-5-p.	1914	15.00	17.50	21.50
Oakland	"48"-5-p.	1914	18.00	20.00	25.00
Oakland	"43"-5-p.	1914	18.00	20.00	25.00
Oakland	"37"-2-p.	1915	8.00	9.00	11.00
Ford Touring	5-p.	1911	10.00	12.00	14.00
Ford Touring	5-p.	1912	10.00	12.00	14.00

Car	Model	Year	1046	1000	1032 1050 1074
Ford Touring	5-p.	1913	9.00	10.50	13.00
Ford Touring	5-p.	1914	8.00	9.30	12.50
Ford Touring	5-p.	1915	8.00	9.30	12.50
Ford Touring	5-p.	1916	8.00	9.30	12.50
Ford Runabout	2-p.	1911	6.00	7.00	9.50
Ford Runabout	2-p.	1912	5.50	6.50	9.00
Ford Runabout	2-p.	1913	5.50	6.50	9.00
Ford Runabout	2-p.	1914	4.50	5.50	7.50
Ford Runabout	2-p.	1915	4.50	5.50	7.50
Ford Runabout	2-p.	1916	4.50	5.50	7.50
Buick	"29"-5-p.	1912	17.00	19.00	22.00
Buick	"24"-2-p.	1913	8.00	9.00	11.00
Buick	"30"-2-p.	1913	9.00	10.00	12.00
Buick	"25"-5-p.	1913	15.00	17.00	20.00
Buick	"31"-5-p.	1913	17.00	19.00	22.00
Buick	"40"-5-p.	1913	19.00	21.00	25.00
Buick	"B24"-2-p.	1914	7.50	8.50	10.00
Buick	"B36"-2-p.	1914	9.00	10.00	12.00
Hupmobile	"H"-5-p.	1912	14.00	16.00	20.00
Hupmobile	"32"-2-p.	1913	8.00	9.00	11.00
Hupmobile	"32"-5-p.	1913	14.00	16.00	20.00
Hupmobile	"32"-6-p.	1913	18.00	20.00	24.00
Hupmobile	"32"-2-p.	1914	8.00	9.00	11.00
Hupmobile	"32"-5-p.	1914	14.00	16.00	20.00
Hupmobile	"32"-6-p.	1914	18.00	20.00	24.00
Hupmobile	"32"-2-p.	1915	8.00	9.00	11.00
Hupmobile	"K"-2-p.	1915	8.00	9.00	11.00
Hupmobile	"32"-5-p.	1915	14.00	16.00	20.00
Hupmobile	"K"-5-p.	1915	14.00	16.00	20.00
Hupmobile	"N"-2-p.	1916	8.00	9.00	11.00
Hupmobile	"N"-5-p.	1916	13.00	15.00	18.50
Hupmobile	"N"-7-p.	1916	17.00	19.00	28.00
Maxwell	Spec. 36-5-p.	1912	16.00	18.00	22.00
Maxwell	"25"-5-p.	1914	14.00	16.00	19.00
Maxwell	"35"-5-p.	1914	16.00	18.00	22.00
Maxwell	"6-50"-7-p.	1914	21.00	24.00	29.00
Maxwell	Cabriolet-2-p.	1915	8.00	9.00	11.00
Maxwell	"25"-2-p.	1915	7.00	8.00	10.00
Maxwell	"17"-2-p.	1915	12.00	14.00	17.00
Maxwell	Cabriolet-2-p.	1916	8.00	9.00	11.00
Maxwell	"25"-2-p.	1916	7.00	8.00	10.00
Maxwell	"25"-5-p.	1916	12.00	14.00	17.00
Lozier	4-cyl.-7-p.	84	26.00	30.00	36.00
Lozier	6-cyl.-7-p.	82	26.00	30.00	36.00
Overland	"59R"-2-p.	1912	8.00	9.00	11.00
Overland	"59T"-5-p.	1912	15.00	17.00	20.00
Overland	61T, 61F-5-p.	1912	18.00	20.00	24.00
Overland	"69" R-2-p.	1913	8.00	9.00	11.00
Overland	69T.C., 61F, 69T-5-p.	1913	15.00	17.00	20.00
Overland	71T, 71F-5-p.	1913	18.00	20.00	24.00
Overland	"79" R-2-p.	1914	8.00	9.00	11.00
Overland	"79T"-5-p.	1914	14.00	16.00	19.00
Overland	"81" R-2-p.	1915	7.00	8.00	10.00
Overland	80R-2-p.	1915	8.00	9.00	11.00
Overland	"80T"-5-p.	1915	13.00	15.00	18.00
Overland	"81T"-5-p.	1915	12.50	14.00	17.00
Overland	"82T"-7-p.	1915	18.00	20.00	24.00
Overland	"83R"-2-p.	1916	6.75	7.50	9.50
Overland	"84R"-2-p.	1916	7.50	8.50	10.50
Overland	"83T"-5-p.	1916	12.50	14.00	17.00
Overland	"84T"-5-p.	1916	13.00	15.00	18.00
Overland	"86"-7-p.	1916	18.00	20.00	24.00

Prices on covers for cars not listed here upon application. Top slip covers to match all above \$3.50 to \$5.00

H. Channon Company Chicago

Fire-Proof Dimmer Goggles



No. 20.	Clear	\$1.00
No. 21.	Amber	1.00
No. 2022.	Clear bottom green top	1.50

Micalite

It won't burn

MICALITE has all the properties of celluloid, but will not burn. MICALITE is just as flexible, transparent and durable as celluloid, but is harder to scratch and will not support combustion.

NOTICE ALSO—The two colors are in one piece without seam or pasted joint. The old-fashioned celluloid eyeshields for dimmer purposes are made of two pieces of celluloid, either pasted together right before the line of vision, or of two pieces, one under the other, with four surfaces to scratch, and a place between for dust and dirt.

Two Colors—One Piece—Fire-Proof

ANOTHER POINT. Instead of using a cotton elastic which is certain to become useless in a short time, we use ordinary rubber bands slip-knotted through the end eyelet, and a rubber ring at the end of one band to fasten the goggle about the head. The bands are easily replaceable—any ordinary rubber band slip-knotted through the hole will do.

Optical Shock Absorber

Alwon Motor Glasses

The color glass protects the eyes when facing the sun or a brilliant headlight. Lenses are amber above and clear below, as shown. Each is made in one piece—not in two pieces pasted together right on the line of vision. Polished frames shell color.

No. 745.	Two colors, clear and amber.	Price each	\$2.00
No. 146.	One color, clear, amber or green.	Price each	1.00



Imperial Auto Folding Chair

The frame is made of the very best oval steel and finished in rich black Japan. The seat and back rest are upholstered in black water-proof art leather.

Built for strength and safety as well as convenience and comfort. Designed for an auxiliary seat in automobiles. An ideal seat for the camp, launch and many other places. It is without question the most comfortable seat made, and when folded occupies less space than any other seat.

DIMENSIONS OF CHAIR—Seat 11x12 inches. Back 12½x3½ inches. Height seat 16 inches. Folded, 12½x20x2 inches.

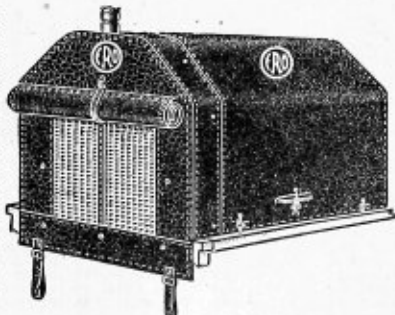
Price each. \$2.00



Radiator and Hood Covers for Ford Cars

These radiator and hood covers are made of heavy duck, felt lined.

They are heavily bound and come supplied with straps and buttons to fasten them properly. They are made so that it is unnecessary to detach them when hood is raised.

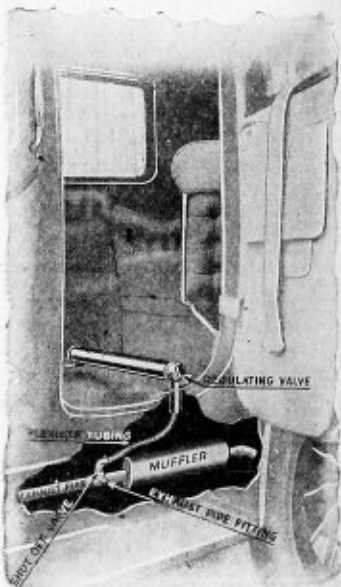


Radiator cover	\$2.70
Radiator and Hood Cover	4.70

The Utility Heater

For All Gasoline Cars

Keeps car heated at comfortable temperature in coldest weather without costing a cent for maintenance. The gases from the exhaust, instead of being wasted pass through the heater and escape into the air beneath the car. Simple, or namental and in destructible. Gives off no obnoxious odors or gases. Can not set anything afire. Can be installed in half an hour by drilling two small holes in floor of tonneau and one in the exhaust pipe ahead of the muffler. In ordering, please state outside diameter of exhaust pipe before it enters muffler. Nickel plated.



Utility heater, each	\$15.00
Utility heater for Ford cars, each	10.00

We carry Radiator and Hood Covers for all makes of cars. Prices on application.

Automobile Accessories

Pyrene Fire Extinguisher



DID YOU KNOW that any insurance company in the United States will allow a 15% reduction on automobile fire insurance rates for cars equipped with the Pyrene Fire Extinguisher?

This extinguisher is an effective safeguard against fires in garages and homes as well as on motor cars.

Few people who see an occasional machine consumed by flames realize the great numbers that are burned annually throughout the country, and the amount of loss and inconvenience, not to mention the fatalities. The sight of burning automobiles along the highway is still a common enough sight in spite of the improvements in their construction. None of these fires and the resulting deaths are necessary. The Pyrene Fire Extinguisher can be relied upon to kill the most stubborn blaze, no matter where it is, quickly and efficiently, without harm to engine or car. A few well directed shots from the extinguisher smother the fire instantly.

Don't use sand or water on your burning automobile. Sand hurts the bearings, and it is a well known fact that water merely spreads gasoline flames.

Pyrene Extinguishers are as easily refilled as a kerosene lamp. The liquid cannot deteriorate or freeze and will not hurt clothing. The extinguisher is easily operated and handsomely finished. It may be carried in the special holder on the dashboard.

Price each Brass.....\$14.00
Nickel.....16.00

Utility Coverall



Front View



Rear View

Style—Comfort—Safety

The highest grade utility garment on the market. Invaluable to motorists. It is a handsome garment, being made of the finest grade of khaki cloth. Perfect protection for clothes. Double belt, double fly flap in front, concealing buttons, thus preventing them from marring the finish of the car while being cleaned.

Price each.....\$5.00

Automobile Gloves



Sliding
tape
fastener
ventilated

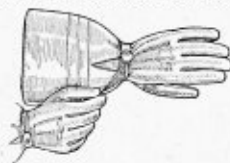
Style No. V4400

Price per pair Tan.....\$3.60
Black Colt Skin.....4.00



Style No. 4827 for Motorcyclists

Tan "Reindeer" or black coltskin, with double thumb and palm. Gives sure grip on handlebar.
Price each.....\$5.40

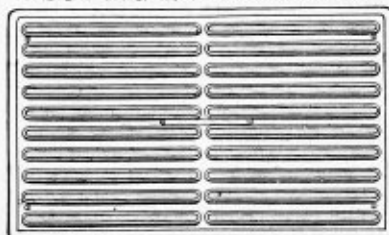


Style V4020

Ventilated or unventilated, cuff leather lined quick adjustable tape fastener.

Price per pair.....\$4.50

STANWOOD STEP PLATES PREVENT TRACKING OF DIRT INTO YOUR CAR



Consists of a series of semi-pliable rubber segments inserted into an embossed enameled metal plate. The rubber segments may be replaced at any time. Measurements—8 1/2 x 12 inches.

Type A, nickel plated, gray enameled, 24 segments...\$7.00

Type B, nickel plated, black enameled, 12 segments...5.00

Type C, rubber molded or perforated steel plate....3.00

Gripwell Tires are guaranteed for 3,500 miles.

H. Channon Company Chicago



A perfect assortment of 35 High Grade Tools, complete in every detail, containing in addition to the essential tools, many of great value in cases of emergency; handsomely mounted in heavy brown duck case, sewed throughout and indestructible.

Price complete.....\$18.00

"Perfection" Auto Tool Kits

No. 9 Iron Handle Screw Driver
3 1/2-lb. Ball Pein Hammer
4-in. Perfect Handle Screw Driver
10-in. Stillson Wrench
3-in. Screw Driver
W. & B. 10-in. Auto Wrench
Bearing Scraper
Soldering Copper
8-in. 1 1/2 Rd. Bastard File, with Handle
8-in. Mill Bastard File, with Handle
8-in. Round Bastard File, with Handle
8-in. Square Bastard File, with Handle
6-in. Slim Taper File, with Handle
4-in. Ward Bastard File, with Handle
8-in. Nickel Plated Combination Pliers
Drop Forged Wrench for 1/4 & 5/8 nuts
Drop Forged Wrench for 3/8 & 1/2 nuts

Drop Forged Wrench for 1/4 & 5/8 nuts
Cotter Pin Extractor
6-in. Side Cutting Pliers
No. 84 Two-Foot Rule
One Piece Self Fluxing Solder
One Piece Copper Wire
Box Assorted Lock Washers
Nickel Plated Bicycle Wrench
5-in. Flat Nose Pliers
5-in. Round Nose Pliers
3 1/2-in. Cold Chisel
3 1/2-in. Cape Chisel
Large Solid Drive Punch
Medium Solid Drive Punch
Small Solid Drive Punch
3 1/2-in. Knurled Center Punch
Box Assorted Cutters
Three Pieces Emery Cloth

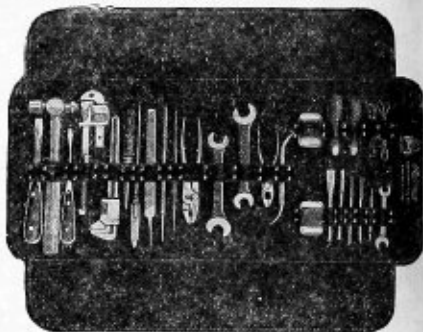
"Reliance" Auto Tool Kits

Consists of 28 Tools. All the essential tools for making repairs on the road, together with complete soldering outfit. Every tool is strictly high grade, fully warranted, and especially adapted for purpose intended. The case is of heavy brown duck, with retaining straps securely fastened with double rows of copper rivets.

9-in. Steel Handle Screw Driver
3 1/2-lb. Ball Pein Hammer
4-in. Perfect Handle Screw Driver
10-in. Stillson Wrench
9-in. Auto Wrench
Bearing Scraper
Soldering Copper
8-in. Mill Bastard File
8-in. Square Bastard File
8-in. Round Bastard File
6-in. Slim Taper File
8-in. Nickel Plated Combination Pliers
Drop Forged Wrench for 1/4 & 5/8 nuts
Drop Forged Wrench for 3/8 & 1/2 nuts

Drop Forged Wrench for 1/4 & 5/8 nuts
6-in. Side Cutting Pliers
Cotter Pin Extractor
Box Assorted Lock Washers
3 1/2-in. Cold Chisel
3 1/2-in. Cape Chisel
Small Solid Drive Punch
Medium Solid Drive Punch
3 1/2-in. Knurled Center Punch
Box Assorted Forged Cutters
One Piece Copper Wire
Two File Handles
One Piece Self Fluxing Wire

Price complete.....\$12.00



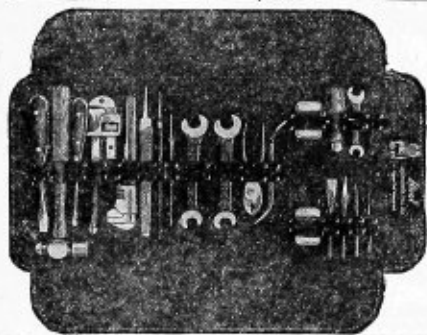
"Rival" Auto Tool Kits

Consists of 21 most necessary tools. Every one fully warranted. Mounted in a heavy duck case, with double riveted retaining straps.

9-in. Steel Handle Screw Driver
3 1/2-lb. Ball Pein Hammer
4-in. Perfect Handle Screw Driver
10-in. Stillson Wrench
9-in. Auto Wrench
8-in. Mill Bastard File
8-in. Round Bastard File
6-in. Slim Taper File
Drop Forged Wrench for 1/4 & 5/8 nuts
Drop Forged Wrench for 3/8 & 1/2 nuts

Drop Forged Wrench for 1/4 & 5/8 nuts
Pair 6-in. Nickel Plated Combination Pliers
Cotter Pin Extractor
Box Assorted Lockwashers
3 1/2-in. Cold Chisel
3 1/2-in. Cape Chisel
Medium Solid Drive Punch
3 1/2-in. Knurled Center Punch
Box Assorted Cutters
File Handle
One Piece Copper Wire

Price complete.....\$9.00



"Challenge" Kit

Consists of 15 Tools that are used every day. Fully warranted. The case is of heavy duck and the retaining straps double riveted.



5-in. Screw Driver
3 1/2-lb. Ball Pein Hammer
12-in. Stillson Wrench
9-in. Auto Wrench
Cotter Pin Extractor
6-in. Nickel Plated Combination Pliers
8-in. Mill Bastard File
8-in. Round Bastard File
6-in. Slim Taper File
Drop Forged Spark Plug Wrench with 7/8 & 1 1/8 openings
Drop Forged Wrench for 3/8 & 1/2 nuts
One Piece Soft Copper Wire
File Handle
1 1/2-in. Cold Chisel
No. 4 Solid Drive Punch
Price complete.....\$5.50

"Roadster" Auto Kits

Consists of 7 Tools which are indispensable. Fully warranted. The case is of heavy duck and the retaining straps double riveted.

D. P. Spark Plug Wrench with 7/8 & 1 1/8 openings
9-in. Auto Wrench
3 1/2-lb. Ball Pein Hammer
8-in. Mill Bastard File
5-in. Screw Driver
No. 4 Solid Punch
6-in. Combination Pliers

Price complete.....\$2.50



Automobile and Wagon Jacks Barrett Auto Jacks

The .088 1916 model one-ton jack meets at a very moderate price all utility requirements of motor vehicles, as to capacity and lifting heights.

By means of the quick acting footlift it is instantly set to any height without ratcheting, the entire raise of the lifting rack being reserved for actual lifting.

The base is made of highest grade malleable iron scientifically ribbed and proportioned to give maximum strength.

No. 311 has also a steel worm and bronze worm gear which provides powerful and easy leverage. Instantly set to any axle height and operated by as short or long a stroke as desired. It is automatically reversible, has ample capacity for the heaviest pleasure cars and will last a life time. The best automobile jack made.



No. 088



No. 311

No.	Capacity Tons	Height Inches	Raise Inches	Weight Pounds	List Price
.088	1	11 3/4	6 1/2	8 1/2	\$3.00
311	1 1/2	11	7	14	6.50

Barrett Auto Truck Jacks

The No. 24, 2 1/2-ton Garage and Truck Jack, is furnished as standard equipment with a great many makes of motor trucks. The load is ratcheted up one tooth space at every down stroke of the lever; to lower, push down the small reversing lever. Operating handle is furnished with each jack.

The Nos. 100 and 200 jacks are the same in design and operation but differ in capacity. The leverage is so compounded by gears that the load is lifted with only one-third the effort required with direct leverage. They are highly recommended for constant service in garages and repair shops where less sturdily built jacks soon wear out.

No. 24. Capacity 2 1/2 tons; height 11 1/2 inches; raise 5 1/2 inches; weight with lever, 15 pounds. Price each.....\$6.70

No. 100. Capacity 3 tons; height 10 3/4 inches; raise 5 1/2 inches; weight with lever, 16 pounds. Price each.....\$8.60

No. 200. Capacity 5 tons; height 13 inches; raise 6 3/4 inches; weight with lever, 28 pounds. Price each.....\$11.00



Nos. 100-200



No. 24

No. 36 Simplex Automobile Jacks



Made of malleable iron and painted. A simple, powerful jack intended for light cars, yet a thoroughly practical tool. Capacity 1,000 pounds; height 10 inches; raise 6 1/2 inches; weight 5 pounds; nicely finished. Price.....\$1.25

New Samson Wagon Jack

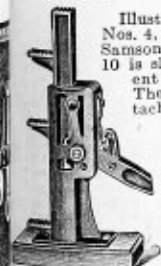
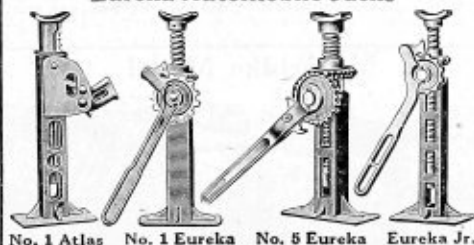


Illustration shows Nos. 4, 5 and 6 New Samson Jacks. No. 10 is slightly different in design. The lever is attached to a ratchet cog wheel which in turn operates a rack on movable section. It raises or trips with reverse movement, can be lowered notch by notch automatically.

Eureka Automobile Jacks



No. 1. Atlas.—For cars weighing up to 5,000 pounds. Malleable iron, aluminum finish. Quick and positive action. Only five simple working parts. No chance for load to slip or drop. Adjustment 10 1/2 to 18 inches; weight 6 pounds. Price each.....\$1.90

No. 1. Eureka.—For cars weighing up to 4,500 pounds. For quick adjustment pull screw with hand until top strikes load, spin gear into place, operate handle and load is quickly raised. Adjustment 10 to 17 inches; weight 4 1/2 pounds. Price each.....\$1.25

No. 5. Eureka.—For trucks weighing from 5 to 8 tons. Heavy bearings; long leverage; lifts load easily. Simply built with no loose or delicate parts to become deranged. Adjustment 13 to 30 inches; weight 15 pounds. Price each.....\$5.00

Eureka Jr.—For cars weighing up to 3,800 pounds. Malleable iron and steel, aluminum finish. Light, strong and efficient. Solid stud shaft used for side gear and handle. Adjustment 10 to 17 inches; weight 4 pounds. Price each.....\$1.00

The lower bracket will catch 1 1/2 inches from the ground. When standard reaches extreme height it will not drop back on cogs or pull out of frame.

No.	Will raise vehicles weighing	Tons	Weight Pounds	Price Each
No. 4.	Will raise vehicles weighing	2 tons	16	\$4.00
No. 5.	Will raise vehicles weighing	6 tons	25	5.00
No. 6.	Will raise vehicles weighing	8 tons	32	7.00
No. 10.	Will raise vehicles weighing	10 tons	30	8.00
No. 10.	With drop hook		32	9.00

Nos. 41-2-3 Simplex Automobile Jacks

These jacks are made from drop forged steel and are the only automobile jacks made in this way. All others are malleable iron or pressed steel. Furnished complete with auxiliary detachable shoe as shown in cut.

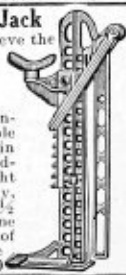
No. 41. Cap. 1 ton; height 10 ins.; lift 7 ins.; weight 9 1/2 lbs. Price each.....\$3.50

No. 42. Cap. 2 tons; height 11 1/2 ins.; lift 8 1/2 ins.; weight 11 lbs. Price each.....\$4.25

No. 43. Cap. 3 tons; height 13 ins.; lift 10 ins.; weight 13 lbs. Price each.....\$5.00

Tire Saving Jack

These jacks relieve the weight of the car from its tires and keeps them off greasy floors. Made entirely of malleable iron finished in aluminum. Adjusted to any height of wheel instantly, and will raise 2 1/2 inches with one lift. Wt. per set of four, 30 lbs. Price per set of 4 \$7.00



Bullock Bicycles

In presenting Bullock bicycles we have been guided by one object—to secure the maximum of efficiency.

Every component part entering into the assembly of these machines is of the highest quality procurable for the purpose. No attempt has been made to cheapen them in any way by substituting inferior materials. When we advertise "None Better Made," we mean just that. We do not sell competitive or even second grade machines, and therefore when buying a Bullock bicycle—whether a Roadster model or a Motorbike, you have the satisfaction of knowing that you are securing an article of quality—the best.

Roadster Model



Specifications

Frame, 1-inch seamless steel tubing, all flush joints. **Fork**, seamless fork sides, drop forged crown. **Crank Hanger**, drop forged one piece, 7-inch cranks, removable without disturbing cups. **Finish**, four coats of enamel, hand rubbed. **Colors**, red and black, battleship gray, blue and white. **Front Hub**, new departure. **Coaster Brake**, new departure or Corbin. **Rims**, one-piece maple. **Chain**, $\frac{1}{2}$ English twin roller. **Sprockets**, 25-tooth, diamond pattern; 9-tooth rear. **Spokes**, No. 1 quality, 24-16 gauge, swaged-piano wire. **Wheel Stand**, dead finish to match frame. **Tires**, 28x1 $\frac{1}{2}$ Thornproof thick tread 4-ply single tube; guaranteed. **Handle Bars**, forward extension with wound leather grips. **Saddle**, suspension cushion spring. **Pedals**, English, wide pattern. **Tool Bag**, round type, containing pump, wrench, oiler and kit. **Mud Guards**, steel, front and rear, double braced enameled to match frame. This model is also furnished in a juvenile size.

Price \$34.00

Motorbike Model



Specifications

Frame, 1-inch seamless steel tubing, extra heavy, strongly reinforced, flush joints. **Upper Tube**, motorcycle design. **Height**, 20 inches at seatpost. **Wheels**, 28-inch. **Truss Work**, motorcycle style as illustrated. **Crank Hanger**, drop forged one piece, 7-inch; can be removed without disturbing cups. **Finish**, handsomely enameled, four coats, hand rubbed. **Colors**, red and black, battleship gray, and blue and white. **Front Hub**, New Departure. **Coaster Brake**, New Departure or Corbin. **Rims**, one-piece maple. **Chain**, $\frac{1}{2}$ English twin roller. **Sprockets**, front 26-tooth, rear 9-tooth. **Spokes**, highest quality diamond E; 32 in. front, 36 in. rear. **Tires**, heavy motorcycle type, studded, single tube, guaranteed. **Handle Bar**, motorcycle style, extension, long rubber grips. **Saddle**, Eagle Easy Riding. **Pedals**, heavy English rubber. **Tool Bag** contains pump, wrench, oiler and kit. **Guards**, metal front and rear with leather splasher flap on front. **Stand**, as shown.

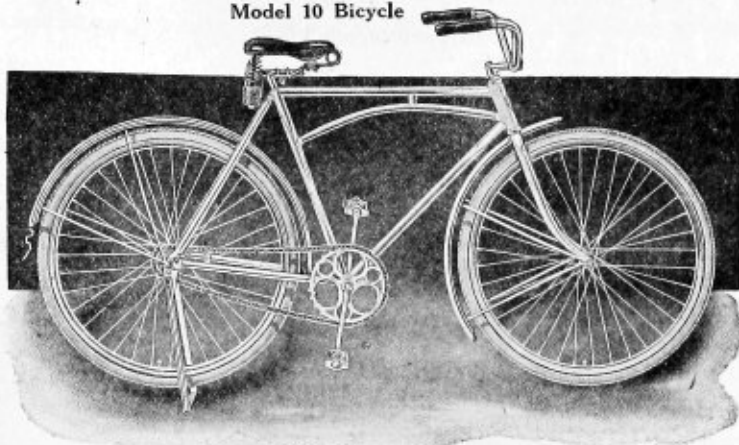
Price as above \$43.00

Boy's or girl's coaster brake model with 16 or 18-inch frame. Price \$31.00

Gripwell Automobile Tires are guaranteed for 3500 miles.

Bullock Arch Truss Frame

Model 10 Bicycle



There is a steady demand for a bicycle of this type. The arch bar is not needed to strengthen the frame, but is for ornamental purposes only.

Frame. 20 or 22-inch; made of 1-inch, 19-gauge tubing; 7-inch head; flush connections; $\frac{1}{4}$ -inch tapered rear works; $\frac{1}{4}$ -inch stays.

Fork. Full enameled.

Crown. Forging of beautiful design and great strength.

Cranks. Fauber round special; one-piece; with three-arm sprocket; patented.

Gear. 22-tooth front; rear, 9x $\frac{1}{2}$.

Front Hub. New Departure.

Coaster Brake. New Departure or Corbin.

Price. \$40.00
Extra for Clincher Rims and Tires..... 5.00

Rims. One-piece maple, enameled and striped.

Chain. $\frac{1}{2}$ -inch roller, 1-inch pitch.

Finish. Handsomely enameled, four coats, hand-rubbed.

Tires. Heavy, single tube, Gripwell Non-Skid.

Saddle. Coil spring, easy riding.

Pedals. Divided rubber.

Handle Bars. Adjustable expander, forward extension with leather grips.

Other Equipment. Dress and chain guards and nets and stand.

Bullock Ladies' Model Bicycle



Frame. One-piece seamless steel tubing, extra heavy, reinforced, all flush joints; arched bar, $\frac{1}{2}$ -inch.

Height. 20 or 22-inch at seat-post mast.

Wheels. 28-inch.

Crank Hanger. Fauber, drop forged, one-piece; removable without disturbing cups.

Finish. Handsomely enameled with four coats; hand rubbed.

Front Hub. New Departure.

Coaster Brake. New Departure or Corbin.

Rims. One-piece maple, enameled and striped.

Price. \$38.00
Extra for Clincher Rims and Tires..... 5.00

Chain. $\frac{1}{2}$ -inch twin roller.

Sprockets. Front, 26-tooth; rear, 9-tooth.

Spokes. Highest quality, Diamond E; 32 in front, 36 in rear.

Tires. Heavy Single Tube, Gripwell Non-Skid.

Handle Bars. Motorcycle style, extension long grips.

Saddle. Troxel Easy, motorcycle style.

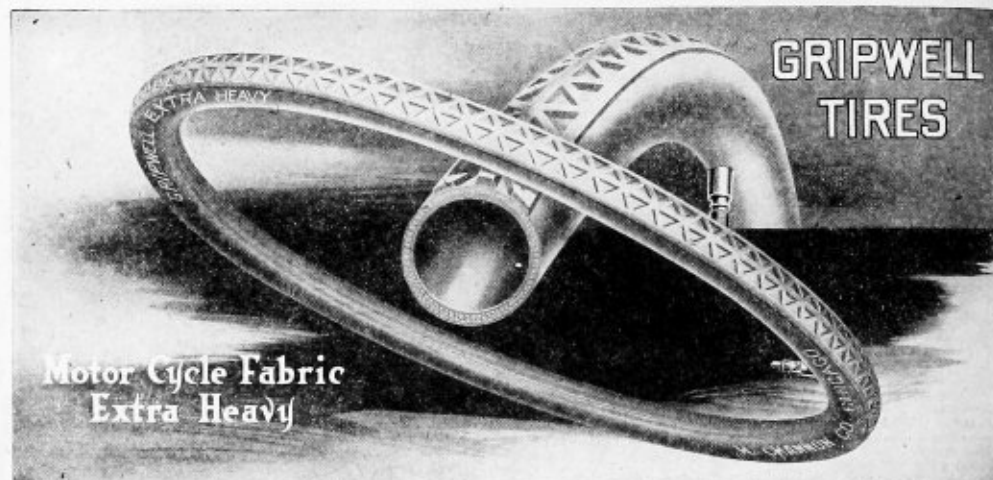
Tool Bag. Contains pump, oiler, wrench and kit.

Guards. Metal; front and rear.

Stand. Motorcycle style.

Bicycle Supplies

Gripwell Bicycle Tires

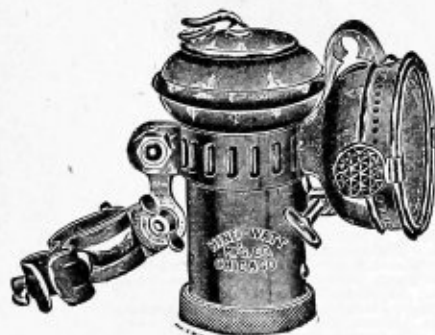
Gripwell Triangle Non-Skid
Bicycle Tires

In offering our customers Gripwell bicycle tires, we are confident that they are the best tire value the market affords. They are strictly first quality and guaranteed. Our economical methods of merchandising enables us to sell them at a very moderate price.

These tires are constructed of the best quality of motorcycle fabric, with a red rubber tread, especially compounded to make them oilproof and reduce punctures to a minimum. The Triangle Non-Skid is our exclusive design and is a positive non-skid tire on wet streets and slippery roads. It possesses a vast amount of tractive power on any kind of roads or streets.

These tires are guaranteed first quality and to give entire satisfaction. Any tire that fails through defective material or workmanship will be replaced free of charge.

Price per pair \$10.00



Columbia Gas Lamp

This gas lamp has a perfect record.

It operates the same as an ordinary barn lantern. It lights, and turns down or out at once.

Nickel plated over brass, powerful double convex lens, improved fish tail type removable burner, gas valve for regulating flame, or turning out entirely. Patent water distributor allows carbide charge to be used repeatedly until exhausted. Self-cleaning water valve; parabolic reflector, combination bracket that fits head or fork; no wicks, no rolled threads to stick; no flimsy material. Diameter of face, 2 3/4 inches.

Price each \$5.50

The Union Sanitary Clothes Hanger

For Mines, Steel Mills, Factories, Etc.



A simple, sanitary and inexpensive clothes hanger, which fully complies with the laws of Illinois and other states which require industrial plants of all kinds to provide suitable and sanitary wash rooms for employees. So arranged that they may change their clothing and provided with lockers or hangers in which clothing may be kept.

In mine, foundry and steel mill work the laborer's clothes after working one shift are usually damp, sweaty, smelly and dirty. When these clothes are stuffed into the very small locker space usually provided the condition of the clothes, also the locker, are hardly "sanitary" as provided by law. The clothes will be found to be in even worse condition than when they were taken off.

The Union hanger elevates the clothing, lunch box and valuables to a point near the ceiling where the circulating of the air rapidly dries the clothing besides keeping out all vermin and protecting such valuables as may be kept in the wire basket. This hanger is sanitary, complies with the law and is appreciated by the worker.

Can be furnished with or without padlock or wire basket as desired. Further particulars upon request.

The Union clothes hangers, besides being simple and inexpensive to install, are sanitary, safe, vermin proof—the location permits of a free circulation of air.

A standard hanger unit consists of: 35 to 40 feet of Union lock link chain with two special chain pulleys, either with lag screw or swivel screw, one special 4-prong ball point hanger and connecting link, two cleats with screws and with or without wire basket or padlock as desired.

Prices per Unit in Lots of 100 Units

Unit No. 132 as outlined above with 35 feet of chain without basket or padlock.....	\$3.60
Unit No. 133 as above with basket but no padlock.....	4.20
Unit No. 134 as above with both wire basket and padlock.....	4.80
Unit No. 135 same as No. 134 but with master key for padlocks.....	4.95

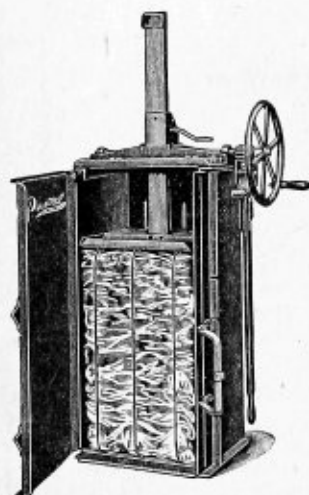
Extra length chain, add \$0.07½ foot.

Steel Paper Balers

Paper in a Baler

Means

Money in Your Pocket



Presteel

With the price of paper soaring, it is easy to start a new revenue by baling waste paper. The baler soon pays for itself many times.

The **Presteel** baler is fireproof, simply constructed and will last a lifetime.

The type of press used gives an enormous amount of leverage, enabling one to get a greater amount of weight into the same cubic space than could possibly be done by other balers.

The open top permits the dumping in of waste paper without poking with the hands from the front. The elastic sides of the bin provide for the easy quick removal of the bale from the front of the baler.

A list of dealers in paper can be had from the local Chamber of Commerce or Board of Trade.

Dimensions and Prices

Lot No.	Size of Press, Inches	Size of Bale, Inches	Weight of Bale, Pounds	Shipping Weight, Pounds	Price
1	19x21x39	17x18x35	125-150	250	\$48.00
2	22x23x45	18x20x38	150-225	325	60.00
3	26x27x56	22x24x42	250-350	425	95.00

No. 3 is equipped with double ram.

Wood Balers

The Superior baler gives bigger value for the money than any other baler on the market. The No. 30 Superior contains over 300 more cubic inches baling space than balers made by some of the other manufacturers listing at 20 per cent more.

The "U" shaped steel clamp encircling the entire baler protects sides and bottom when baling. The cross beam is reinforced by two steel truss rods. The large manganese iron nut with concave top insures perfect lubrication and ease of operation. The 1½ screw is more than ample strength and enables a boy to operate the Superior balers. The bottom and top are double. All corners are bound with heavy sheet steel.

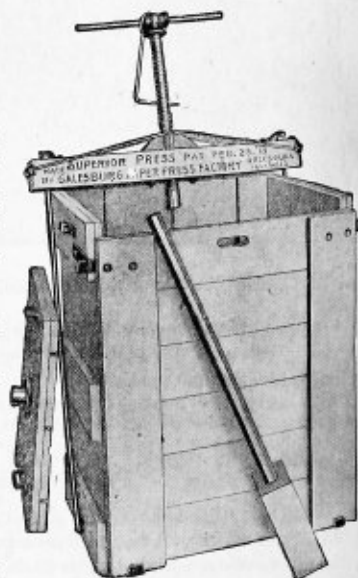
More than four years of continual use without breakage or signs of wear proves perfect construction and good service.

Two automatic spring locks on sides of balers hold compression clamp. Door locks are easily opened and do not project outward and are out of the way.

No.	Size Baler, Inches	Size Bales, Inches	Weight of Bales, Pounds	Price Each
2	48x27x22	18x22x30	150	\$12.50
3	48x34x22	18x27x30	175	13.50
30	48x24x34	20x27x30	225	15.50

All above numbers are three-wire balers which hold the bale better than a two-wire baler.

Bundle of 250 extra wires with one end looped. Price.....\$1.50



Superior

The Newman 1916 Grille Model Watch-Clock

A portable watch clock which must be carried by the watchman on each inspection round.

Approved by the National Board of Fire Underwriters, and all Mutuals.

The movement contained in this clock is similar to that of a fine watch—being jeweled and having thick plates and pillar posts, thus minimizing damage in case of accident. Pinions and pivots are of tool steel, highly polished. Cut wheels. Escape balance and pallet mounted in separate bridge with heavy balance cock.

The keys are of hardened phosphor bronze, which will not rust or corrode, and a metal guard on the flange protects the die from damage when the key is allowed to fall against masonry, iron pillars, etc.



Clock in Pouch

The case is of nickel aluminum, light in weight and durable. A metal guard protects the timepiece from breakage.

A complete outfit consists of a watch, pouch, carrying strap, station keys, chains, seals and one year's supply of paper dials. It also includes lift cover key box as illustrated, but for stations exposed to mischief a locked type of box will be furnished without extra charge.

6 station outfit complete	\$115.00
9 station outfit complete	120.00
12 station outfit complete	125.00
16 station outfit complete	130.00
24 station outfit complete	170.00
35 station outfit complete	205.00

This clock protects The Underwriters Laboratories, Chicago; The Insurance Exchange Building, Chicago; The Underwriters Building, New York, and the Bank of England, London, and it can protect you.



Key in Box



Alert Clock

Hardinge Watchmen's Portable Clocks

Approved and labeled by the National Board of Fire Underwriters and by all factory Mutuals.

The only American made portable watchman's clock.

The design and workmanship of the Hardinge clock movements are in accordance with the most stringent requirements for accuracy and endurance. These movements have eleven-jewel escapements which assure correct time-keeping. The plates are extra heavy and the pinions are hardened and finished like in a watch. In fact the only difference between this movement and a high grade watch is in size and strength.

The movement is entirely separate from the recording device, is absolutely dust proof. The jewels are protected from jars by a spring device and all parts are interchangeable.

The Hardinge Alert and Patrol Systems of portable clocks possess several exclusive and advantageous features described in a special booklet mailed on request.

The Alert System, for service requiring only a limited number of call boxes, has a capacity of 32 stations. It is only necessary to order the actual number of stations required as others may be added at regular price per station, with no rearrangement or interruption of service.

Complete with leather pouch, wire grill and a supply of paper dials to last one year.

Price.....\$66.00

Locked stations for exposed points. Price each.....3.30

Station for interior points not exposed. Price each.....2.20

The Patrol System, an unlimited clock system for plants requiring many stations and employing two or more watchmen.

Complete with leather pouch, wire grill and a supply of paper dials to last one year.

Price.....\$60.00

Patrol stations all lock boxes opened by master key. Price each.....6.00

There is no limit to the number of stations used with one clock and the system may be expanded or contracted at will.



Alert Drop-Cover Station Model "B"

Grinding Mills

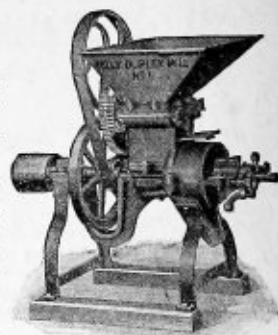
For Grinding Corn, Cobs, Husks and All Kinds of Small Grain

These machines are designed for general all-around grinding and are equipped with a set of double shear grinders or burrs which gives them a grinding surface of just double that of any other mill of equal size. Consequently they do twice as much work.

This type of grinder far excels any other for grinding corn with or without husks, cotton seed, Kaffir heads, peas with vines, sheaf oats, clover or alfalfa, etc.

Material to be ground passes first through the hopper to spiral knives, which revolve towards each other, and cut or crush it by a shearing process, which is adjustable. When this operation is completed, material drops to the lower crusher, which acts as a force feed, forcing the mass into the burrs.

Grinding into meal by the burrs is the final process, which may be fine, medium or coarse, but is always uniform.



Made in Ten Sizes

No. 00A.	With one hand wheel.....	\$23.00	No. 10.	Junior.....	\$39.00
No. 00A.	With two hand wheels.....	25.00	No. 30.	Junior.....	62.00
No. 00.	Mounted on sills.....	23.00	No. 1.	Duplex with pulley.....	58.00
No. 00B	With box base and sieves.....	34.00	No. 1.	Duplex, with horse power gear.....	58.00
	Hand wheel for No. 00B, each.....	3.50	No. 2.	Duplex, with pulley.....	72.00
No. 0.	.....	34.00	No. 3.	Duplex, with pulley.....	82.00

No. 4. Duplex, with pulley..... \$100.00

Elevator and bag attachments, extra cost prices on application.

Dimensions and Capacities

No. of Mill	Height	Width Outside	Speed	Size of Standard Pulley, Inches	Diameter of Burrs, Inches	Shipping Weight, Pounds	Power Required H. P.	Capacity per Hour, Bushels		
								Ear Corn and Cob	Ear Corn with H. Sks	Small Grain
00-A	2 ft. 2 in.	1 ft. 6 in.	.....	6x3 1/2	4	90	Hand	.....	.....	75 lbs. meal
00	1 ft. 8 in.	1 ft. 6 in.	.....	6x3 1/2	4	100	1 to 3	.....	.....	4 to 6
00-B	2 ft. 5 in.	1 ft. 6 in.	500 to 900	6x3 1/2	4	120	1 to 3	.....	.....	4 to 6
0	2 ft. 8 in.	1 ft. 4 in.	500 to 1000	6x6	6	160	1 1/2 to 6	.....	.....	4 to 8
1	3 ft. 4 in.	1 ft. 9 in.	700 to 1000	6x6	6	365	3 1/2 to 6	8 to 15	4 to 8	10 to 20
2	3 ft. 6 in.	2 ft. 0 in.	800 to 1000	8x6	7 1/2	475	7 to 10	15 to 25	8 to 15	20 to 30
3	3 ft. 8 in.	2 ft. 0 in.	900 to 1000	10x8	9	615	10 to 15	25 to 35	15 to 20	30 to 40
4	4 ft. 0 in.	2 ft. 4 in.	900 to 1100	12x9 1/2	12	860	15 to 20	40 to 60	30 to 40	50 to 75
10-Jr.	3 ft. 2 in.	2 ft. 0 in.	400 to 850	10x6	6	250	2 to 5	6 to 12	.....	8 to 15
30-Jr.	3 ft. 3 in.	2 ft. 4 in.	500 to 900	12x7	9	400	6 to 10	20 to 45	.....	25 to 50

The Mosher Bag Holder



This is the only bag holder adopted to all sizes of bags from a 48-pound flour sack to a 6-bushel gunny bag.

It is very simple and does the work perfectly, and will not tear the bags.

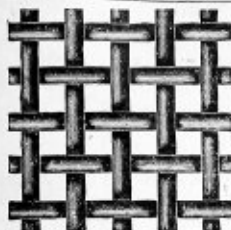
Price each.....\$8.00

The Hercules Steel Scoop



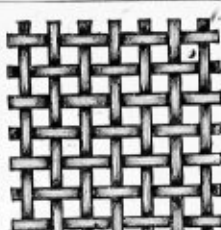
Price

Half bushel scoop, plain type, weight 7 lbs.....	\$3.00
Bushel scoop, plain type, weight 8 lbs.....	3.50
Half bushel scoop, double end type, weight 7 1/2 lbs.....	3.50
Bushel scoop, double end type, weight 8 1/2 lbs.....	4.00



Steel Wire Cloth

In ordering wire cloth always specify mesh, size wire, width and quantity desired. Mesh is the number of openings per lineal inch, center to center of wires. Space is the actual openings between wires. Washburn and Moen Gauge has been adopted as standard for steel wire cloth; Old English Gauge for brass and copper wire cloth. Full rolls contain 100 lineal feet. Cut rolls cannot be returned for credit or exchange.



Price Per Square Foot

No. meshes to in.	2	2	2	2	2	2	2	2	2	2	2	2 ¹ / ₂	2 ¹ / ₂	2 ¹ / ₂	2 ¹ / ₂	2 ¹ / ₂	2 ¹ / ₂
No. of wire.....	8	9	10	11	12	13	14	15	16	17	18	9	10	11	12	13	14
Last price, sq. ft.	\$0.60	\$0.48	\$0.38	\$0.32	\$0.27	\$0.22	\$0.17	\$0.14	\$0.12	\$0.10	\$0.09	\$0.60	\$0.48	\$0.38	\$0.32	\$0.27	\$0.22
No. meshes to in.	2 ¹ / ₂	2 ¹ / ₂	2 ¹ / ₂	2 ¹ / ₂	2 ¹ / ₂	3	3	3	3	3	3	3	3	3	3	3 ¹ / ₂	3 ¹ / ₂
No. of wire.....	15	16	17	18	19	11	12	13	14	15	16	17	18	19	20	12	13
Last price, sq. ft.	\$0.17	\$0.14	\$0.12	\$0.10	\$0.09	\$0.48	\$0.38	\$0.32	\$0.27	\$0.22	\$0.17	\$0.14	\$0.12	\$0.10	\$0.09	\$0.48	\$0.38
No. meshes to in.	3 ¹ / ₂	3 ¹ / ₂	3 ¹ / ₂	3 ¹ / ₂	3 ¹ / ₂	3 ¹ / ₂	3 ¹ / ₂	4	4	4	4	4	4	4	4	4	4
No. of wire.....	14	15	16	17	18	19	20	21	12	13	14	15	16	17	18	19	20
Last price, sq. ft.	\$0.38	\$0.27	\$0.22	\$0.17	\$0.14	\$0.12	\$0.10	\$0.09	\$0.60	\$0.48	\$0.38	\$0.32	\$0.27	\$0.22	\$0.17	\$0.14	\$0.12
No. meshes to in.	4	4	5	5	5	5	5	5	5	5	5	5	5	5	6	6	6
No. of wire.....	21	22	13	14	15	16	17	18	19	20	21	22	23	14	15	16	17
Last price, sq. ft.	\$0.10	\$0.09	\$0.60	\$0.48	\$0.38	\$0.32	\$0.27	\$0.22	\$0.17	\$0.14	\$0.13	\$0.10	\$0.09	\$0.60	\$0.48	\$0.38	\$0.32
No. meshes to in.	6	6	6	6	6	6	6	7	7	7	7	7	7	7	7	7	7
No. of wire.....	18	19	20	21	22	23	24	15	16	17	18	19	20	21	22	23	24
Last price, sq. ft.	\$0.27	\$0.22	\$0.17	\$0.14	\$0.12	\$0.10	\$0.09	\$0.60	\$0.48	\$0.38	\$0.32	\$0.27	\$0.22	\$0.17	\$0.14	\$0.12	\$0.10
No. meshes to in.	8	8	8	8	8	8	8	8	8	8	8	8	10	10	10	10	10
No. of wire.....	25	18	17	17	19	20	21	22	23	24	25	26	12	13	14	15	16
Last price, sq. ft.	\$0.09	\$0.60	\$0.48	\$0.38	\$0.32	\$0.27	\$0.22	\$0.17	\$0.14	\$0.12	\$0.10	\$0.09	\$0.60	\$0.48	\$0.38	\$0.32	\$0.27
No. meshes to in.	10	10	10	10	10	10	12	12	12	12	12	12	12	12	12	12	12
No. of wire.....	23	24	25	26	27	28	19	20	21	22	23	24	25	26	27	28	29
Last price, sq. ft.	\$0.22	\$0.17	\$0.14	\$0.12	\$0.10	\$0.09	\$0.60	\$0.48	\$0.38	\$0.32	\$0.27	\$0.22	\$0.17	\$0.14	\$0.12	\$0.10	\$0.09

Steel Space Cloth

With raw edges. Made of hard wire crimped both ways.
Made to order in pieces or rolls 24 to 108-inch widths. Also
made of galvanized wire.

We are also equipped for setting this screen into round, channel, angle or flat framing and also rolling into cylinders when used for revolving screens or separators. Send us your specifications.

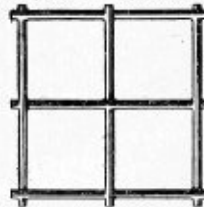
Price Per Square Foot

Wire No.	Space Between Wires, Inches									
	$\frac{1}{8}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{8}$	$1\frac{1}{2}$	$1\frac{3}{4}$	2	
0					\$1.18	\$1.09	\$0.96	\$0.85	\$0.90	
1				\$1.24	.98	.92	.80	.73	.68	
2			\$1.24	1.05	.86	.77	.68	.62	.58	
3	\$1.40	1.22	.99	.81	.71	.63	.57	.53	.50	
4	1.16	.96	.77	.67	.59	.53	.49	.46	.44	
5	.90	.76	.65	.57	.50	.46	.43	.41	.40	
6	.77	.64	.56	.48	.43	.40	.38	.37	.36	
7	.66	.55	.47	.41	.37	.35				
8	.56	.47	.40	.35	.32					
9	.46	.40	.34	.30						
10	.40	.35	.30							
11	.34	.30								

Galvanized Hardware Cloth Standard Grade

Stock widths 24, 30 36, 42 and 48 inches. Full rolls of 100 lineal feet.

Mesh	Gauge of Wire	Price per Sq. Ft.
2	19	\$0.07
2½	20	.07
3	21	.07½
4	23	.08
5	24	.08
6	25	.08½
8	27	.09



Standard Market Grade Brass Wire Cloth

Widths in stock 24, 30 and 36-inch.

No. meshes	2	3	4	5	6	8	10	12
No. wire	15	17	18	19	20	22	24	25
List, sq. ft.	\$0.64	.56	.55	.52	.52	.50	.46	.48
No. meshes	14	16	18	20	24	30	35	40
No. wire	26	27	28	29	30	31	32	33
List, sq. ft.	\$0.50	.48	.48	.48	.50	.55	.57	.60
No. meshes	50	60	70	80	90	100	120	140
No. wire	35	36	37	38	39	40	42	44
List, sq. ft.	\$0.65	.70	.78	.88	1.00	1.20	1.40	1.60

Brass strainer cloth, rolls 5 feet by 12 inches, also 36 inches,
Nos. 40, 50 and 60 mesh.

Old English gauge used for brass, copper and bronze wire cloth.

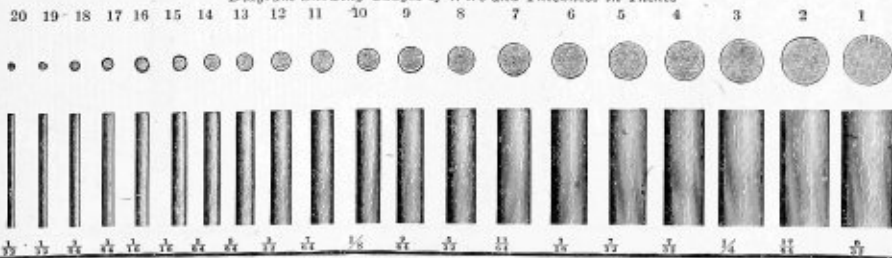
Window Screen Cloth

Price per 100 square feet in 100 lineal-ft. rolls only

12-mesh, black.....	\$ 3.00
12-mesh, galvanized.....	4.00
14-mesh, galvanized.....	4.50
14-mesh, copper-bronze.....	18.00

Widths furnished 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46 and 48 inches.

Diagram Showing Gauges of Wire and Thickness in Inches





Section Cut through Weld

Pittsburgh Perfect Wire Fencing

Perfect Weld—Double Galvanized

While this fence is called "double galvanized," it is, in reality, three times more durable than the galvanizing in ordinary fencing. The wire remains in the pure zinc bath three times longer than in the process usually used, allowing the spelter to penetrate deeply into the fibre and at the same time leaving a heavy, even layer of pure zinc on the surface.

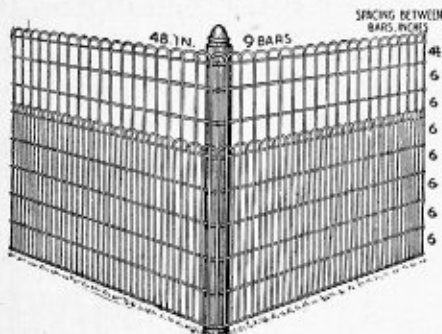
The weld makes a perfect union of the two wires at every joint. To make this perfectly clear, we illustrate a weld cut through the middle. Note the perfect amalgamation. There is no seam. The surface galvanizing is piled around the joint. The weld is twice as strong as the wire itself, because at each joint there are two wires merged into one. It is practically one solid piece of perforated metal. The wires are not cut into small pieces, twisted, jammed or hammered to the ruin of the galvanizing, nor is it burdened with useless wire which contributes weight at the expense of strength.

All "Pittsburgh Perfect" Fences have stay wires as heavy as intermediate line wires. A fence is only as strong as its lightest wire.

No wire projections to injure cattle or pull wool from sheep.

Stays cannot be slipped or separated from strands.

Adjustable to uneven ground.



Pittsburgh Special No. 9 Ornamental Lawn Fence

With Double Scroll

Cut shows fence 48 inches high, 9 bars, all heights, No. 9 wire. Upper pickets spaced $2\frac{3}{4}$ inches apart, lower pickets $1\frac{3}{8}$ inches apart.

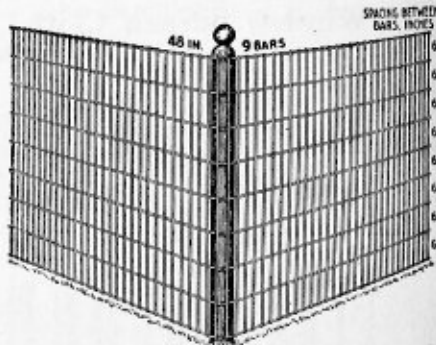
List Prices

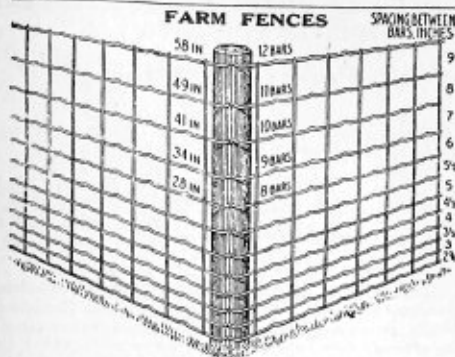
Style Number	Height Inches	Number of Bars	Inches Between Upper Pickets	Inches Between Lower Pickets	Approx. Weight per Foot	List Price Per Lineal or Running Foot
367x	36	7	$2\frac{3}{4}$	$1\frac{3}{8}$	1.69	\$0.20
428x	42	8	$2\frac{3}{4}$	$1\frac{3}{8}$	1.98	.22
489x	48	9	$2\frac{3}{4}$	$1\frac{3}{8}$	2.27	.25

Nos. 9 and 11 Plain Top Lawn Fence

No. 9 Plain Top Lawn Fence: Made entirely of No. 9 wire; 5 heights; picket wires either $1\frac{3}{4}$ or $2\frac{3}{4}$ inches apart. No. 11 Plain Top Lawn Fence: Made entirely of No. 11 wire; 5 heights; picket wires either $1\frac{3}{4}$ or $2\frac{3}{4}$ inches apart. Horizontal wires in Plain Top Fences are 6 inches apart. Put up in rolls of 100 feet and 150 feet.

Style No.	Height in Inches	No. of Bars	Inches Bet. Stays	No. 9 Plain Top, All No. 9 Wire		No. 11 Plain Top, All No. 11 Wire	
				Weight per 100 Feet	List Price per Lineal or Running Foot	Weight per 100 Feet	List Price per Lineal or Running Foot
245	24	5	$2\frac{3}{4}$	80	\$0.12	53	\$0.07
306	30	6	$2\frac{3}{4}$	98	.13	65	.08
367	36	7	$2\frac{3}{4}$	115	.15	77	.10
428	42	8	$2\frac{3}{4}$	133	.17	88	.11
489	48	9	$2\frac{3}{4}$	150	.19	100	.12
245	24	5	$1\frac{3}{8}$	106	.16	70	.10
306	30	6	$1\frac{3}{8}$	129	.18	86	.11
367	36	7	$1\frac{3}{8}$	153	.21	100	.13
428	42	8	$1\frac{3}{8}$	176	.24	116	.15
489	48	9	$1\frac{3}{8}$	200	.26	132	.16





Pittsburgh Perfect Light Weight Farm Fence

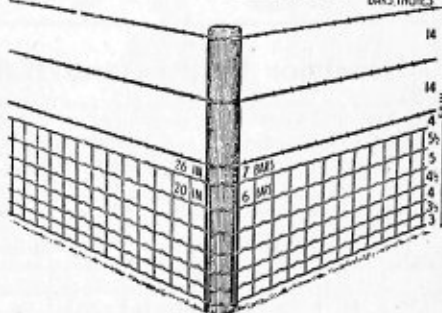
Made in regular and Jumbo weight. Regular weight, all No. 12 wire except top and bottom strands which are No. 10. Jumbo weight, No. 9 wire throughout.

The Special Hog Fence, shown below, is the same as farm fences Nos. 267 and 206 with barbed wire above.

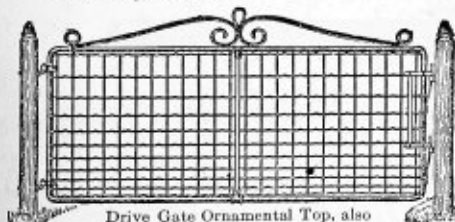
Style No.	Hgt. in Ins.	Ins. bet. Stays	Regular Fence				Jumbo Fence			
			Aprx. Wt. per Rod	Price per Rod	Ins. bet. Stays	Aprx. Wt. per Rod	Aprx. Wt. per Rod	Price per Rod	Ins. bet. Stays	Aprx. Wt. per Rod
5511	55	12	10.7	\$0.95	9	11.7	\$1.10	12	15.2	\$1.44
4710	47	12	9.7	.85	9	10.5	.99	12	13.6	1.29
399	39	12	8.6	.76	9	9.3	.87	12	12.0	1.14
328	32	12	7.6	.67	9	8.2	.77	12	10.5	.99
267	26	12	6.6	.59	9	7.1	.67	12	9.0	.86
206	20	12	5.7	.49	9	6.1	.57	12	7.6	.72
5511	55	6	13.8	1.25				6	19.8	1.99
4710	47	6	12.3	1.12				6	17.6	1.77
399	39	6	10.8	.98				6	15.3	1.55
328	32	6	9.4	.87				6	13.2	1.34
267	26	6	8.1	.75				6	11.3	1.15
206	20	6	6.8	.65				6	9.4	.97

Styles of General Farm Fence listed here are made with stays 9 inches apart (Regular Wt. only).

SPECIAL HOG FENCES



Plain top, also made with ornamental top as below.



Drive Gate Ornamental Top, also made with plain top as above.

Pittsburgh Perfect Gates

The tubular frames used in all "Pittsburgh Perfect" Gates have electrically welded joints, which produce one-piece, continuous frames of greatest strength, rigidity and durability. Couplings, which necessarily weaken the frame, are eliminated. The weld is equally as strong as the tubing itself.

When ordering, specify whether Ornamental Top or Plain Top is desired. Unless otherwise ordered, all Drive will be covered with "Jumbo" (all No. 9 wire) Farm Fence, stays 6 inches apart.

For Drive Gates covered with Lawn Fence, Plain or Ornamental Top, add \$1.00 to net price. We cannot cover with Lawn Fence gates over 50 inches high.

Single Drive Gates made only in heights and widths enumerated below.

Set posts 6 inches farther apart than width of gate.

Gates furnished complete with latches and hinges for wooden posts. 34-inch and 42-inch gates have single latches. 50-inch and 58-inch gates have single-action double latches (see cut).

LIST PRICES SUBJECT TO DISCOUNT

Size Ft. In.	Aprx. Weight	List Prices		Size Ft. In.	Aprx. Weight	List Prices		Size Ft. In.	Aprx. Weight	List Prices		Size Ft. In.	Aprx. Weight	List Prices	
		Plain Top	Ornamental Top			Plain Top	Ornamental Top			Plain Top	Ornamental Top			Plain Top	Ornamental Top
3x34	19	\$2.25	\$2.75	4x50	26	\$2.85	\$3.35	10x34	64	\$5.15	\$5.90	12x50	85	\$6.55	\$7.30
3x42	22	2.40	2.90	4x58	28	3.00	3.50	10x42	69	5.50	6.25	12x58	88	6.95	7.70
3x50	24	2.60	3.10	5x34	34	3.60	4.10	10x50	75	5.85	6.60	14x34	79	6.25	7.00
3x58	26	2.80	3.30	5x42	37	3.80	4.30	10x58	77	6.25	7.00	14x42	81	6.60	7.35
4x34	22	2.40	2.90	5x50	40	4.05	4.55	12x34	73	5.75	6.50	14x50	85	7.05	7.80
4x42	25	2.60	3.10	5x58	46	4.30	4.80	12x42	77	6.10	6.85	14x58	93	7.50	8.25

NETTING



Poultry Netting

Galvanized before or after weaving. Prices per square foot in full rolls 150 lineal feet.

Mesh	No. 16	No. 19	No. 20
2 -inch.....	\$0.05½	\$0.02½	\$0.02
1½ -inch.....	.08½	.03½	.03
1 -inch.....	.14	.06½	.06½

Widths 12 inches, 18 inches, 24 inches, 30 inches, 36 inches, 42 inches, 48 inches, 54 inches, 60 inches and 72 inches. Netting galvanized before weaving shipped unless otherwise ordered.

Excelsior Poultry and Rabbit Fence

All wires are specially cold drawn from hard steel stock, exceptionally strong and thoroughly galvanized to prevent rusting.

This fence is made light and heavy weight. The light has 19 gauge body wires and double 19 gauge selvage. The heavy has 17 gauge body and single 14 gauge selvage wires top and bottom. Made in 10-rod rolls.

List Price Light Grade

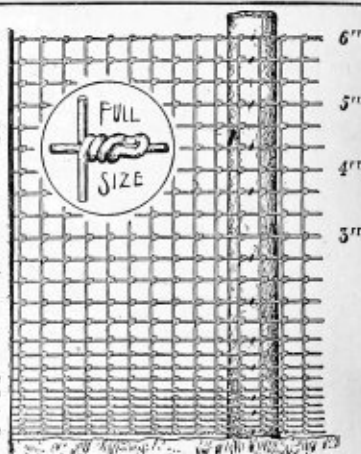
No.	Height, Inches	No. of Run'g Wires	Approx. Lbs. in 10 Rods	Price per Rod
L19	36	16	24	\$0.75
L19	48	19	28	.83
L19	60	22	33	.96
L19	72	25	40	1.08

List Price Heavy Grade

No.	Height, Inches	No. of Run'g Wires	Approx. Lbs. in 10 Rods	Price per Rod
H17	36	16	42	\$0.96
H17	48	19	51	1.12
H17	60	22	59	1.36
H17	72	25	68	1.46

Mesher.—The 1st, 2d, 3d and 4th spaces from bottom are 1½ inches. The 5th and 6th spaces are 1½ inches. The 7th and 8th spaces are 2 inches. The 9th and 10th spaces are 2½ inches and the 11th and 12th spaces are 3½ inches.

These meshes make up exactly the first 24 inches in height. All meshes above are 4 inches and the spacing of all uprights or stays is 4 inches.



"Veribest" Stretcher

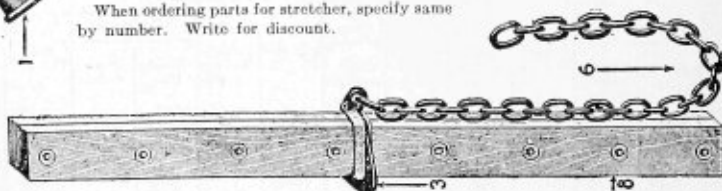


The simplest, cheapest, strongest and the only satisfactory tool ever gotten out. It distributes the pull over the entire area of the fencing and stretches the whole width of the fencing at one time until the tension is right and the fencing is taut.

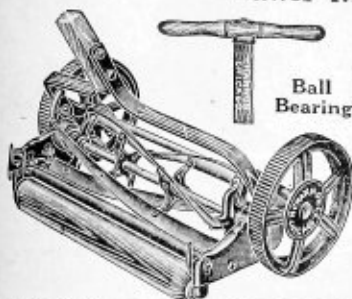
We especially recommend this stretcher for stretching "Pittsburgh Perfect" fencing, although it will work equally as well for stretching other makes. We do not ship wood handle with the stretcher. A hard-wood stick five to seven feet long will answer the purpose fully.

Price each, without handle. \$6.00

When ordering parts for stretcher, specify same by number. Write for discount.



Lawn Mowers, Clippers and Rollers



"Channon Special"

Ten-Inch Wheels—Four Blades

The material from which this machine is built is of the very best, the reel knives being made of manganese steel and the cutter bar of crucible tool steel. This is the same material as used in higher grade machines, Helmer and Boughton. The cold rolled steel shaft passing through the center of the open wheel mowers makes them rigid and permits their use as an axle. This makes an absolutely substantial axle. The long hub on the open wheel mowers aids the wheels to run easy and true, lengthens the life of the machine and reduces the wear on the ratchet. The cutter bar blade is fastened to the reel by set screws at each end and, being of extra length, makes them accessible for quick adjustment. Furnished in three convenient sizes, 16, 18 and 20-inch diameter.

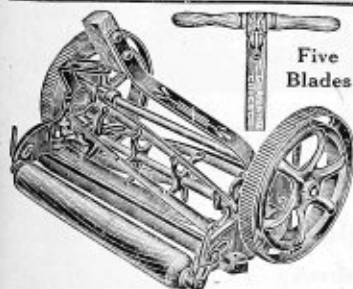
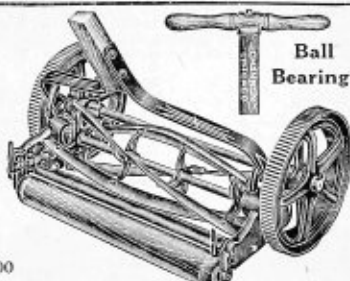
Width of blade, inches.....	16	18	20
Shipping weight, pounds.....	45	47	50
Price each.....	\$8.20	\$9.20	\$10.20

Helmer Lawn Mower

Ten-Inch Wheels—Four Blades

The "Helmer" is so built that it is one of the most pleasing to operate. Its pleasing design, proportion of weight, size of reel and reel blades make it a favorite as an all around machine. The wheels are fitted with solid hubs and oil retaining chamber, and are held by a steel clip bolted to the casing and fitted over the inside end of the hub, which is enlarged for the purpose. This permits the oil to circulate freely around the axle. No cotter pins or washers are necessary to hold the wheel on. The ratchets used are about one-fourth larger in diameter than the average. The shoulder on which the ratchet pins catch are longer, allowing a larger holding surface and more metal for them to wear on.

Width of blade, inches.....	16	18	20
Shipping weight, pounds.....	54	60	64
Price each.....	\$12.00	\$13.00	\$14.00



Boughton Ball-Bearing Lawn Mower

Eleven-Inch Wheels—Five Blades

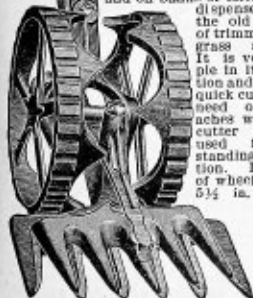
To satisfy the demand for a strictly high grade machine, we offer the "Boughton." Its noiseless, light-running operation cannot be excelled. Two reel blades are on the cutter bar blade at all times, giving a short cut. The reel is adjusted to the center bar blade and is the most accurate form of adjustment yet designed. It is easily set, then locked by a simple locking device, which preserves at all times the rigidity and correct alignment of the machine. A special feature of the Boughton machine is the turned-up hardened lip on the crucible tool steel bar blade. This turned-up lip feature makes the cutter bar blade self-sharpening and gives a larger wearing surface. The reel is 5 1/2 inches in diameter with five blades of manganese steel. The balls, cups and cones are of the highest grade steel, uniformly hardened and dustproof. Furnished in three sizes, 16, 18 and 20-inch diameter.

Width of blade, inches.....	16	18	20
Shipping weight, pounds.....	65	68	70
Price each.....	\$17.00	\$18.00	\$19.00

The Victor

Grass Clipper

A very handy device for trimming lawns in narrow spaces, along walks and drives around trees and shrubbery and on banks or terraces. It dispenses with the old method of trimming with grass shears. It is very simple in its operation and is a very quick cutter. No need of back-aches when this cutter can be used from a standing position. Diameter of wheel 5 1/2 in. 5 1/2 in. cutting capacity.



Price each
\$5.00

Water-Weight Lawn Rollers

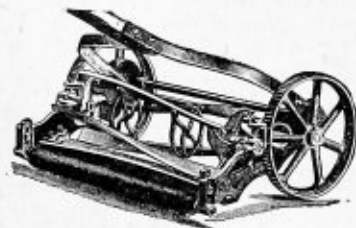
For use on lawns, gardens, tennis courts, athletic fields, golf courses, walks and drives. Its very easy running quality is due to the use of roller-bearings, high carbon steel, perfectly round and smooth axles—as used in automobile construction. The axle revolves freely in the roller-bearings at each end. The rolls revolve independently, being loose on the axle. The handles are strong and rigid, but light—all steel except the grip. Two weights are attached to the handle on either side, keeping the handle off the ground at all times. The weights are hung on the outside of the roll ends, instead of the inside where they work loose and cannot be readily reached. The edges are rounding to avoid cutting.

We can also furnish rollers without handle weights or without the water-weight attachment in most any size desired. Information gladly furnished.

No.	Size of Roller, inches	No. of Sections	Weight, pounds			Price Each
			Empty	Filled with Water	Filled with Sand	
2	14x20	1	120	260	360	\$15.00
4	18x24	1	135	360	560	18.90
6	24x24	1	185	560	860	24.00
8	24x32	1	200	710	1060	26.70
10	18x24	2	160	360	560	25.70
12	24x32	2	230	710	1060	33.20
14	24x24	2	185	560	860	30.50



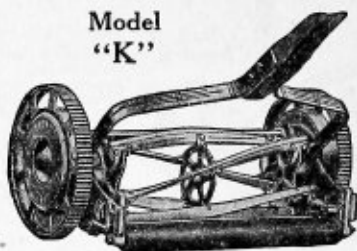
Genuine Philadelphia Lawn Mowers Plain Bearings



**Model
"E"**
Four
Vanadium
Steel Blades.
10-in. Dia.
Drive
Wheels

An especially efficient and satisfactory mower for professional or private work. It has removable box caps for taking out cylinder without disturbing adjustments. A train of 3 gears on one side operates double ratchets on other side, and its particular balance enables it to cut the thickest and toughest grass.

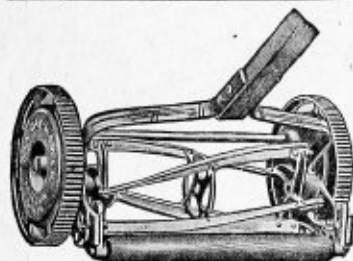
	15 in.	17 in.	19 in.	21 in.
Prices.....	\$25.00	\$28.00	\$31.00	\$34.00



**Model
"K"**
Five
Vanadium
Steel Blades.
10-In. Dia.
Drive
Wheels
Geared
Both
Sides

For many years this mower has met all requirements of professional and private work. We recommend this mower knowing that it will give absolute satisfaction.

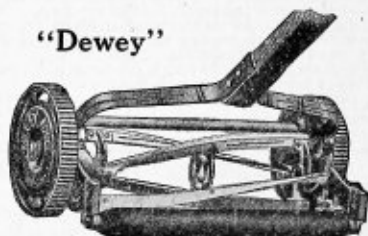
	16 in.	18 in.	20 in.
Prices.....	\$22.00	\$24.00	\$26.00



"All Day"
Four
Vanadium
Steel Blades
10-In. Dia.
Wheels
Geared
Both Sides

A Strictly High Grade Mower

A medium priced machine, fully efficient for high class work. Bearings $\frac{1}{2}$ inch diameter $1\frac{1}{4}$ and $1\frac{1}{2}$ inches long.
Price 16-inch blade....\$14.25 Price 18-inch blade....\$15.75

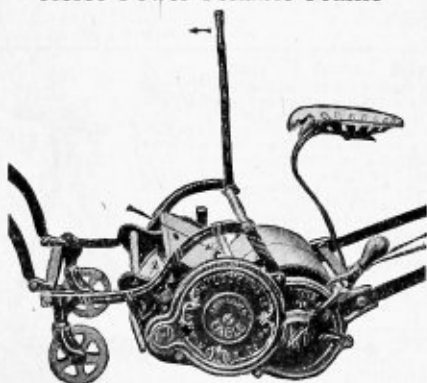


"Dewey"
Four
Vanadium
Steel
Blades.
8-In. Dia.
Wheels
Geared
Both Sides

Made to meet the demand for a moderate price and moderately low wheel mower. This mower is strictly high grade in every detail.

Price 16-in. blade.....	\$9.15	18-in. blade.....	\$9.60
-------------------------	--------	-------------------	--------

Improved "Eagle" Horse Power Flexible Frame

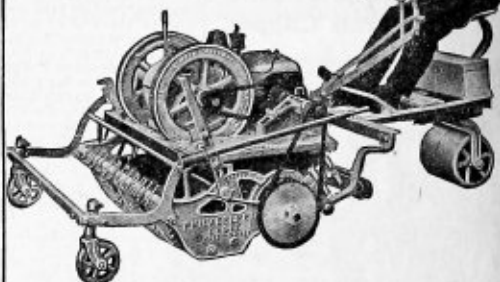


The Highest Grade and Only Flexible Frame Mower Made

Blades raised and all operations controlled from driver's seat. Can also be used as lawn roller only.

5 vanadium steel blades, ample bearings, high class workmanship. Prices with seat shaft and side draft attachment.
30-in. blade \$100.00 35-in. blade \$125.00 40-in. blade \$150.00

Eagle Motor Mower Walking and Riding Types



30-inch walking type. 40-inch walking and riding type. Material, workmanship and accuracy of construction same as in a high grade automobile one-piece cylinder Bosch magneto. $2\frac{1}{2}$ horse power for 30-inch, 4 horse power for 40 inch. Full description sent on request.

	30 in. Walker	40 in. Walker	40 in. Rider
Prices.....	\$300.00	\$475.00	\$550.00



Eureka Adjustable Grass Catcher

Made to meet the demand for a low-priced grass catcher.

Adjustable to all sizes and makes of low wheel mowers.

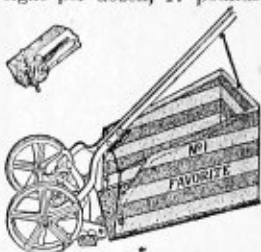
No. 1.—Fits 12 to 18 inches, inclusive. Weight per dozen, 17 pounds.

Price per dozen.....\$8.00

No. 2.—Fits 18 to 24 inches, inclusive.

Weight per dozen, 18 pounds. Price per

dozen.....\$9.00



Favorite Grass Catcher

Made of heavy striped canvas on a steel frame and steel bottom.

No. 1.—Fits 12 to 16 inches, inclusive. Weight per dozen, 36 pounds. Price

per dozen.....\$13.50

No. 2.—Fits 16 to 20 inches, inclusive. Weight per dozen 47 pounds. Price

per dozen.....\$13.80



Bieder Adjustable Grass Catcher

One of our best numbers.

Made extra deep to prevent grass being thrown over sides and rear. Will fit all sizes and makes of mowers.

Our unconditional guarantee is back of this grass catcher.

No. 7.—Fits all low wheel mowers, 18 inches and smaller. Weight per dozen

20 pounds. Price per dozen.....\$11.00

No. 13.—Fits all high wheel mowers, 24 inches and smaller. Weight per dozen

22 pounds. Price per dozen.....\$15.50

Ironclad Adjustable Grass Catcher

Made of heavy striped canvas, with galvanized iron bottom. This combines lightness with durability, and is especially designed for the trade that wants the best irrespective of price.

No. 1.—For all high and low wheel mowers, 18 inches and smaller. Weight per dozen, 43 pounds. Price per dozen.....\$20.00

No. 2.—For all high and low wheel mowers, 18 to 24 inches. Weight per dozen 50 pounds. Price per dozen.....\$23.50



Carroll Adjustable Grass Catcher

Fastens to mower without the use of clamps.

The spring in the forward hem holds the catcher securely to the mower. Easily removed for emptying—it is only necessary to spread the forward end.

Adjustable to fit all size mowers.

No. 1.—Fits 12 to 18 inches, inclusive. Weight per dozen 18 pounds. Price per dozen.....\$10.00

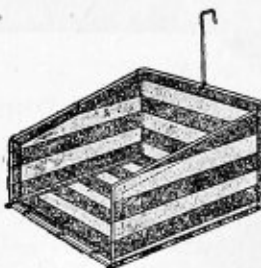
No. 20.—Fits 18 to 24 inches, inclusive. Weight per dozen 20½ pounds. Price per dozen.....\$13.00

Champion Grass Catchers

These catchers are made over a wire frame which tends to keep the canvas off the ground, thereby protecting it.

The No. 3 model has only one wire in the center while the Nos. 4 and 5 models have three each.

No	To Fit, Inches	Weight, Pounds to Dozen	Price per Dozen
3	12 to 18, inclusive	15	\$10.00
4	12 to 18, inclusive	18	11.00
5	18 to 24, inclusive	22	13.00



The American Wolf Type Miner's Safety Lamp

An American Made Lamp Similar to the Imported Wolf Safety Lamp

Its construction has proven the most satisfactory. It is made of heavy cold rolled steel tinned with brass trimmings. It is stronger, more serviceable and costs less to maintain than any other safety lamp on the market.

It is very sensitive to gas, indicating plainly as low as $\frac{3}{4}$ of 1 per cent with the luminous flame, and is extensively used for testing purposes. With a non-luminous flame, as low as $\frac{1}{2}$ of 1 per cent of gas may be detected and $\frac{3}{4}$ of 1 per cent shows a distinct gas cap.

It has from 1 to $1\frac{1}{2}$ c. p. illuminating power and the light remains practically constant from 9 to 12 hours.

The maintenance cost is very low and should not exceed 1 cent each lamp per shift, for naphtha, repair parts and supplies. The fuel burns as a gas. The wick does not char and rarely requires renewal.

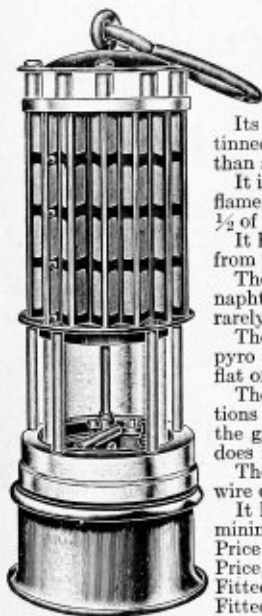
The standard lamp for general use! Burns naphtha and is fitted with double gauzes, pyro metal or match tape internal igniter, key or magnetic lock, and burner for either flat or round wick.

The shield, or bonnet, is corrugated to increase the radiating surface, and the perforations are so made as to prevent the high velocity currents from impinging directly against the gauze. A plain steel bonnet can be furnished, but it has less radiating surface and does not keep the lamp as cool.

The gauzes are of the best grade charcoal iron wire carefully woven. Brass or copper wire can be furnished at small additional cost.

It has passed the most exacting tests and been formally approved in practically every mining locality. It has been tested in high velocity currents up to 2500 feet per minute.

Price each, as described above..... \$4.50
 Price, made from light weight aluminum alloy, round wick only..... 6.00
 Fitted with 1 lens, extra..... 1.65
 Fitted with 2 lens, extra..... 3.35
 Fitted with 3 lens, extra..... 4.75



The American Pneumatic, Signal System

A thoroughly reliable pneumatic signal system, durable, easy to install, and which will not echo, nor repeat the signal given. It is positively the only pneumatic signal device which will operate without an echo, an inestimable advantage, as all confusion from this cause is avoided.

It consists essentially of a specially designed air pump which when operated at any station on the line compresses the air sufficiently to cause the desired signal to be given simultaneously at all stations on the line. One blast of the whistle or one stroke of the gong is given for each impulse of the pump piston.

The signal pump is entirely self-contained and no fittings are required for its erection. All that is necessary is to erect a suitable pipe line connecting the points between which it is necessary to signal, and attach the pumps. One pump for each station.

Line Can Be Used as Speaking Tube

The piston rod is hollow and upon opening the check valve near the mouthpiece the line is open as a speaking tube. Sound is transmitted sharp and clear in the very deepest shafts. This feature is invaluable when the mine telephone is out of order, or if an accident should occur and more than one method of communication is desired.

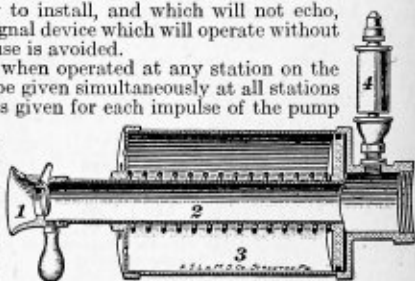
Once properly installed there is practically no maintenance expense. The pump is heavily constructed of cast and drawn brass and has no delicate parts. Signals installed for 10 to 20 years still give perfect service, the only expense being an occasional new packing ring.

It cannot get out of order. Left untouched for an indefinite period it will operate perfectly at first impulse of the piston.

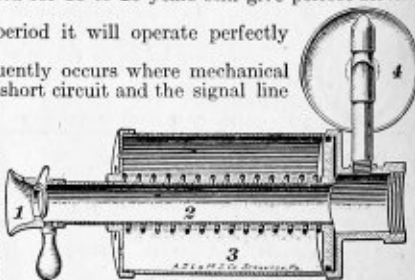
Materials falling down shaft cannot cause a false signal, as frequently occurs where mechanical signals using wires are employed. There are no wires to break or short circuit and the signal line is not readily damaged by fire or water.

Prices

- M220. Pneumatic signal pump complete with one gong or whistle, 6x9 $\frac{1}{4}$ x2 $\frac{1}{2}$ inches, for signaling up to 900 ft. Each \$27.00
 M222. Pneumatic signal pump complete with one gong or whistle, 8x13 $\frac{1}{4}$ x3 inches, for signaling up to 2000 ft. Each \$33.50
 M224. Signal whistles, brass. Each..... 2.00
 M225. Signal gong, steel, complete. Each..... 4.00
 M226. Signal gong, brass, complete. Each..... 5.50
 Brass tubing and pipe at market.



Whistle Signal



Gong Signal

The Justrite Carbide Campers' and Miners' Lamps

No matches required to light the Justrite. Cover the reflector with palm of the hand, hold few seconds, then draw hand downward, quickly, rubbing over the steel wheel.
This lamp has the new lever feed and a polished brass reflector with a sparker attachment permanently attached. It is part of the lamp and cannot get loose or fall off.



Lever Feed—Valve Control—Lighter Attachment 2 1/4-inch Reflector

No. 407.	Polished brass, lamp only.	Price each	\$1.25
No. 408.	Gun metal finish, lamp only.	Price each	1.25
No. 409.	Nickel plated, lamp only.	Price each	1.35
No. 85.	Polished brass with No. 77 carbide can.	Price each	1.25
No. 89.	Gun metal finish with No. 77 carbide can.	Price each	1.25
No. 86.	Nickel plated with No. 77 carbide can.	Price each	1.60
No. 57.	Polished brass with No. 68 extra bottom.	Price each	1.35
No. 59.	Gun metal finish with No. 39 extra bottom.	Price each	1.35
No. 58.	Nickel plated with No. 31 extra bottom.	Price each	1.60

2 5/8-inch Reflector

No. 427.	Polished brass, lamp only.	Price each	\$1.25
No. 258.	Polished brass with No. 77 carbide can.	Price each	1.35
No. 268.	Polished brass with No. 68 carbide can.	Price each	1.60

Spiral Feed—Valve Control—Lighter Attachment

2 1/4-inch Reflector

No. 527.	Polished brass, lamp only.	Price each	\$1.25
No. 528.	Gun metal finish, lamp only.	Price each	1.25
No. 529.	Nickel plated, lamp only.	Price each	1.45
No. 124.	Polished brass with No. 77 carbide can.	Each	1.35
No. 125.	Gun metal finish with No. 77 carbide can.	Each	1.35
No. 126.	Nickel plated with No. 77 carbide can.	Each	1.60
No. 121.	Polished brass with No. 68 extra bottom.	Each	1.50
No. 122.	Gun metal finish with No. 39 extra bottom.	Each	1.50

2 5/8-inch Reflector

No. 123.	Nickel plated with No. 31 extra bottom.	Each	\$1.60
No. 237.	Polished brass, lamp only.	Price each	1.25

2 5/8-inch Reflector

No. 547.	Polished brass, lamp only.	Price each	\$1.25
No. 154.	Polished brass with No. 77 carbide can.	Each	1.35
No. 151.	Polished brass with No. 68 extra bottom.	Each	1.50

Equipped with No. 28 Jewel tips.

Superintendents' Lamps

Lever Feed—Valve Control—Lighter Attachment —Nickel Plated Highly Polished

Nickel plated reflector, with sparker attachment. Folding handles and hook, pocket carbide can and extra repair parts. Burns 3 hours with 2 ounces of 1/4-inch carbide. Height, 4 inches. Weight, 6 ounces. Reflectors are built into the lamps.

No. 100.	Price each	\$1.90
No. 95.	Price each	2.50
No. 105.	Price each	3.10

Justrite Headlight

For Drivers, Motormen
Miners, Inspectors, Etc.

Gives a penetrating light. Protected by strong lens. Will not blow out. Self lighting attachment. Matches not required. Burns 10 hours on one charge 8 ounces 1/4-inch carbide. Generator weighs 1 1/2 pounds. Headlight weighs 5 ounces.

No. 44.	Price each	\$5.00
No. 36	Open flame.	Price \$3.65



Headlight



Acetylene
Lantern



Superintendent's Lamp

The Justrite Acetylene Lantern

Gives a 20 candle power light. Burns 5 to 6 hours with 3 ounces of carbide. Flame is controlled by the valve and can be turned high or low or extinguished, as desired. Made of brass throughout, nickel plated and highly polished. No complicated parts to get out of order and very easy to operate.

Each lantern is packed in a tin case.	
No. 10.	Price each \$5.00

H. Channon Company Chicago

Supplies for Cap Lamps

60	Gasket, flat rubber, packed 1 dozen in box, 12 boxes in carton	Per doz.	\$ 0.75
62	Felt packing for filtering gas, packed 1 dozen in a box, 12 boxes in carton	Per doz.	.75
64	Felt holders, packed $\frac{1}{2}$ dozen in box, 12 boxes in carton	Per doz.	1.75
78	Valve stems for lever feed, packed $\frac{1}{2}$ dozen in box, 6 boxes in carton	Per doz.	6.00
113	Valve stems for spiral feed, packed $\frac{1}{2}$ dozen in box, 6 boxes in carton	Per doz.	6.00
16	Wires for No. 78 valve stem, packed 1 dozen in box, 6 boxes in carton	Per doz.	.75
68	Bottoms, brass, small size, packed 1 dozen in box	Per doz.	5.00
39	Bottoms, gun metal fin, small size, packed 1 dozen in box	Per doz.	5.00
31	Bottoms, nickel plated, small size, packed 1 dozen in box	Per doz.	6.00
181	Water caps or doors, packed 1 dozen in box	Per doz.	2.50
215	Valve stem, for No. 227 lamp, packed $\frac{1}{2}$ dozen in box, 6 boxes in carton	Per doz.	6.00
216	Filtering screen, for No. 227 lamp, packed 1 dozen in box, 12 boxes in carton	Per doz.	1.25
217	Felt packing, for No. 227 lamp, packed 1 dozen in box, 12 boxes in carton	Per doz.	.75
218	Extra bottom, for No. 227 lamp, packed 1 dozen in box	Per doz.	6.00
219	Triple container, for No. 227 lamp, packed 1 dozen in box	Per doz.	18.00

Supplies for Nos. 100 and 95

60	Gasket, flat rubber, packed 1 dozen in box, 12 boxes in carton	Per doz.	\$ 0.75
62	Felt packing for filtering gas, packed 1 dozen in box, 12 boxes in carton	Per doz.	.75
64	Felt rubber, packed $\frac{1}{2}$ dozen in box, 12 boxes in carton	Per doz.	1.25
78	Valve stem for No. 100, packed $\frac{1}{2}$ dozen in box, 6 boxes in carton	Per doz.	6.00
79	Valve stem for Nos. 95, 101, 103, packed $\frac{1}{2}$ dozen in box, 6 boxes in carton	Per doz.	6.00
16	Wire for No. 78 valve stem, packed 1 dozen in box	Per doz.	.75
17	Wire for No. 79 valve stem, packed 1 dozen in box	Per doz.	.75
31	Bottoms, nickel plated, for No. 100, packed 1 dozen in box	Per doz.	6.00
34	Bottom, nickel plated, for No. 95, packed 1 dozen in box	Per doz.	7.50
69	Bottom, brass, for No. 101 model, packed 1 dozen in box	Per doz.	6.00
29	Bottom, brass, for No. 103 model	Per doz.	8.50
35	Candlestick, for 101, 103 models, packed 1 dozen in box	Per doz.	6.00

Supplies for Nos. 44 and 36 Headlight

40W	Water tank, as wanted	Price each	\$2.00
40C	Bottom, as wanted	Price each	1.50
40L	Head lamp, as wanted	Price each	2.50
41	Canvas belt, 42 inches, packed 1 dozen in box, 12 boxes in carton	Per doz.	6.00
42	Rubber hose, 4-foot lengths, packed as wanted	Price each	.70
42B	Hose pins, packed 2 in envelope, 1 dozen envelopes in box	Per doz.	1.25
43	Gasket, round rubber, packed 1 dozen in box	Per doz.	2.50
45	Lava tip, packed 1 dozen in box	Per doz.	2.50
45B	Brass tube and tip, packed as wanted	Price each	.70
46	Valve stem, packed 1 dozen in box	Per doz.	6.00
47	Locking clamp, packed as wanted	Price each	.70
48	Glass lens, regular, packed as wanted	Price each	.50
49	Glass lens, special "Bulls' Eye," packed as wanted	Price each	1.00
38	Reflector attachment for No. 36 lamp, packed as wanted	Price each	2.00

Supplies for No. 10 Lantern

3L	Dome, top part, packed as wanted	Price each	\$1.00
4L	Valve with tip, packed as wanted	Price each	.70
5L	Valve stem, packed as wanted	Price each	.50
7L	Rubber ring for inside, packed as wanted	Price each	.20
8L	Reflector, packed as wanted	Price each	.50
32	Carbide container, 2 shells, packed as wanted	Price each	1.00
33	Water shell, bottom, packed as wanted	Price each	2.00
61	Gasket, flat rubber, for outside, packed 1 dozen in box	Per doz.	1.25
67	Lava tip, fish tail, packed 1 dozen in box	Per doz.	2.50
11	Bull's eye lens, packed as wanted	Price each	.50
70	Globe, regular lime glass, packed as wanted	Price each	.30
71	Globe, extra pearl glass, packed as wanted	Price each	.50

Carbide

For use in all lamps. Put up in 2-pound cans.

Price per can	\$0.35
100-pound drums. Price per drum	6.00



The "Buckeye" Kerosene Light

Fig. 2255

A portable light for outside work. Very popular with railroads and contractors, chiefly on account of its simplicity and because it uses kerosene which is cheap and readily obtainable in the smallest hamlet in the country.

Unaffected by wind or rain. Casts no strong shadows. Has no mantles to break as in a gasoline light. It is a portable light torch, having the power within itself generated from kerosene oil forced by compressed air to a burner which is heated by a simple process before the oil is turned on. When turned on, it at once becomes vaporized and sends forth a strong, white, smokeless flame 12 to 40 inches long, depending upon the size of the lamp. Uses common or stove kerosene.

This is the light that was adopted as standard by the Panama Canal Commission.



Fig. 2255

Size No.	Price Each	Candle Power	Size of Tank, Inches	Oil Consumed per Hour	Weight, Boxed	Extra Burners
No. 3	\$65.00	2000	16x22	1 1/4 Gal.	160 Lbs.	\$15.00
No. 5	75.00	4000	18x30	1 3/4 Gal.	210 Lbs.	22.40

The "Buckeye" Carbide Light

A flare light that will stand wind, rain or storm and operates at a cost of about one cent per 1000 candle power.

The simplest form of mechanism possible, no pumps or any moving parts, no mantles, no heating of burners, can be started very quickly and requires no attention until burned out.

The action is caused by water attacking the calcium carbide and generating acetylene gas, which is the nearest approach to artificial sunlight.

Carbide can be purchased in some localities as low as 3 1/2c lb.

* Freezing—During the generation of gas, a large amount of heat is liberated (as in slacking lime) this would prevent any danger from freezing, but in extreme latitudes the addition of calcium or chloride will prevent all freezing.

Recharging—By the use of extra cylinders the capacity in length of hours can be carried on continuously.



Size No. 5, Type S.

Tripod Attachment can be applied to any light, giving double the light but for shorter periods. Outfit consists of tripod, reflector, burner, unions, valves, 25 feet of hose and connections to attach to standpipe on standard light.

Price.....\$40.00

Cylinders—The capacity of one cylinder is 10 hours; with extra cylinder 20 hours. An extra cylinder with carbide cage is usually purchased and recommended.

Type "S" Outfit—For wrecking cranes, dredges and steam shovels. Generator is placed on the machine and piped to the reflectors which may be located where desired. This outfit includes the generator, 25 feet of armored hose, reflector, burner, unions, cocks and all connections.


No. 5
Pipe
Style.
The
popular
Size
and
Style.

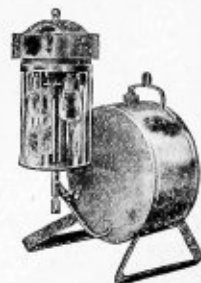
Size No.	Price Each	Candle Power	Extra Cyl. with Carbide Cage	Diam. of Reg. Reflectors, Inches	Add for 18-inch Reflector	Add for Long Beam Reflector	Net Wght., Lbs.
No. 2A	\$50.00	1000	\$13.50	12	16-in., \$6.00	\$7.50	60
No. 3C	70.00	5000	16.50	16	6.00	9.00	75
No. 3"S"	96.00	5000	18.00	16	6.00	6.00	56

The "K-B" Portable Gasoline Light

An 800 Candle Power Outdoor Lamp

A small portable light, a general favorite with contractors, railroads, mining and lumber camps, farmers, circuses, tent shows, camping parties and other places where a light that will stand rough usage is required. It is a complete plant in itself, and can be hung anywhere; burns well inside or outside. Absolutely storm proof; is easily lighted and cleaned; is equipped with a self guiding cleaning needle, which can also be used as a regulator. The tank is made of heavy galvanized sheet steel, and has a gasoline capacity of one and one-half gallons and can be operated at a cost of about one cent for two hours.

Weight 12 lbs. Price each.....\$15.00



Kerosene Lanterns

**Cold Blast**

No. 2 Cold Blast for use indoors or out. Gives a steady, white light.

With White Globes

Per dozen . . . \$10.50

With Ruby Globe

Per dozen . . . \$12.50

Globes Per Dozen

White	Ruby
\$1.80	\$4.40

**No. 6 Hot Blast**

The most popular type of Hot Blast lantern made. Height with ball down, 13 1/2 in. Fount holds oil to burn 23 hours. Gives 4 C. P. light.

With White Globes

Per dozen . . . \$6.50

With Ruby Globes

Per dozen . . . \$8.50

Globes Per Dozen

White	Ruby
\$1.50	\$4.00

**"Lightning"
Lantern**

The globe is much shorter than those used on the ordinary lantern. The opening being larger allows free access in cleaning. Keeps cool and eliminates breakage. The fount holds sufficient oil to burn 62 hours. Extra quality tinplate. Domed well. Inside lever lift, large filler, seamless inside cylinder, 1-inch wick, cold blast globe. Fount holds 1 1/2 pints of oil.

With White Globes

Price per dozen . . . \$12.00

With Ruby Globes

Price per dozen . . . \$14.00

Globes Per Dozen

White	Ruby
\$1.80	\$4.40

**No. 2 Mill**

For watchman's use. When locked it is impossible to raise globe or reach burner. Height with ball down, 15 inches. Fount holds sufficient oil to burn 20 to 23 hours. Cold Blast construction. Gives good, clear light.

With White Globes

Per dozen . . . \$33.00

Globes Per Dozen

White	Ruby
\$1.80	\$4.40

**Railroad**

with Wire Base

No. 39 Standard Railroad Lantern with wire base, exactly the same as the No. 39 Railroad Lantern described in other column, except for the base. Wire base is preferred by some users.

With White Globes

Per dozen . . . \$13.00

Price each . . . 1.50

Globes Per Dozen

White	Ruby
\$1.80	\$4.00

**Side Wall Reflector
Lamp****Cold Blast Extra Quality Tin Plate**

For wall or portable use. Gives a powerful light over a wide area.

Price per dozen . . . \$24.00

Globes

Price per dozen . . . \$1.80

Packed three in a box.

**Banjo or Lighting
Gasoline Torches**

For indoor or outdoor lighting. Not affected by wind, rain, heat or cold. Gives strong, bright light. Our torches are of superior quality and are well made throughout. Practical in operation and very durable. Finished either tin, japanned finish or galvanized.

Prices Tin Japanned

Dozen . . . \$20.00

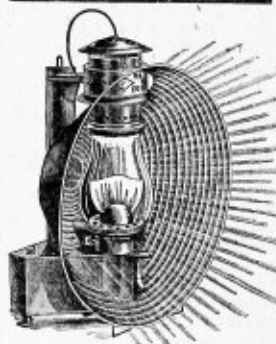
Galvanized

Dozen . . . \$25.00

**No. 20 Tin Tubular Cold
Blast Searchlight**

Japanned finish; throws brilliant and steady light; will burn out of doors as well as inside without smoking or flickering; it is not affected by wind or strong drafts; has 7-inch nickel plated brass reflector with 16-inch concentric corrugated hood. They are useful wherever a strong reflected light is required. They may be filled, lighted and regulated without removing the globe. Has a No. 2 cold blast burner; 1-inch wick; cold blast globe and fount holds 1 1/4 quarts of oil; burns 48 hours.

Price each . . . \$3.00



Kerosene Lanterns

"Little Star" Lantern

The "Little Star" is a favorite among lantern users. It gives a 3 C. P. light, is only 11 inches high and will burn for 12 hours straight. Patent tinned steel No. 1 burner and $\frac{5}{8}$ -inch wick. Has positive-locking globe lift and dome shaped solderless oil fount. Price per dozen \$6.00

Globes

Price per dozen \$1.50

"Junior" Cold Blast Lantern

This little lantern is one of our best selling small lanterns. Used mostly around barns and on milk wagons. It stands 12 inches high, gives a 6 C. P. light and will burn for 13 hours with one filling. It has all the latest improvements; globe lift inside of frame; safety wing-lock No. 1 burner; dome-shaped solderless oil fount; $\frac{5}{8}$ -inch wick. Weight 2 $\frac{1}{2}$ pounds. Price per dozen \$8.50

Globes

Price per dozen \$1.50

"Buckeye" Dash Lamp

Black enameled dash lamp. Burns steadily, even in the strongest wind. It has a dash clip-spring, a ball for use as a hand lantern and also serves as a wall lamp. Bright corrugated tin reflector and a 2 $\frac{1}{4}$ -inch magnifying bull's eye lens in front of flame. Has a safety wing-lock No. 1 burner; positive locking globe lift; dome shaped solderless oil fount; safety well and large oil filler. 13 $\frac{1}{4}$ inches high, $\frac{5}{8}$ -inch wick and burns 19 hours. Gives a bright 10 C. P. light. Weight 2 pounds. Price per dozen \$10.50

Globes

Price per dozen \$1.50

"Junior" Wagon Lamp

Designed to meet the requirements of the state and city laws regulating night lights on horse drawn vehicles. It has a clip-spring holder in addition to the combination socket taking a round or flat bracket. It lights the road and shows a red danger signal to the rear. Has a bright corrugated tin reflector and 2 $\frac{1}{4}$ -inch magnifying bull's eye lens in front of flame; also a 2 $\frac{1}{4}$ -inch ruby rear lens. 12 inches high; 10 C. P. light; $\frac{5}{8}$ -inch wick; burns 13 hours and weighs 2 pounds. Price per dozen \$15.00

Globes

Price per dozen \$1.50

"Eureka" Driving Lamp



A reliable lamp for night driving for those who like a small but bright light. 7 $\frac{1}{4}$ inches high. Made of cold rolled steel. Has a 3-inch door lens. 2 $\frac{1}{4}$ ruby rear lens and burns for 10 hours.

Price per dozen \$18.00

"Imperial" Platform Lamp



Burns steadily with a clear white flame, giving 100 C. P. reflected light. 21 inches high, 10 $\frac{1}{2}$ inches wide, 10 $\frac{1}{4}$ inches deep, 8-inch reflector, 1 $\frac{1}{2}$ -inch wick. Burns 17 hours. Weight 21 pounds. Price each \$7.50

"Climax" Platform Lamp



For both indoor and outdoor use, dancing platform, skating ponds, etc. Two sizes, No. 1, 15 inches high, No. 2, 17 $\frac{1}{2}$ inches high. Easy to substitute gas pipe and burner.

Price Each

No. 1 \$3.25
No. 2 3.75

Boughton Brand Paint

All paints under our Boughton brand can be relied upon to give not only the utmost covering capacity, but to contain the finest ingredients, thoroughly and properly ground and mixed.

A painting job consists so largely of labor that it is poor economy not to buy good paint.

Poor paint costs just as much to put on as good paint. Good paint stays on longer and its protecting and preserving qualities are in direct proportion; in other words, a coat of good paint will protect for a long time, while a coat of poor paint, although it may look bright and fresh for a time, soon loses its protecting qualities.

Under the Boughton label there is a paint for machinery; a paint for your engine, boiler, boiler front, smokestack; paint for concrete and brick structures, cement floors, mill and factory interior walls and ceilings, barns and roofs, wagons and implements; a paint for painting interior and exterior of houses; in fact, a paint for every purpose.



Boughton Cold Water Paint

The perfect paint for machine coating large surfaces.
Easier to prepare than whitewash—costs but little more.

Sanitary, Fire-Retardant, Light-Reflecting

It is a finely ground pigment prepared for cold water mixing and produces a sanitary paint, possessing fire-resisting qualities recognized by the National Board of Fire Underwriters. It contains no lime, alkali, injurious chemicals, or ill-smelling animal matter and will not burn the hands and face or harm the clothing of the workman, as does whitewash. May be applied with brush or paint sprayer.

It cannot be equalled for coating the interior walls and ceilings of mills, factories, warehouses or similar structures. Can be applied to either smooth or rough surfaces of wood, cement, stone, brick, metal, or plaster, forming a beautiful finish, which will not fade, turn yellow, chalk or peel. The white is a pure white, and will stay white. It makes the most unsanitary dark, grimy, and unpleasant places clean, bright and cheerful. Does not scum, foam, or settle when used with a spraying machine, and will remain in perfect solution without clogging the machine.

Its cost is one-tenth that of oil paint, and it is ten times as good as whitewash.

Sprays freely, and much more surface can be covered and more satisfactorily, than with any other paint on the market.



Five pounds, mixed with water, will make one gallon of paint, and cover on most surfaces about 300 square feet.

List Prices on White Only

Barrels, 400 pounds each.	Price per pound	\$0.07
100-pound kegs.	Price per pound	.09
50-pound kegs.	Price per pound	.10
25-pound kegs.	Price per pound	.12
5-pound trial package.	Price per pound	.16

Made in white and fourteen beautiful shades.

Write for color card and prices.

Style J Spraying Machine

A strong, durable and efficient sprayer used in applying Boughton cold water paint. The working parts are brass, the handle and legs are of iron, bolted firmly. It has a suction hose to extend into bucket or tub, or it may be adjusted to a barrel.

Price each, complete with 10 feet of discharge hose and long spray rod.....\$22.00

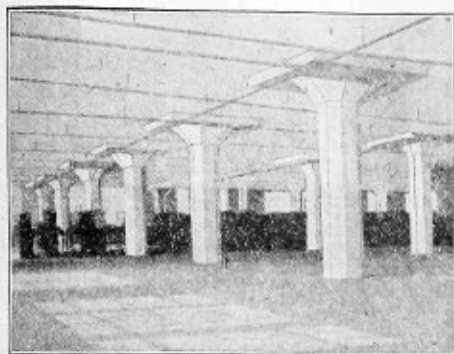


Style J Spraying Machine



Boughton Mill White

A Bright Intense White Paint for Lightening Up Factory Interiors



Boughton Mill White is the only oil paint (without varnish) giving a glossy tile-like finish. Do not mistake it for a kalsomine or cold water paint. It is a combination of a paint and an enamel possessing the easy working qualities of a linseed oil paint. It is as white as porcelain—and stays white—and has a high gloss finish like tile or enamel. It flows easily from the brush and dries hard and white. Keeping it clean and sanitary is a simple matter. It can be washed with soap and water as easily as tile and does not require frequent renewals like a cold water paint and will not powder or scale off. It is an ideal wall coating for the inside of all buildings, such as packing houses, dairies, creameries, bakeries, breweries, laundries, garages, machine shops, mills, factories, etc. Improves the lighting in any shop, and the workmen can accomplish more and better results from their day's work. The high gloss will not absorb light or coal dirt, germs or odors like a flat paint, but utilizes all the available light by reflecting it down upon the machinery and in every corner, reducing the light bills and lengthening the daylight day.

Two coats are equal to three coats of lead and oil.

Approximate covering capacity, 250 square feet to the gallon, two coats.	
Barrels and half-barrels, price per gallon.....	\$4.00
Five and ten-gallon cans, per gallon.....	4.10
One gallon can, per gallon.....	4.20

Boughton Mill White Primer

Boughton Mill White primer is used on metal ceilings, brick, plaster, concrete and other porous surfaces. We recommend our Boughton primer as a coating preparatory to using the Mill White, on account of its special adhering quality to these particular surfaces, and at the same time giving a non-absorbent foundation for the finishing coat of Boughton Mill White.

Barrels and half-barrels, per gallon.....	\$3.90
Five and ten-gallon cans, per gallon.....	4.00
One-gallon cans.....	4.10

Boughton Cement and Brick Coating

A Waterproof, Dustproof, Wearproof Coating for Cement, Concrete or Brick Floors, Walls or Ceilings

By driving into the pores of new concrete and brick structures, Boughton Cement and Brick Coating forms a part of the surface, resisting the dampness and producing a splendid flat finish. Used for all inside and outside brick, stone, cement, concrete, stucco, old and new plaster. Prevents wearing and dusting of cement surfaces, particularly floors of warehouses, factories, vaults, basements, etc. Can be used on floors of garages and engine rooms as well as walls. Its hard flint-like surface is very easily cleaned and proves unequalled as an aid to maintaining a dry and sanitary building.

Its covering capacity is about 200 to 400 square feet, according to the finish and condition of surface. Write for color card.

Barrels and half-barrels, per gallon.....	\$4.00
Five and ten-gallon cans, per gallon.....	4.10
One-gallon cans.....	4.20

Boughton Cement and Brick Coating Reducer

Used in connection with our Cement and Brick Coating in thinning or reducing to the proper consistency for the particular porosity of the floor. Thin coats are especially important in treating cement floors. Two thin coats will produce far more satisfactory and permanent results than one heavy coat. On account of the different materials used and the different methods employed in hardening the cement, no two floors are alike in porosity.

Barrels, per gallon.....	\$2.40	One-gallon cans, each.....	\$2.60
Five-gallon cans, per gallon.....	2.50		



Boughton Graphite Paint

Liquid Form

Graphite in its liquid form is used for painting smoke-stacks, iron structures, roofs, bridges, boilers or any metal or wooden surface where the exposure is severe and it is necessary to have a durable non-corrosive paint.

Graphite is practically indestructible and preserves iron and steel surfaces for an indefinite length of time. For that reason it is being used more and more each year. The graphite used in the manufacture of this paint is a natural product and is absolutely pure. It possesses fire-proof qualities and will resist the action of alkalis, acids, gases, water, brine, and sulphur fumes. On account of its elasticity it will successfully withstand the heat and cold.

One gallon of Boughton Graphite Paint will cover 500 to 600 square feet of space, according to the weather and surface. It spreads easily and prevents corrosion if the surface is thoroughly covered.

Made in black, natural, green and brown. Black always furnished unless otherwise specified.

Barrels and one-half barrels. Price per gallon.....	\$3.00
5 and 10 gallon cans. Price per gallon.....	3.30
1 gallon cans. Price per gallon.....	3.50
One-half gallon cans. Price per can.....	1.80

Paste Form

For those who desire to mix their own paint, we can furnish Boughton Graphite Paint in paste form. Painters often mix their own paint in accordance with the condition of the surface. Otherwise it does not differ from the liquid form.

12½ and 25-pound cans. Price per pound.....	\$0.28	100-pound kegs. Price per pound.....	\$0.24
---------------------------------------------	--------	--------------------------------------	--------

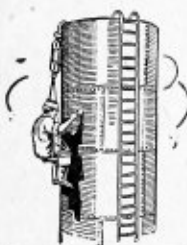


Boughton Smoke Stack Paint

This paint, although not as durable and heat resisting as Boughton Graphite Paint, is used extensively for painting smoke stacks, boiler fronts, etc. It will wear an exceptionally long time and protect the metal from deterioration. We recommend it for use on any metal surface.

Made in black only.

Barrels and one-half barrels. Price per gallon.....	\$3.30
5 gallon cans. Price per gallon.....	2.40
1 gallon cans. Price per gallon.....	2.50



Boughton Structural Paint

For application to temporary construction or enclosed structural iron or steel work. There is no better way to preserve structures than to keep them covered with a good coat of paint. It adds considerably to its appearance and at the same time is economical. It dries rapidly and does not become brittle or hard and crack off, but remains tough and elastic. It is a non-porous paint which seals the surface and prevents rust and corrosion. Furnished in two shades—red-oxide and deep brown. Also black.

In barrel lots. Price per gallon.....	\$1.60
---------------------------------------	--------



Boughton Flat Black Paint

Prepared ready for use. Can be used on either metal or wood for producing a dead black, wrought iron finish. For ornamental iron work, picture frames, mouldings, lamps, gas fixtures, etc. One gallon cans. Price per can..... \$4.50
One-half gallon cans. Price per can..... 2.40
One quart cans. Price per can..... 1.20
One pint cans. Price per can..... .70

Boughton Galvanized Iron Primer

For first coat on galvanized iron. Obviates the liability of peeling or scaling so common where ordinary paints are applied direct to the galvanized surface. May be coated over with any good oil or graphite paint. Recommended for use as a first coat on galvanized iron stove fronts, roofs, cornices, etc. Barrels and one-half barrels. Price per gallon..... \$4.80
5 and 10 gallon cans. Price per gallon..... 4.90
1 gallon cans. Price per gallon..... 5.00

Boughton Asphalt Paint

Mostly used for metal exterior work, boiler tanks, or wherever a metal preservative is needed. Owing to its ability to stand heat and cold without cracking or checking, it is most satisfactory for steam pipe coating. It is also recommended for use on all kinds of roofing as it is not in any way affected by water. It is an extremely heavy paint and when it dries it has a brilliant jet black lustre. We carry this paint in stock in two grades only, and unless otherwise specified, No. 1 will be shipped.



	No. 1	No. 2
One quart cans. Price each.....	\$0.60	\$0.50
One-half gallon cans. Price each.....	1.10	.80
One gallon cans. Price per gallon.....	2.00	1.50
5 and 10 gallon cans. Price per gallon.....	1.90	1.40
Barrels. Price per gallon.....	1.80	1.30

Boughton Black Iron Paint

This paint is made for painting finished metal products of all kinds where a cheap black finish is desired. Suitable for castings, iron fences, grates, and all structural iron work. Dries very fast and can be dipped or brushed.

Put up in barrels, half barrels and five and ten gallon cans. Barrels and one-half barrels. Price per gallon..... \$1.00
5 and 10 gallon cans. Price per gallon..... 1.10

Boughton Black Dipping Paint

This paint is composed of pigments of the lightest gravity, thus eliminating any settling in the dipping tank. It gives a nice gloss on metal surfaces with one coat; on wood and porous surfaces it is necessary to dip twice to get a good gloss black. Dries in from 4 to 6 hours.

Barrels and one-half barrels. Price per gallon.....	\$3.00
5 and 10 gallon cans. Price per gallon.....	3.10
1 gallon cans. Price per gallon.....	3.20

Boughton Air Drying Black Japan

A quick drying Black Japan for painting iron work of all descriptions. It prevents the corrosion as it keeps air and moisture from coming in contact with the metal.

Barrels. Price per gallon.....	2.00
5 gallon cans. Price per gallon.....	2.20
1 gallon cans. Price per gallon.....	2.40

Boughton Stove Pipe Enamel

Made of special ingredients to withstand extreme heat. Will prevent rust and always maintains a glossy finish. Mostly used on stove pipes, registers, furnaces, ventilators, gas ranges, grates and all metal surfaces.

Pint cans. Price each.....	\$0.70
Half-pint cans. Price each.....	.60

U. S. G. Co.'s Mexican Graphite Paint

Made from pure air floated Mexican graphite ground in linseed oil. Unaffected by smoke, water, brine, acids, alkali, extreme temperatures, steam, moisture, sulphur fumes or any chemical or climatic condition. Used on structural iron and steel, steam pipe, coils, roofs, smokestacks, boiler fronts, vessels, freight cars, water tanks, bridges, etc. Under ordinary weather conditions covering power per gallon is approximately 1,000 square feet of smooth or new metal surfaces, 750 square feet on rough, scaley or rusty metal surfaces and 400 square feet on dressed lumber or old painted wood.

Barrels.	Price per gallon	Color A Natural	Color B Black
1/2 barrels.	Price per gallon	\$3.20	\$3.50
5-gallon cans.	Price per gallon	3.30	3.60
1-gallon cans.	Price per gallon	3.60	3.90
1/2-gallon cans.	Price per can	3.80	4.10
		2.00	2.10

Prices on dark green, red, dark brown, quoted on application. Write for color card.

Dixon's Silica—Graphite Paint

This is the original graphite paint manufactured for fifty-two years in one quality only—four colors. The pigment is crystalline or flake graphite, a silica mined by the Jos. Dixon Crucible Co. The vehicle is pure boiled linseed oil.

It is the best paint for smokestacks, gasholders, boiler fronts, standpipes, fire escapes, iron shutters, fences, bridges, grain elevators, roofs and all metal surfaces. Has given from eight to fourteen years' service on iron and steel—fifteen to twenty years' service on wood.

Spreading capacity, 500 square feet to gallon first coat, 550 square feet to gallon second coat.

Made in four shades.

Use black for stacks, boiler fronts and heated surfaces; red for roofs; green and natural for other iron and steel surfaces.

Barrels (50 gallons).	Price per gallon	\$3.30	5-gallon kegs.	Price per gallon	\$4.30
Half barrels (25 gallons).	Price per gallon	3.40	1-gallon cans.	Price per gallon	4.50
10-gallon kegs.	Price per gallon	3.50	1/2-gallon cans.	Price per can	2.40



Boughton Machinery Paint

Gloss and Flat Finish

A guaranteed preservative against absorption of moisture, or rust for painting new or old machinery and metal castings. Made in liquid form and giving a steel appearance. It dries perfectly, leaving an excellent finish, either flat or glossy. Has an unusual amount of elasticity and durability. Furnished in four shades of steel and stock shades of red, blue, green and black or will match any shade submitted. Write for our color sheet.



1 gallon cans.	Price each	\$3.20
3 and 10-gallon cans.	Price per gallon	3.10
Full barrels.	Price per gallon	3.00

Paste Form.—For those who mix the paint themselves, Boughton brand is the best to be had. It should be thinned with turpentine or benzine. Made from the best pigments ground to a stiff paste in special hard drying oils. After drying, the surface is flat and the imperfections of the iron or steel are not visible. When dry it may be sanded to a smooth finish and becomes as hard as the iron itself.

25 and 100-pound drums.	Price per pound	\$0.20
Kegs.	Price per pound	.19
Barrels.	Price per pound	.17

Boughton Iron Filler or Leveling Putty

Furnished in paste form. To be applied on rough surfaces or for filling up the uneven or imperfect places in iron castings or steel before painting. Applied with putty knife the same as putty for large crevices, or it may be thinned to the consistency of cream for covering the whole surface and then sanded until smooth. It is always advisable to have a smooth surface on which to apply paint, as a much higher finish is produced. Made in same shades as our flat steel color.

10-pound cans.	Price per pound	\$0.17
25-pound cans.	Price per pound	.16
100-pound kegs.	Price per pound	.15
Barrels.	Price per pound	.14



Boughton Engine Paint



Our Boughton engine paint gives a smooth, glossy finish and practically eliminates the necessity of varnishing. Most generally used on gas, gasoline, automobile and steam engines. Boughton brand engine paint is particularly well known for its ability to stand the most extreme heat without showing any effects whatever. It will absolutely prevent rust or corrosion. It is made of ingredients which have a special tendency to grip tin, iron, steel and other metals effectively. Furnished in French yellow, Brewster and Coach greens, black, maroon, wine and royal blue.

1-gallon cans.	Price each	\$6.00
5 and 10-gallon cans.	Price per gallon	5.90
Barrels.	Price per gallon	5.80

For aluminum heat-proof paint, vermilion or carmine shades, add \$1.00 per gallon to above prices.

Boughton Blue Lacquer

Lacquer is used to prevent rust on steel or iron pulley surfaces, steel shafting, and all kinds of highly finished metal surfaces. Add considerably to the attractiveness of machinery or small engines for selling purposes as well as to the appearance in machine shop or factory. Also used on tin and metal cans of all kinds, lamp frames, shades, etc.

1-gal. cans.	Price each	\$2.50
5-gal. cans.	Price per gal.	2.40
Barrels.	Price per gal.	2.30



Boughton Anti-Rust Lacquer

Same as above only transparent. Made for preserving highly polished metal surfaces, such as shovel blades, steel shafting, etc. It is very tough and durable and dries rapidly.

1 gallon cans.	Price each	\$2.40
5-gallon cans.	Price per gallon	2.30
Barrels.	Price per gallon	2.20

Boughton Brand

Ready Mixed Paint



Boughton Ready Mixed Paints are superior to ordinary hand mixed paints for the reason that it is impossible to thoroughly mix with a paddle the necessary amount of linseed oil that the pigments will take. All of our paints are ground and reground by machinery, which produces a uniform color that is practically impossible in paints mixed by hand. When the pigments are thoroughly ground with the oil, the spreading qualities of the paint are noticeably improved, and because of this fact, this paint is the most economical to use.

A hand mixed paint will show the effects of the weather in much less time than a good machine-mixed paint.

Boughton

There is a constant demand for a ready mixed paint at a moderate price. This grade is not a cheap composition paint, but is made of pigments and oils thoroughly mixed and ground to the utmost fineness which will spread and work easily under the brush. The quality and weather resisting properties surpass paint that costs a great deal more per gallon, thus giving the greatest possible value for the money.

Covering capacity is about 250 square feet to the gallon, two coats.

Boughton Marine

This is our highest grade of paint, originally made for use on wooden and metallic surfaces of vessels, yachts and other marine painting, where a paint is subjected to the most severe tests of wind, water and sun. It has given satisfaction for so many years that we highly recommend it for painting all exterior surfaces. It is made of absolutely pure ingredients and has a covering capacity of 250 to 300 square feet to the gallon, two coats.

Note: All shades except 458, 419 and 433 take regular prices. See following tables for special prices.

Barrels	Price per gallon	Boughton Marine		Barrels	Price per gallon	5 & 10 Gal. Cans		Gal. Cans	1/2-Gal. Cans	Qt. Cans
		\$3.10	\$4.80			Per gal.	Per gal.			
5 and 10 gallon cans.	Price per gallon	3.20	4.90	Boughton No. 468 Vermillion	4.70	4.80	4.90	2.50	1.20	1.20
Gallon cans.	Price per gallon	3.30	5.00	Boughton Nos. 419 & 413 Greens	4.00	4.10	4.20	2.30	1.20	1.20
One-half gallon cans.	Price each	1.80	2.60	Marine Grade No. 124 Vermillion	6.40	6.50	6.60	3.50	2.00	2.00
Quart cans.	Price each	.90	1.40	Marine Grade Nos. 117 & 140 Greens	5.70	5.80	5.90	3.10	1.70	1.70

Write for Color Card

Boughton Floor Paint

For all Inside Floors

Boughton Brand Floor Paint is for inside use only, and is made to withstand the severe wear which it naturally receives. It is made of carefully selected ingredients, the most adhesive pigments prepared in conjunction with the hardest drying and most durable varnishes. Will dry over night holding up a good, lasting gloss which is brilliant, durable and sanitary, and at the same time decorative. It is manufactured in variety of colors so that shades may be selected to harmonize with other interior decorations and furnishings. It does not settle and may be scrubbed with soap and water without diminishing the quality of the finish. Boughton floor paint is easily applied and satisfactory results may be obtained by an inexperienced person. It will not crack, peel or fade, but tends to protect and preserve the floors. One gallon covers about 250 square feet, two coats. Put up in cans of 1 gallon, 1/2 gallon and 1 quart. Write for Color Card.

Single quart cans.	Price each	\$0.90
One-half gallon cans.	Price each	1.80
One gallon cans.	Price each	3.30

Boughton Porch Floor Paint

A Washable Exterior Paint

Especially prepared for outside exposure such as porches, steps, decks of vessels and similar surfaces that require frequent scrubbing and cleaning and receive extremely hard wear. It is made of carefully selected ingredients, pure linseed oil and the most adhesive pigments. It dries perfectly with a high lustre. It will not crack, fade or peel off, special care having been taken to overcome these objections. It imparts a tough, elastic and durable surface that will not only withstand the rain, snow and ice, but also extreme heat and cold. One gallon will cover about 300 square feet, two coats. Write for Color Card.

Quart cans.	Price each	\$1.40
One-half gallon cans.	Price each	2.60
One gallon cans.	Price each	5.00

Boughton Flat Wall Paint

A Washable, Flat, Interior Finish

A high grade washable flat wall finish for interior use on plaster, wood, metal, etc. Boughton Flat Wall Paint will not peel, but adheres to any surface applied. The white does not turn yellow. Particularly recommended for homes, churches, office buildings, hospitals, hotels, and all places where a sanitary artistic washable wall finish is desired. It is neither an oil paint or an enamel, but a beautiful combination of the two. For the work intended it accomplishes more than either one possibly could. It can be applied over old paint on walls, ceilings, woodwork, and metal ceilings with perfect success. It flows like oil paint, easily and smoothly from the brush. One gallon will cover about 300 square feet, one coat. Write for Color Card.

Quart cans.	Price each	\$1.20
One-half gallon cans.	Price each	2.40
Gallon cans.	Price each	4.50
5 to 10 gallon cans.	Price per gallon	4.40
Barrels.	Price per gallon	4.30

Boughton Varnish Stain

For all Kinds of Interior Work

Boughton Varnish Stains may be used on either old or new work, giving the effect of staining and varnishing in one application. The stains are very rich in tone and are made from the most transparent colors, and dissolved in special penetrating oils, thus insuring the greatest penetrating power. They are very durable and are particularly adapted for all kinds of interior woodwork; covering up scratches, marks, etc. They dry quickly and leave a brilliant, glossy finish. Not affected by soap nor hot or cold water. Unexcelled for general household use—floors, front doors, furniture, screens, wicker and porch furniture, linoleum, etc. One gallon covers about 300 square feet, two coats. Write for Color Card.

One-half pint cans.	Price each	\$0.40
Pint cans.	Price each	.60
Quart cans.	Price each	1.10
One-half gallon cans.	Price each	2.10
Gallon cans.	Price each	4.00

Boughton Barn, Roof and Metal Paint



In offering Boughton Barn, Roof and Metal Paint to our customers we are confident that they will be thoroughly satisfied after the first trial. A good coat of Boughton Paint will add from five to eight years to the life of a barn. It is made of high grade metallic pigments and natural oxides ground perfectly by modern machinery and mixed with pure linseed oil. For best use on barns, metallic and shingle roofs, out-buildings, iron fences, mill and factory buildings, freight houses and cars, depots, coal sheds, bridges, water tanks, elevators and all building surfaces, either iron or woodwork, exposed to the effects of the weather. Absolutely rust and weather proof and will not crack or blister. One gallon covers about 250 square feet, two coats. Write for our color card.

Single gallon cans. Price each.....\$2.20
Five and ten gallon cans, per gallon.....2.10
Full barrels, per gallon.....2.00

Boughton Wagon and Implement Paint

The life of a wagon or an implement of any kind can be prolonged fifty per cent if it is kept covered with a good coat of paint. Boughton Wagon and Implement Paint is a preservative, as it tends to prevent deterioration and rust, and will withstand the wear and tear to which it is subjected. It may also be used where a durable gloss finish is desired. Varnishing is unnecessary, as it dries quickly, leaving a brilliant, durable luster. Used mostly for painting wagons, trucks, heavy vehicles and implements of every description, pumps, windmills, etc. Write for our color card.

One gallon cans. Price each.....\$4.50
One-half gallon cans. Price each.....2.40
Quart cans. Price each.....1.30

Prices cover all shades except vermilion, which takes an advance of 75 cents per gallon.



Boughton Screen Paint

A screen paint that will stay glossy and will not clog the meshes. Used for screen doors and sleeping porch screens. Can be used for screen door frames as well. Write for color card.

Made in two shades of green, also in black.

One gallon cans. Price each.....\$2.80
Half-gallon cans. Price each.....1.50
Quart cans. Price each......80
Pint cans. Price each......60
Half-pint cans. Price each......40



Boughton Damp Proofing Paint

This is a damp proofing paint especially recommended for use above the ground level on the interior stone, brick or concrete walls to exclude dampness.

It penetrates readily into the pores of the stone, brick or concrete so that the seal cannot be broken by abrasion. It unites so thoroughly with the wall that plaster may be applied directly upon the damp-proof coating without danger of elevating off.

Barrels. Price per gallon.....\$1.60
Half Barrels. Price per gallon.....1.70
5 and 10 gallon cans. Price per gallon.....1.80
Single gallon cans. Price per gallon.....2.60

Boughton Enamel

Boughton Brand White and Tinted Enamel produces a very high gloss and an artistic washable, porcelain-like surface. It is durable and sanitary, dries hard in from 12 to 14 hours, producing a smooth, hard and durable finish which is not affected by moisture or heat. Exceptionally good for decorative work and can be applied on any surface, such as walls, furniture, frames, willowware, benches, etc. Can be easily cleaned with damp cloth or soap and water. Can be applied over old paint or enamel with perfect success. Write for our color card.

One gallon cans. Price each.....\$4.50
One-half gallon cans. Price each.....2.40
Quart cans. Price each.....1.20
Pint cans. Price each......70
One-half pint cans. Price each......40

Boughton Radiator Enamel



Boughton Radiator Enamel is very useful for matching up general decorations, furnishings, draperies, etc., and can be made to harmonize with the woodwork, wall decorations and pictures. One gallon covers about 250 square feet. Made in maroon, black, bronze, green and white. White, \$0.50 per gallon extra.

Gallon cans. Price each.....\$7.00
Half-gallon cans. Price each.....3.60
Quart cans. Price each.....1.90
Pint cans. Price each.....1.00
Half-pint cans. Price each......50

Boughton Mission Finish

Gives a dull velvety mission finish effect to all kinds of hard and soft wood. Boughton Mission Finish is a stain and finish complete in one coat and is so easily applied that anyone may obtain satisfactory results. One gallon covers approximately 800 square feet. The stain sinks into the wood and colors it—not merely a surface stain.

Gallon cans. Price each.....\$6.00
Half-gallon cans. Price each.....3.20
Quart. Price each.....1.70
Pint cans. Price each......90
Half-pint cans. Price each......60



Boughton Shingle Stain



Made of creosote and other wood-preserving and penetrating oils, for preserving shingles, clapboards and exterior woodwork. They penetrate the wood and prevent moisture from causing dry-rot, or injury from insects or worms. On new shingle roofs life of shingles can be doubled by dipping. Prepared in all the beautiful shades, such as brown, weather brown, green, moss green, light red, red and yellow.

One gallon brush coats 150 square feet, one coat. Two and one-half gallons dip 1000 shingles, one-third length. Three gallons dip and brush-coat 1000 shingles. Write for miniature set of shingles, showing colors.

One gallon cans. Price per gallon.....\$2.50
Five and ten gallon cans. Price per gallon.....2.30
Barrels. Price per gallon.....2.20

Boughton Creosote Oil

Coal Tar Creosote Oil is recognized everywhere as the best wood preservative that has stood the test of time under all conditions. This oil is a pure coal tar distillate from which all objectionable properties of crude creosote oil have been completely eliminated. The railroads and steamship companies have always found Creosote Oil to be the best wood preservative and they continue to use it to protect their vast properties against decaying bridges, ties, water tanks, wharfs, docks and trestles. We highly recommend it for use on fences, tanks, walks, silos and windmills.

Full barrels. Price per gallon.....\$0.90
Half-barrels. Price per gallon.....1.00
5 and 10-gallon cans. Price per gallon.....1.10



Non-Fouling Enamel Paint

The best paint on the market for racing boats, producing a smooth, elastic non-absorbent surface which increases the speed of a yacht or boat very materially. It positively will not foul, and boats do not require repainting during the season.

Made in three colors: Green, red and gold.	
1-gallon cans. Price each.....	\$18.00
1/2-gallon cans. Price each.....	9.20
1-quart cans. Price each.....	4.70

Anti-Corrosive Paint

For Iron and Steel Boat Bottoms

This paint positively prevents pitting, and is strongly recommended for application as a first coat or base on which to apply our Anti-fouling composition.

It is made in one color only: Dark maroon.
Applied alone it is a most excellent composition for vessels in fresh water.

1-gallon cans. Price each.....	\$9.00
--------------------------------	--------

Anti-Fouling Composition

This composition will prevent all kinds of marine growths. While it contains chemicals which destroy these growths, it is absolutely free from any ingredients which are injurious to iron or steel.

It hardens to a smooth lacquer-like finish and will stick both above and below the water line.

It will not saponify or peel, and does not wash off as the result of the friction of salt water.

Made in two colors: Bright red and yacht green.	
1-gallon cans. Price each.....	\$14.00

Copper Paint

For Use on Wooden Hulls

This paint is made for use on wooden hulls and is preserving, lasting, economical and non-fouling. Its ingredients are combined under a most skillful process and it contains a greater percentage of pure copper than any other paint on the market.

It has a smooth body, spreads well, is very tenacious, yields the finest results in protecting against worms and marine growths.

Made in three shades: Brown, Green and Red.	
1-gallon cans. Price each.....	\$6.50
1/2-gallon cans. Price each.....	3.50
1-quart cans. Price each.....	1.90

Yacht White Ready Mixed Paint

For top sides there is nothing equal to our Yacht White. It is a heavy-bodied, dense-covering white paint, which dries with an egg-shell gloss. It's the paint that lasts.

1-gallon cans. Price each.....	\$5.00
1/2-gallon cans. Price each.....	2.60
1-quart cans. Price each.....	1.40

Write for color card on other shades of Marine Paint.

Valspar Enamels

For Boats and Marine Use



These enamels are made of the highest grade pigments, ground in Valspar and possess the same remarkable qualities of Valspar itself. They are easily worked and show no brush marks. Woodwork covered with Valspar enamel can be washed with soap and water as desired. Very valuable in bathrooms, hospitals, refrigerators, yachts, motor boats, and wherever a good enamel is desired. Made in eight standard colors.

	Gal.	1/2 Gal.	Qt.	Pt.
Gloss white. Price each.....	\$10.00	\$5.10	\$2.60	\$1.40
Flat white. Price each.....	10.00	5.10	2.60	1.40
Black. Price each.....	10.00	5.10	2.60	1.40
Red. Price each.....	10.00	5.10	2.60	1.40
Blue. Price each.....	10.00	5.10	2.60	1.40
Green. Price each.....	10.00	5.10	2.60	1.40
Battleship gray. Price each.....	10.00	5.10	2.60	1.40
Mahogany. Price each.....	10.00	5.10	2.60	1.40
Aluminum. Price each.....	10.00	5.10	2.60	1.40
Brown, quart cans only. Each.....			3.00	

Write for color card.

Valentine's Val-Enamel

Starts white and stays white. It is long-oil white-enamel and will remain indefinitely, indoors and out. Flows out round and full, free from brush marks and sags. Dries with a porcelain-like finish in from 24 to 48 hours and is perfectly sanitary. It presents a non-porous surface that may be washed with hot or cold water. One gallon covers 700 square feet.

Price Each	Price Each
1-gallon cans.....	\$12.00
1/2-gallon cans.....	6.10
1-quart cans.....	3.20
1-pint cans.....	\$1.90
1/2-pint cans.....	.90

Bronzite

The permanent green paint. Bronzite is a permanent green paint made from the ore of kalamite. It is different from all other greens in that it may be depended upon to withstand for an indefinite time the action of sun and water and will not fade.

Used for bridges, barns, roofs, iron girders, iron railings, iron piping, implements, brick work, screen doors, store fronts, mail boxes, lamp posts, hydrants, structural iron work, and general painting.

Made in paste form, in six shades of green.



Aluminum Ready Mixed Paint

This paint produces a brilliant and smooth finish, is not affected by heat, cold or moisture and will not peel off.

Used for painting or repainting steam pipes, radiators, registers, automobile engines, picture frames, wood and metal surfaces.



1-gallon cans. Price each.....	\$8.00
1/2-gallon cans. Price each.....	4.30
1-quart cans. Price each.....	2.10
1-pint cans. Price each.....	1.10
1/2-pint cans. Price each.....	.60
1/4-pint cans. Price each.....	.40

Boughton Bronze Powders

Our bronze powders are of the highest quality, and when mixed with our extra quality bronzing liquids, make a brilliant and durable finish.

Furnished in two grades of aluminum and gold.

Chemically pure aluminum No. 1.

Chemically pure aluminum No. 2.

Pale gold metal leaf No. 1.

Pale gold brilliant No. 2.

	No. 1 Alum- inum	No. 2 Alum- inum	No. 1 Gold	No. 2 Gold
1-lb. cans. Price per can.....	\$4.00	\$3.50	\$3.00	\$2.50
1/2-lb. cans. Price per can.....	2.20	1.90	1.60	1.30
1-oz. cans. Price per can.....	1.20	1.00	.90	.70
1-oz. papers.....	.30	.30	.20	.20

Illinois Radiator Bronzing Liquid

This is a special high grade heat-resisting bronzing liquid and will retain the color of gold and aluminum longer than any other grade on the market on account of its heat-resisting qualities. Recommended for radiators, boilers, steam pipes, etc.

Price Each	Price Each
1-gallon cans.....	\$3.00
1/2-gallon cans.....	1.60
1-quart cans.....	.90
1-pint cans.....	\$0.50
1/2-pint cans.....	.30

Imperial Banana Bronzing Liquid

This is a superior quality liquid which can be used for all exterior uses, and also for high grade decorating.

1-gallon cans. Price per can.....	\$5.00
1/2-gallon cans. Price per can.....	2.70
1-quart cans. Price per can.....	1.40
1-pint cans. Price per can.....	.80
1/2-pint cans. Price per can.....	.60

Hygienic Kalsomine

"Germ-proof your walls" with Hygienic kalsomine. It possesses the practical advantage of great spreading power and easy working qualities. Does not settle like the various cement mixtures formerly sold as wall finishes, consequently there is no waste or necessity for straining. Its ingredients are ground exceedingly fine, thereby insuring a smooth, velvety surface. Prepared especially for the interior decoration of public buildings, theatres, school houses, churches, private residences, etc.

From a sanitary standpoint, Hygienic kalsomine is ideal, as it contains an odorless disinfectant which will absolutely germ-proof any surface to which it is applied. Furnished in powdered form, to be mixed with water, in 4-pound packages and in bulk. One pound has a covering capacity of approximately 150 square feet. Write for our color card.

	White	Tints
Barrels, per pound	\$0.20	\$0.23
Half-barrels, per pound	.22	.24
100-pound drums, per pound	.24	.26
4-pound cartons, per package	1.00	1.10

Decorative colors quoted on application.

Hygienic Kalsize

A preparatory wall size to be used in connection with Hygienic kalsomine and decorative colors, or any ordinary wall finish, paint or enamel. Fills the pores, prevents all suction and forms an elastic, non-crumbing surface previous to kalsomining. It is the most economical wall size on the market. One pound mixed with water will make over a gallon, with a covering capacity of about 800 square feet to the gallon.

Barrels, per pound	\$1.00
Half-barrels, per pound	1.04
4-pound cartons, per pound	1.12
1-pound carton, per pound	1.20

Plastic Surfacers

For leveling walls, ceilings, floors, windows, door casings, etc., we recommend our Plastic surfacer. Used with a putty knife to fill in cracks and all imperfections in wood, iron or other surfaces. Also used for leveling walls and ceilings where paint has been scraped off for the purpose of decorating. Dries in a few hours.

200-pound barrels, per pound	\$0.18
25, 50 and 100-pound drums, per pound	.20
4-pound cartons, per pound	.24
1-pound carton	.30

Plaster Paris

Barrels. Price per pound	\$0.04
10-pound packages. Price per package	.55
6-pound packages. Price per package	.40
3-pound packages. Price per package	.30

Plymouth Rock Floor Wax

A paste preparation for finishing hardwood floors. It is a natural finish and does not cover up the grain of the wood. Dries hard and does not become soft or sticky in warm weather, and requires very little attention to keep floors in finest condition. Worn portions of floors may be renewed without refinishing the entire floor. Will not show scratches or heel marks.

1-pound cans, per pound	\$1.00
2-pound cans, per pound	1.00
4-pound cans, per pound	.90
8-pound cans, per pound	.90

Zinc Whites in Oil

French Zinc. —The finest imported white zinc pigment, ground in strictly pure linseed oil.	
100-pound kegs. Price per pound	\$0.50
50 and 25-pound kegs. Price per pound	.32
12½, 5 and 2-pound cans. Price per pound	.60

American Zinc. —A grade of extra selected American zinc, ground in strictly pure linseed oil.	
100-pound kegs. Price per pound	\$0.30
50 and 25-pound kegs. Price per pound	.32
12½, 5 and 2-pound cans. Price per pound	.40

Marine White Lead in Oil



Warranted for whiteness, covering capacity and durability. We have sold this brand for over a quarter of a century. It has always given satisfaction. Not a carbonate of lead like other brands of white lead, but will positively wear better and not chalk, peel or crack. Takes more lead and covers more surface, pound for pound, is whiter and brushes out evenly under the brush.

100-pound kegs. Price per pound	\$0.19½
50 and 25-pound kegs. Price per pound	.20
12½-pound kegs. Price per pound	.21
5, 2 and 1-pound cans. Price per pound	.24

We also stock Carter's white lead and National Lead Company's leads, such as Southern, Red-Seal, etc., and sell at prevailing market prices.

Red Lead in Oil

Red lead in paste form is made of pure linseed oil and red lead of highest purity ground exceedingly fine by machinery, and will stay in workable condition indefinitely, exactly as white lead does. Paint is made from it exactly as white lead paint is made from white lead paste, by simply adding more linseed oil and a little drier. It will not harden in the pail.

100-pound kegs. Price per pound	\$0.24
50 and 25-pound pails. Price per pound	.26
12½-pound pails. Price per pound	.28

Dry Red Lead and Litharge

Strictly Pure

A large stock of strictly pure red lead and litharge always on hand. Immediate shipments.

Red Lead

100-pound kegs. Price per pound	\$0.24
50 and 25-pound kegs. Price per pound	.26
12½-pound kegs. Price per pound	.28
Less quantity. Price per pound	.30

Litharge

100-pound kegs. Price per pound	\$0.24
50 and 25-pound kegs. Price per pound	.26
12½-pound kegs. Price per pound	.28
Less quantity. Price per pound	.30

Lead oil

Used in breaking up white lead (regular white lead ground in linseed oil) by gradually thinning with Lead oil to proper working consistency, without the addition of dryers, turpentine or other thinners.

Put up in barrels and cans. Lowest market prices.

We Carry a Large Stock of:

Strictly pure turpentine.
Strictly pure linseed oil—raw and boiled.
Turpentine substitute.
Linseed oil substitute.
Benzine or naphtha.
Alcohol—denatured or wood.
Lowest market prices in barrel lots and all size cans.

Boughton Colors in Oil

Colors in oil are ground in pure linseed oil and are the purest colors that it is possible to make.

	Price per lb.
Blacks—Lamp.....	\$0.38
Drop.....	.38
Blues—Ultramarine.....	.70
Prussian, 1 1/2-pound cans, each.....	.55
Prussian, 1/2-pound cans, each.....	.50
Browns—Turkey umber, raw and burnt.....	.40
Italian Sienna, raw and burnt.....	.42
Van Dyke.....	.42
Greens—Chrome.....	
Light, medium, dark.....	.50
Reds—Venetian.....	.20
Red lead in oil.....	.24
American vermilion.....	.80
English vermilion.....	2.00
Permanent red.....	.60
Indian red.....	.50
Yellows—Chrome.....	
Light, medium, dark.....	.60
Yellow ochre.....	.30

Larger size cans and any other colors quoted on application.

Coach and Automobile Colors

(Ground in Japan)

These goods are the highest grade of pure colors, combined with the very best grinding Japanese, and are unexcelled for coach, carriage and automobile painting.

	Price per lb.
Blacks—Coach painters' black.....	\$0.60
Special drop black.....	.50
Lamp black.....	.46
Reds—English Venetian red.....	.46
Indian red.....	.56
Coach painters' red.....	1.00
Unfading red.....	1.20
Wine color.....	.80
Greens—Brewster green, light and dark.....	.76
Coach painters' green, light, medium and dark.....	.76
Whites—Zinc white.....	.70
Grays—Auto gray.....	.70
Yellows—Chrome yellow, light, medium and dark.....	.70
Golden ochre.....	.50
Yellow ochre.....	.50
Blues—Ultramarine blue.....	1.00
Prussian blue.....	1.50
Cobalt blue.....	1.00
Browns—Italian Sienna, raw and burnt.....	.60
Turkey umber, raw and burnt.....	.60
Vandyke brown.....	.60
Pullman body color.....	.66
Lakes—Rose lake.....	1.00
Carriage Part lake.....	.80
Carmine lake.....	4.00

Any other shades quoted on application.

Boughton Rough Stuff or Body Filler

Made especially for carriage and wagon painters.

5-pound pails, per pound.....	\$0.30
10-pound pails, per pound.....	.28
25-pound pails, per pound.....	.26

Boughton Dry Colors

	Per pound	Blbs.	Less quan.
Blacks—Lamp.....	\$0.30	\$0.28	
Drop (English).....	.30	.28	
Blues—Prussian.....	1.50	1.48	
Ultramarine.....	1.00	.98	
Browns—Italian sienna, raw and burnt.....	.32	.30	
American sienna, raw and burnt.....	.20	.18	
Turkey umber, raw and burnt.....	.32	.30	
American umber, raw and burnt.....	.20	.18	
Van Dyke.....	.32	.30	
Greens—Chrome—light, medium, dark.....	.50	.48	
Reds—American vermilion.....	.75	.73	
Turkey red.....	.50	.48	
Indian red.....	.40	.38	
Rose pink.....	.50	.48	
English venetian.....	.30	.28	
American venetian.....	.30	.28	
Rose lake.....	.80	.78	
Yellows—Chrome—light, medium, dark.....	.40	.38	
Yellow ochre.....	.10	.08	
French ochre.....	.14	.12	
Whiting in barrels, cwt.....	\$3.00		
Barrels, extra.....		.60	

Steel Wool



Steel wool is a mass of fine fibre of steel resembling curled hair, which, while sharp, does not scratch, but will cut as smoothly as the finest abrasive material heretofore used. It is the best article for rubbing off varnish, shellac, etc., for various uses where sandpaper, pumice stone and other rubbing materials are used, and does the work more quickly. Being soft and pliable, steel wool adapts itself to the shapes of carvings, mouldings, etc., going into places where sandpaper will not reach. It is excellent for rubbing a first coat of varnish and if a particularly smooth finish is desired, use a little linseed oil.

	Per lb.
No. 0 takes place of pumice stone.....	\$1.00
No. 1 equals sandpaper No. 0.....	.76
No. 2 equals sandpaper No. 1 1/2 to 1.....	.72
No. 3 equals sandpaper No. 3 1/2 to 2.....	.60
Fine steel shavings for rough work.....	.52
Medium steel shavings for rough work.....	.50
Coarse steel shavings for rough work.....	.42

Boughton Flint (Sand) Paper

In Sheets 9x11 Inches

No.	Size of Original Packages	Number of Reams in a Bundle	Price per Ream	Price per Quire
4/0 to 1 1/2	1 1/2 Ream	5	\$7.00	\$0.43
1	1 1/2 Ream	4	7.50	.46
1 1/2	1 1/2 Ream	3	8.00	.50
2	1 1/2 Ream	2 1/2	8.50	.53
2 1/2	1 1/2 Ream	2	9.00	.56
3	1 1/2 Ream	1 1/2	10.50	.65

Boughton Emery Cloth

In Sheets 9x11 Inches

No.	Grit Nos.	Size of Original Packages	Number of Reams in a Bundle	Price per Ream	Price per Quire
Crocus		1 1/2 Ream	2	\$31.00	\$1.93
3/0 to 1 1/2	180-190	1 1/2 Ream	2 1/2	31.00	1.93
1	80	1 1/2 Ream	1 1/2	33.00	2.06
1 1/2	70	1 1/2 Ream	1 1/2	35.00	2.18
2	60	1 1/2 Ream	1 1/2	38.00	2.37
2 1/2	54	1 1/2 Ream	1	41.00	2.56
3	46	1 1/2 Ream	3/4	44.00	2.75

Sundries

Pumice Stone, powdered.....		
Pumice stone, lump.....		
Pumice stone, brick.....		
Rotten stone, powdered, lump, brick.....		
Rubbing felt.....		
Putty Powder.....		
Ground Glass.....		
Curled hair.....		
Oxalic acid.....		
Muriatic acid.....		
Savogran.....		
Soap powder.....		

Lowest Market Prices

Champion Lye

Champion Lye is a high test lye thoroughly granulated and is used for removing old paint, varnish, grease, tar and paint before recoating any surface.

Single cans. Price each.....	\$0.20
Dozen cans. Price each.....	2.00
Case of 4 dozen cans. Price.....	7.80



Boughton Commercial or Glaziers' Putty

In bladders, 5 to 12 pounds, per pound.....	\$0.09
In tin lined kegs:	
100-pound kegs, per pound.....	\$0.06
50-pound kegs, per pound.....	.06 1/2
25-pound kegs, per pound.....	.07

Boughton Deck Putty

This is sometimes called white lead putty and is used for caulking deck seams, etc.	
300-pound barrels, per pound.....	.08 1/2
100-pound tins, per pound.....	.09 1/2
25-pound tins, per pound.....	.10

Scraping Knives

Solid cocobola handles, brass ferrule. Best quality material and workmanship throughout.

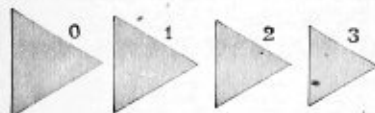
	Each	Dozen
2 1/4-inch.....	\$0.70	\$7.50
2 3/4-inch.....	.80	8.60
3 1/4-inch.....	1.00	10.80
3 3/4-inch.....	1.30	14.00

Putty Knives

Same quality as scraping knives.

Description	Each	Dozen
No. 35-S. Stiff blade.....	\$0.50	\$5.00
No. 35-E. Elastic blade.....	.56	5.60
No. 35-P. Pliable blade.....	.56	5.60

Pure Zinc Glaziers' Points



Above are actual sizes and are pure zinc.	
25 or 50-pound boxes, in bulk, per pound.....	Market
3 1/2-pound papers, 50-pound boxes, per pound.....	Prices
1/2-pound papers, per dozen papers.....	

Wall Paper Cleaner

For cleaning wall paper, calcimine, fresco and window shades.	
Put up in cans weighing 1 pound each.	
Single cans. Price each.....	\$0.20
Dozen cans. Price per dozen.....	2.00

Painter's Drop Cloths

Made up ready for use. For protecting furniture, etc., during painting or kalsomining.	
Sheeting 9x12 feet. Price each.....	\$2.50
Sheeting 12x15 feet. Price each.....	4.00
Drill 9x12 feet. Price each.....	4.20
Drill 12x15 feet. Price each.....	6.50
Drill 14x16 feet. Price each.....	8.00
Special, subject to stock on hand, heavy second-hand canvas, 9x12. Price each.....	2.80

Kennedy Metal Grips



Made especially for painters and paper hangers' use. Made of prepared steel, finished in brown enamel, and fitted with solid brass corners, side catches and has Yale lock.

Furnished in five sizes.

More fully described elsewhere in this catalog. See index.

Hy-Pol Furniture Polish



Hy-Pol is a high grade piano and furniture polish and is absolutely non-injurious. It is composed largely of such oils as are employed in the manufacture of varnish, thus serving as a food to old finishes.

An ideal polish for pianos, furniture, floors, interior woodwork, bathtubs, tiling, porcelain, chandeliers, leathers, etc., in fact for all varnished, waxed, enameled or japanned surfaces.

Dries quickly and leaves no greasy deposit.

5-gallon cans. Price per gallon.....	\$5.30
1-gallon cans. Price each.....	5.50
1/2-gallon cans. Price each.....	3.00
1-quart cans. Price each.....	2.00
12-ounce cans. Price each.....	1.00
5-ounce cans. Price each.....	.50

Semdac Liquid Gloss

Semdac liquid gloss is the most efficient dusting, cleaning and polishing agent for household use. It cleans woodwork, furniture, hardwood floors, metal and enamel surfaces better and quicker than soap and water. It softens and removes every trace of dirt and grime, leaving the surface treated clean, bright and with a lustrous polish.

For polishing such highly finished surfaces as pianos and automobile bodies, Semdac has no equal. It cannot harm the finish, but can and does restore the original polish, making the object treated like new.

5-gallon cans. Price each.....	\$8.50
1-gallon cans. Price each.....	2.50
1/2-gallon cans. Price each.....	1.50
1-quart cans. Price each.....	1.00
1-pint cans. Price each.....	.70
1/2-pint cans. Price each.....	.40

Sponges

Rock Island Sponges



For painters and for washing automobile bodies; extra fine quality.

3 to 4 or 4 to 6 sponges to the pound.

Price per pound..... \$10.00

Price each..... 2.50

Cuba Sheeps Wool Sponges

Selected grade, satisfactory for painters' use. 4 to 6 or 6 to 8 to the pound.

Price per pound.....	\$8.00
Price each.....	1.50

Florida Grass Sponges

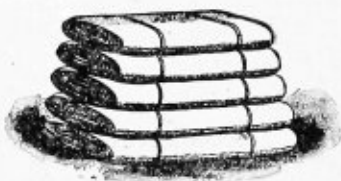
For boat and general house or factory use. 6 to 8 or 8 to 10 to the pound.

Price per pound..... \$1.80

Price each..... .40

Chamois Skins

Users of chamois skins will appreciate the good qualities of our selection. We offer nothing but perfect skins, carefully oil tanned and dressed by the French process. With proper use they will dry out and give practically unlimited service.



Size 22x26 inches. Per kip (30 pieces).....	\$50.00
Per each.....	2.50
Size 18x24 inches. Per kip (30 pieces).....	40.00
Per each.....	1.80
Other sizes and larger quantities quoted on request.	

H.Channon Company Chicago

Boughton Brand Varnishes



In presenting our Boughton brand of varnish, we take exceptional pride in being able to give our customers varnishes for general or special uses which for years have given entire satisfaction to some of the most critical users. For example, in our Boughton floor varnish we have a free flowing varnish drying hard over night with a brilliant finish that will not mar under severe usage. Water will not injure or cause it to turn white. Boughton interior finishing varnish will work very freely under the brush and has a greater body than a large number of high class varnishes today on the market. No matter what they may be, we can take care of your varnish requirements.

Floor Varnish

Our Boughton Floor Varnish is unusually tough and elastic. It is heel proof, water and weather proof and will not scratch, mar white or become sticky. For finishing floors in offices, hospitals, public buildings and fine residences, it cannot be surpassed. Will give a beautiful lustre to your old floor and woodwork. Used on linoleum it will bring back its bright, new appearance. Dries dust free in about fifteen minutes and will dry hard over night. Will stand continuous cleaning and washing.

Gallon cans	\$5.50
Half gallons	2.80
Quarts	1.50
Pints .....	.90

Special Floor Varnish

An excellent varnish and capable of giving the best service. We are confident in saying that, for the price, it is impossible for you to obtain a better varnish, as it works easily under the brush, flows out smoothly, and dries hard over night with a good lustre. Can also be used on all interior woodwork where a bright, new finish is desired.

Gallons	\$4.00
Half gallons	2.10
Quarts	1.10
Pints .....	.70

Interior Finishing Varnish

Adapted for all kinds of interior wood finishing except floors. It is pale in color; dries dust free in from four to six hours and absolutely dry in twelve to fourteen hours. Is tough, elastic and durable. Will not crack, blister or sweat and brings out the natural beauty of the grain of either hard or soft wood.

Gallons	\$3.00
Half gallons	1.60
Quarts .....	.90
Pints .....	.50

Interior Rubbing Varnish

Of exceptional quality and particularly recommended for all high class work where a beautiful finish is desired. Dries dust proof in five hours. Sets well over night and can be rubbed to a beautiful dull finish in from two to three days without sweating out, or polished to hard finish wherever desired.

Gallons	\$4.00
Half gallons	2.10
Quarts	1.10
Pints .....	.70

Furniture Varnish

For touching up or revarnishing old furniture, such as desks, chairs, tables, stools, etc. Has a fine finish, is very elastic and durable. It is remarkable how a small quantity of Boughton Furniture Varnish will brighten up furniture and make a vast improvement in the appearance of offices and homes.

Gallons	\$3.20
Half gallons	1.70
Quarts .....	.90
Pints .....	.50

Marine Spar Varnish

A high grade outside spar varnish, very elastic, hard drying, and has maximum life. The component parts are especially assembled to resist wear, moisture, harsh weather conditions, etc., and will not turn white when submerged in water. Has excellent working qualities and its great durability has made it most serviceable for all marine work, as well as for store fronts, outside doors, porch floors, outside ceilings, etc. Will not mar or scratch white. Owing to its great elasticity, plenty of time must be allowed to dry. Dries dust free in about six hours, and becomes thoroughly hard in from 24 to 36 hours.

Gallons	\$7.00
Half gallons	3.80
Quarts	2.00
Pints	1.00

Spar Varnish

This varnish is especially prepared for outside use, and will stand severe usage. Recommended for all outside work, such as window sills, vestibules, outside doors and ceilings, porch floors, marine work, etc.

Gallons	\$6.00
Half gallons	3.20
Quarts	1.70
Pints .....	.90

Automobile and Carriage Varnish

Automobile finishing varnish. Price per gallon	\$9.00
Automobile rubbing varnish. Price per gallon	6.50
Automobile pale body rubbing varnish. Price per gallon	7.00
Automobile heavy gear varnish. Price per gallon	9.00
Coach finishing varnish. Price per gallon	5.00

Above prices are for single gallon cans.
Advances 10 cents per gallon for half gallon cans.
Advances 20 cents per gallon for quart cans.
Advances 40 cents per gallon for pint cans.

Valspar Varnish



Valentine's Valspar is the only varnish in the world that is absolutely waterproof and won't turn white in water. Dries dust-free in two hours and hard ever night, making it suitable for all interior as well as exterior work, and its waterproofing properties and exceptional durability also make it the best varnish for boats and marine use. Is pale in color and heavy in body. Works easily and flows freely, giving a full brilliant coat and may be rubbed in 24 hours. One gallon will cover 500 square feet. It is truly the one varnish for all uses and the best varnish for every use.

One gallon.	Price each	\$9.50
One-half gallon.	Price each	4.80
One quart.	Price each	2.60
Pint.	Price each	1.40
Half pint.	Price each	.80

Ad-el-ite Paint and Varnish Remover

In liquid form. Will take off any thickness of paint, varnish, shellac or enamel. Will clean to the bare wood almost instantly, and leave the wood in perfect condition for refinishing. Is free from acids, alkalis or water and positively will not raise or bleach the grain of the finest veneer. Also used for cleaning old paint brushes, painted glass surfaces and for softening old putty. Especially adapted for floors or all horizontal surfaces.

One gallon can, each	\$6.00
Half-gallon can, each	3.20
Quarter-gallon can, each	1.70
Pint can, each	1.00
Half-pint can, each	.60



24 Paint and Varnish Remover

Ad-el-ite 24 paint and varnish remover has the same qualities as our regular remover, but being in heavy liquid form, is ideal for upright, overhead surfaces, panel-work and for exterior use. Stays where it is put, and remains soft 24 hours or more. Prices same as the regular liquid form.

Boughton Shellac Varnish

For use over stains and fillers prior to varnish or wax coat. Makes a tough, elastic, non-bleeding foundation over which finishing coats may be brought to high degree of smoothness and polish. Especially good over sappy wood, such as pine and Oregon fir, etc.

	White	Orange
Barrels.	Price per gallon	\$4.70
5 and 10-gallon cans.	Price per gallon	4.80
1-gallon cans.	Price per gallon	5.00
1/2-gallon cans.	Price per can	2.60
1-quart cans.	Price per can	1.40
1-pint cans.	Price per can	.70
1/2-pint cans.	Price per can	.40

Shellac Gums

Dry orange shellac:	
50 and 100-pound drums, per pound	\$1.20
Less quantity	1.40
Dry white shellac:	
50 and 100-pound drums, per pound	1.40
Less quantity	1.60

Boughton Japan Dryer

This is a painters' dryer of medium body, and has excellent drying and binding properties. It mixes perfectly with oil and pigments and is well adapted for general use.

1-gallon cans.	Price per gallon	\$2.20
1/2-gallon cans.	Price per can	1.20
1-quart cans.	Price per can	.70
Pint cans.	Price per can	.50

Boughton Paste Wood Filler

This wood filler is composed of the finest quality of silex and the best linseed oil, with the addition of such binding and drying materials as are necessary to produce the most satisfactory results for all purposes, and under varying conditions. Dries stone hard, and does not settle or shrink in the pores. Makes an ideal foundation for a perfect finish.

Made in all the shades of light and dark oak, walnut, mahogany, rosewood, etc.

25-pound cans.	Price per pound	\$0.17 1/2
10-pound cans.	Price per pound	.18
5-pound cans.	Price per pound	.18
2-pound cans.	Price per pound	.24
1-pound cans.	Price per pound	.24

Boughton Liquid Wood Filler

A perfect surfacer for all close grained wood such as birch, cherry, pine, cypress, etc.

It is perfectly transparent and will not stain the lightest color of wood or raise the grain. Stops absorption and leaves a perfectly hard, smooth surface ready for varnishing.

Made in natural, antique oak, walnut, mahogany, cherry and golden oak.

1-gallon cans.	Price per gallon	\$3.00
1/2-gallon cans.	Price per can	1.60
1-quart cans.	Price per can	.80

Dust-Laying Floor Oil

A high grade special oil very popular for use on unfinished wooden floors. Especially adapted for office, warehouse and large store floors. It is sapitary and lays the dust. May be applied with either cloth, brush or mop.

5-gallon cans, per gallon	\$1.50
1-gallon cans, per gallon	1.60

Durable Lac Oil

A special varnish oil which doubles the life of varnish or paint. This oil will add 25 to 50 per cent to any varnish or paint. It is a compound of vegetable paint oils, from which the perishable ingredients have been removed, and the more durable parts combined to form an oil of remarkable durability. It dries in about 12 hours with a tough, elastic film. Entirely waterproof and will resist acid, alkali, brine, ammonia and heat up to 800 degrees. It toughens any varnish or paint in proportion to amount used.

Mix one-quarter of this oil with floor, interior finishing, outside spar or any other high priced varnish. This reduces its original cost and doubles the wearing qualities of the varnish.

1-gallon cans, each	\$3.00
5-gallon cans, per gallon	2.80
1/2-barrels, per gallon	2.70
Full barrels, per gallon	2.60

Boughton Cement Floor Coating

(Transparent)

This is a protective liquid coating for cement floors, where it is desired to preserve the original appearance of the floor. It prevents dusting and possesses excellent wearing qualities.

Covering capacity, about 200 square feet to gallon, two coats.	
Barrels and half-barrels.	Price per gallon
5 and 10-gallon cans.	Price per gallon
1-gallon cans.	Price per gallon

Automobile Colored Varnish



Boughton Automobile colored varnish is made of the best colors procurable and best wearing automobile varnish combined. It will resist the action of oils and water and a good washing with soap and water and the stiff stream from the hose will not dull its lustre. It is exceptionally hard and shows no spots or streaks and will not fade. Applied very easily. Used for automobile and carriage bodies, bicycles, wagons, motorcycles, etc. Made in exclusive grays, lavenders, greens, reds, blues, yellows, browns, maroons, etc. Write for color card.

1-gallon cans.	\$5.00
1/2-gallon cans.	4.10
Quart cans.	2.20
Pint cans.	1.20
Permanent red, \$0.80 per gallon additional.	

Channon Special Flat Wall Paint Brushes

These brushes are the best values on the market. They are made of genuine black Chinese bristles, absolutely free from horse hair and will give good long service. The stock is full, firm and elastic.

A favorite brush among painters for their best work. Packed one in a box.

Cement Set

No. 201. Width 4 inches, length of bristles $3\frac{1}{2}$ inches, yellow varnished handles.

Price per dozen \$15.00

Price each 1.50

No. 202. Width 4 inches, length of bristles $3\frac{1}{2}$ inches, yellow varnished handles.

Price per dozen \$10.00

Price each 1.00



Set in Vulcanized Rubber

No. 300. Width 4 inches, length of bristles 4 inches, yellow varnished handles.

Price per dozen \$20.00

Price each 2.00

No. 301. Width $3\frac{1}{2}$ inches, length of bristles $3\frac{1}{2}$ inches, yellow varnished handles.

Price per dozen \$16.00

Price each 1.60

No. 302. Width 3 inches, length of bristles $3\frac{1}{2}$ inches, yellow varnished handles.

Price per dozen \$12.00

Price each 1.20



Boughton Flat Wall Paint Brush

Fig. 502. Select black Chinese bristles. Full stock with new style oval rosewood handle, nickel band. A very popular brush.

Number.....	41	42	43	44
Width, inches.....	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$
Bristles, inches.....	$3\frac{1}{2}$	4	$4\frac{1}{2}$	$4\frac{1}{2}$
Dozen.....	\$25.00	\$39.20	\$48.30	\$61.00
Each.....	2.50	3.92	4.83	6.10

Black Super Flat Paint Brush

Best black Chinese bristles, rosewood handle, brass band, nickel. The short lengths are most popular for family use, the long lengths for painters.

Fig. 500. Long Stock.

Number.....	56	57	58	59	65
Width, inches.....	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5
Bristles, inches.....	$3\frac{1}{2}$	$3\frac{1}{2}$	$4\frac{1}{2}$	$4\frac{1}{2}$	$4\frac{1}{2}$
Price per dozen.....	\$20.00	\$27.60	\$36.40	\$46.30	\$62.00
Price each.....	2.00	2.76	3.64	4.63	6.20

Fig. 500. Short stock.

Number.....	51	52	53	55	60
Width, inches.....	3	$3\frac{1}{2}$	4	5	6
Bristles, inches.....	$2\frac{1}{2}$	3	$3\frac{1}{2}$	$3\frac{1}{2}$	4
Price per dozen.....	\$11.80	\$15.08	\$19.60	\$29.60	\$48.60
Price each.....	1.18	1.50	1.95	2.96	4.85

Round Wall Paint Brush



Fig. 540. Known as a "common paint brush." White Russia bristle with mixed tampico center. Wire bound.

Number.....	6	2	4-0
Width, inches.....	$2\frac{1}{2}$	$3\frac{1}{2}$	$4\frac{1}{2}$
Price per dozen.....	\$4.20	\$6.20	\$12.50
Price each.....	.42	.62	1.25

Combination Paint and Varnish Brush



Fig. 590. Chisel oval. For both paint and varnish. Black Chinese bristles.

Nickel plated steel ferrule. One of our best sellers. Chisel point.						
Number.....	5-0	6-0	7-0	8-0	9-0	10-0
Length bristles.....	$3\frac{1}{2}$	$3\frac{1}{2}$	$3\frac{1}{2}$	$3\frac{1}{2}$	$3\frac{1}{2}$	$4\frac{1}{2}$
Price per dozen.....	\$18.60	\$19.60	\$23.00	\$28.80	\$34.20	\$43.30
Price each.....	1.86	1.96	2.30	2.88	3.42	4.33

Varnish Brushes

Boughton Flat Varnish Brush



Set in vulcanized rubber. This is our best grade varnish brush, made of full stock first quality Chinese bristles, chisel point.

Width, inches.....	1	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3
Length bristles.....	2	$2\frac{1}{2}$	$2\frac{1}{2}$	$2\frac{1}{2}$	3
Price per dozen.....	\$6.40	\$8.80	\$12.20	\$16.60	\$21.00
Price each.....	.64	.88	1.22	1.66	2.10

XX Chinese Chisel Flat Varnish Brush

Fig. 678XX. Set in vulcanized rubber. Fine selected black Chinese bristles, chisel point, yellow chiseled handle, nickel band. A good mechanic's sash or trimming brush and an excellent family brush.

Width, inches.....	1	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3
Length bristles.....	$1\frac{1}{2}$	2	$2\frac{1}{2}$	$2\frac{1}{2}$	$2\frac{1}{2}$
Price per dozen.....	\$4.00	\$6.50	\$8.80	\$10.50	\$14.50
Price each.....	.40	.65	.80	1.00	1.45

Ko Ko Flat Varnish Brush

Fig. 676½. Set in vulcanized rubber. Made of black Chinese bristles, chiseled edge. A very serviceable brush.

Width, inches.....	1	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3
Length, inches.....	$1\frac{1}{2}$	2	$2\frac{1}{2}$	$2\frac{1}{2}$	$2\frac{1}{2}$
Price per dozen.....	\$3.55	\$5.25	\$6.90	\$8.75	\$10.60
Price each.....	.35	.50	.65	.85	1.00

Boughton Stucco Wall Brush



Fig. 1568R. Set in vulcanized rubber. Metal bound. This brush is so constructed that it has all the good points of a leather bound stucco without any of the faults. Made exactly like an old fashioned stucco except has a steel nickel plated band instead of leather and does not become clogged at the heel. It is supplanting the old style wherever used. Made of pure black Chinese bristles.

No.	Width, Inches	Bristles, Inches	Price Dozen	Price Each
25L	3	4	\$31.50	\$3.15
30L	$3\frac{1}{2}$	4	44.80	4.48
35L	4	$4\frac{1}{2}$	53.30	5.33
40L	$4\frac{1}{2}$	$4\frac{1}{2}$	64.50	6.45
45L	5	5	76.50	7.65

Crow Stucco Wall Brush

Fig. 532. Leather bound. Made of good quality black Chinese bristles, red stained handles. A very serviceable brush.

Number.....	25	30	35	40
Width, inches.....	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$
Bristles, inches.....	$4\frac{1}{2}$	$4\frac{1}{2}$	$4\frac{1}{2}$	$4\frac{1}{2}$
Price per dozen.....	\$28.90	\$38.50	\$49.00	\$60.20
Price each.....	2.89	3.85	4.90	6.02



Calcimine Brushes



Fig. 450. Boughton. Selected Okatka bristles, well known for their spreading and long wearing qualities. Natural varnished handle securely bound with brass.

Number	6	7	8
Width, inches	6	7	8
Length, bristles	4 1/2	4 3/4	5
Dozen	\$70.00	\$89.60	\$130.00
Each	7.00	8.96	13.00

Fig. 446. Royal. All white Russia bristles. Natural wood handles.

Number	6	7	8
Width, inches	6	7	8
Length, bristles	3 1/2	4 1/2	4 1/2
Dozen	\$38.30	\$51.20	\$64.50
Each	3.83	5.12	6.45

Fig. 438. Star. White bristle with white tampico center. Natural wood handles.

Number	6	7	8
Width, inches	6	7	8
Length, bristles	3 1/2	3 1/2	3 1/2
Dozen	\$12.70	\$16.00	\$20.20
Each	1.27	1.60	2.02

The above brushes are highly recommended for use with our Boughton Cold Water paint.

Whitewash Brushes



Fig. 422. Leather bound white bristle outside, gray mixed middle, very full, an excellent brush for factory work.

Number	6	8	10	14
Width of bristles, inches	7	8	9	9
Length of bristles, inches	2 1/2	3 1/2	3 3/4	4 1/4
Dozen	\$16.70	\$24.80	\$36.80	\$54.30
Each	1.67	2.48	3.68	5.43

Fig. 404. For rough whitewashing, this brush cannot be equalled. It has white bristles outside with a soft tampico middle. Metal bound.

Number	6	7	8	9
Width, inches	6 1/2	7	8	9
Length, bristles	2 1/2	2 1/2	3	3 1/4
Dozen	\$7.30	\$8.60	\$9.50	\$11.00
Each	.73	.86	.95	1.10

Radiator Bronzing Brush



Fig. 779. Thin, flat brush for reaching between sections of radiators, similar to sash brush, only flat. Made of Fitch hair.

Number	1	2	3	4
Width, inches	1	1 1/2	2	2 1/2
Dozen	\$3.60	\$4.75	\$6.00	\$7.40
Each	.36	.47	.60	.74

Black Gem Sash Brush



Fig. 636. Made from the best selected black Chinese bristles. Very elastic. Round, red finished handle. Flat, oval, chiseled brush. An excellent working tool.

Number	2	4	6	8	10
Length, bristles, inches	1 1/2	1 1/2	2	2 1/2	2 1/2
Dozen	\$2.30	\$3.10	\$4.05	\$5.60	\$7.70
Each	.25	.30	.40	.55	.75

Painter Duster



Fig. 558. Extra fine painters' brush. Bristles deeply set in pitch. Warranted to hold and stand rough usage.

No. 2. 3 1/2-inch bristle.	Dozen	\$10.00	Each	\$1.00
No. 14. 4-inch bristle.	Dozen	17.50	Each	1.75

Stencil Brushes



Fig. 600. Extra quality black Chinese bristles. Full solid stock. For all kinds of first class stencil work.

No.	Dozen	Each	Diameter, Inches	Length, Inches
44	\$ 7.70	\$0.77	1	1 1/2
66	8.30	.83	1 1/2	1 1/2
88	9.00	.90	1 3/4	1 1/2
110	11.50	1.16	1 3/4	1 1/2
220	12.80	1.28	1 3/4	1 1/2
330	18.00	1.80	1 3/4	1 1/2
440	22.00	2.20	2 1/2	2



Fig. 604. All white bristle, tin band, on small sizes, zinc on large sizes. Yellow finished handles, a good, full brush.

No.	Diameter, Inches	Length, Inches	Per Dozen	Each
1	1 1/2	1 1/2	\$2.40	\$0.24
2	1 1/2	1 1/2	2.60	.26
3	1 1/2	1 1/2	2.90	.29
4	1 1/2	1 1/2	3.40	.34
6	1 1/2	1 1/2	4.20	.42
7	1 1/2	1 1/2	5.00	.50
8	1 1/2	1 1/2	6.10	.61
10	1 1/2	1 1/2	8.00	.80

Marking Brushes



Fig. 692. All bristle, round or flat, red polished handle.

Number	1	2	3	4	5	6
Dozen	\$1.20	\$1.30	\$1.35	\$1.40	\$1.50	\$1.60
Each	.12	.13	.13	.14	.15	.16
Numbers 1 to 6 in set, per set	\$1.40					
Number	1	2	3	4	5	6
Dozen	\$0.75	\$0.95	\$1.00	\$1.15	\$1.25	\$1.50
Each	.07	.09	.10	.11	.12	.15
Numbers 1 to 6 in set, per set	\$1.15					

Auto Wash Brush



Made of black bristle, tapered with polished wooden handle. Brush part 11 inches long, 2 3/4 inches diameter at widest part. Used for washing automobile wheels, springs, gearing, etc.

Price per dozen	\$10.00	Each	\$1.00
-----------------	---------	------	--------

Glue Brushes

Round
Glue
Brush

Fig. 562. All pure Russia bristle. Made with iron handle to prevent shrinkage. Brass ferrule. Will stand hot glue. Nos. 5 and 6 have wood handle only.

Number	000	00	0	1	2	3	4	5	6
Diam., in.	5/8	3/4	3/8	1	1 1/4	1 1/2	1 3/4	1 3/8	2
Dozen	\$5.20	6.40	8.00	8.60	11.00	14.20	17.00	22.50	31.40
Each	.62	.64	.80	.86	1.10	1.42	1.70	2.25	3.14

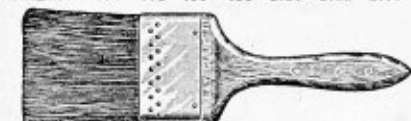
Flat
Glue
Brush

Fig. 566. Galvanized iron bound double nailed, all gray Russia bristle, extra long fastenings, warranted in hot glue.

Width, inches	1	1 1/2	2	2 1/2	3	3 1/2	4
Length, inches	2 1/2	2 1/2	3	3	3	3	3 1/2
Price dozen	\$13.00	\$15.00	\$18.00	\$22.00	\$26.00	\$27.50	\$32.00
Price each	1.30	1.50	1.80	2.20	2.60	2.75	3.20



Ship Seam Brush

Fig. 616

No.	1. Regular	2. Extra large	Dozen	Each
			\$3.50	\$0.35
			4.80	.48

Furniture Rubbing Brush



Fig. 1046

Made of all bristle. Shoe handle style.

	Dozen	Each
2-Row	\$4.00	\$0.40
3-Row	4.80	.48
4-Row	6.00	.60



Roofing Brushes

Fig. 606. For paints, tar or any roofing liquids. Gray mixed bristles and fibre. Very full, double nailed and leather bound. Handles extra.

Width, inches	7	8	9	10
Length bristles	3 1/4	3 1/4	3 1/4	3 1/4
Each	\$31.00	\$35.30	\$39.60	\$44.60
Each	3.10	3.53	3.96	4.46



Knotted Roof Brush

Fig. 612. Each knot made and set as in oval paint brush, to the heavy block as shown. Handles extra. Gray bristles with Tampico center. 3 1/2 inches long.

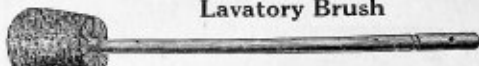
	Dozen	Each
2-knot	\$16.12	\$1.61
3-knot	23.00	2.30
4-knot	30.00	3.00

Roof Stain Brush

Fig. 608-A. Made of best black Chinese bristles, double nailed, short handle, leather bound. A good brush for shingle stain or roof painting.

6 inches wide, black Chinese bristles, 3 1/4 inches long.	
Price dozen	\$51.30
Each	\$5.13
6 inches wide, gray bristles, 4 inches long.	
Price dozen	\$46.60
Each	\$4.66

Lavatory Brush



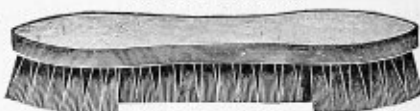
No. 1. Lavatory brush, made of strong gray fibre. Used for cleaning lavatories.

Price dozen	\$9.20	Each	\$0.92
-------------	--------	------	--------

No. 3. Cuspidor brush, made similar to No. 1, of strong palmetto fibre.

Price dozen	\$5.80	Each	\$0.58
-------------	--------	------	--------

Scrub Brushes



No. 33. For general work, selected white Tampico fibre.

Dozen	\$3.00	Each	\$0.30
-------	--------	------	--------



No. 170. For hard work, a strong palmetto fibre.

Dozen	\$4.00	Each	\$0.40
-------	--------	------	--------

Deck Scrub Brush



A good substantial scrub brush, used for scrubbing decks, porches, etc. No. 4 made of coar fibre.

Price dozen	\$11.00	Each	\$1.10
-------------	---------	------	--------

Hand Brushes



Made of white Tampico, with all solid back in three sizes. Nos. 3-0 and 6 are unfinished while No. 20 is finished in red.

No.	3-0	4 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2
Dozen	\$1.00	\$1.00	\$1.00	\$1.00	\$1.00	\$1.00	\$1.00	\$1.00	\$1.00
Each	.10	.10	.10	.10	.10	.10	.10	.10	.10

Window Wash Brush



Fig. 928. All Russia bristles, wire drawn.

No.	2	3	4	Dozen	Each
				\$19.20	\$1.92
				\$22.00	\$2.20
				\$30.00	\$3.00

Fig. 926. Oblong Car Wash Brush

No.	A	B	00	0	1	Dozen	Each
						\$3.00	\$0.30
						5.00	.50
						6.00	.60
						8.80	.88
						12.40	1.24

Rubber Window Cleaner



	Dozen	Each
12-inch	\$4.00	\$0.40
14-inch	4.00	.45
16-inch	5.30	.53
18-inch	6.50	.65

Floor Scrubber or Squeegee

Pure Gum Rubber 1/4" thick in hardwood block

	Dozen	Each
14 in.	\$7.00	\$0.70
16 in.	7.50	.76
18 in.	8.00	.80
20 in.	9.00	.90
24 in.	11.00	1.10
30 in.	14.00	1.40

Floor Sweeping Brushes For Factory and Garage



Fig. 940. Gem floor brush. Made of all black horse hair, wire drawn, red polished blocks and handles. A good serviceable brush for general sweeping purposes.

	Dozen	Each
No. 52. 12 inches long	\$20.50	\$2.00
No. 54. 14 inches long	23.50	2.20
No. 56. 16 inches long	28.00	2.60
No. 58. 18 inches long	32.00	3.00
No. 64. 24 inches long	41.00	4.00

Fig. No. 949 Challenge Floor Brush

Made of high quality bristle, mixed with fibre. Very durable and long wearing. For office, public building and general janitor service.

Prices including handles.	Dozen	Each
12 inches long	\$38.00	\$3.80
14 inches long	44.00	4.40
16 inches long	50.00	5.00
18 inches long	54.00	5.40
20 inches long	59.50	5.95
24 inches long	72.00	7.20

Garage Brushes

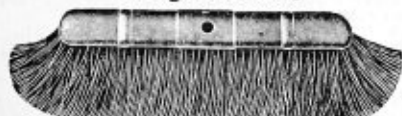


Fig. 960. Garage brush, made of stiff bass, full stock. The best brush for garage cement floors and sidewalks.

Prices including handles.	Dozen	Each
16 inches long	\$28.00	\$2.80
18 inches long	32.00	3.20
24 inches long	43.00	4.30

Capital Factory and Garage Brush



Made on hardwood block, with two handle holes. Designed for sweeping cement floors, rough wood floors and sidewalks. The center of this brush is made of imported fibre which cuts the dirt loose and wears like wire; the outside is made of Tampico fibre which is the nearest substitute for bristle that can be had. The Tampico fibre center will cut dirt loose that bristle or Tampico would skim over.

There is great demand for a brush for this class of sweeping and we recommend this as the most suitable.

Prices including handles.	Dozen	Each
No. 170. 16 inches long	\$28.00	\$2.60
No. 171. 18 inches long	32.00	3.00
No. 172. 24 inches long	40.00	4.00

Tampico Fibre Floor Brush



Prices including handles.	Dozen	Each
No. 22. 12 inches long	\$14.00	\$1.40
No. 25. 15 inches long	18.00	1.80

Wool Dusters

No. 4. Length of wool 9 inches, length of handle 12 inches.
Price dozen \$15.00
Price each 1.50
No. 6. Length of wool 10 inches, length of handle 14 inches.
Price dozen \$20.00
Price each 2.00



Counter and Bench Dusters For Counters, Benches and Machines Bristle Counter Dusters



Fig. 978. Extra. All Russia bristle, black outside, with varnished handle. Very durable.

	Dozen	Each
No. 2. 8 inches long	\$14.50	\$1.45
No. 3. 9 inches long	17.50	1.75
Fig. 976. Common. Black bristles, Good value.		
No. 2. 8 inches long	\$ 9.00	\$0.90
No. 3. 9 inches long	12.00	1.20

Tampico Bench Dusters

Tampico is the most durable fibre known—better than bristle for heavy work.

Channon Stiff Bench Duster



Made of selected Tampico, securely set and wire bound. Unusually well made for long service.

Fig. 980. Length over all 14½ inches, fibre 3 inches long. Price per dozen \$7.50 Each \$0.75

Capital Bench Duster



Made of Tampico, wire bound. In this brush we make no pretensions to finish, but recommend it as cheap and durable.

No. 8. Capital has handle 6 inches long and 8-inch brush, making length 14 inches overall, fibre projects 2½ inches. Price per dozen \$5.50 Each \$0.55

Moulders' Bristle Dusters



No. 990. In two grades of gray mixed bristle, with and without top handle.

	With Handle		No Handle	
	Dozen	Each	Dozen	Each
No. 1. Regular gray bristles	\$7.00	\$0.70	\$6.40	\$0.64
No. 2. Extra gray bristles	8.00	.80	7.40	.74

No. 986 Moulders' Dusters

All Bristle—Wire Fastened

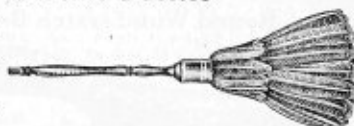
A good substantial all-bristle brush, for use in foundries. Very durable.

	1	2	3
Number	\$12.00	\$18.50	\$18.70
Per dozen	1.20	1.85	1.87

Feather Dusters

Made of the best feathers, re-enforced throughout.

Janitor
200 soft tail feathers.



	Dozen	Each
14 inches long	\$25.00	\$2.50
16 inches long	33.00	3.30
18 inches long	38.00	3.80

Hotel. 150 selected tail and wing feathers.

	Dozen	Each
14 inches long	\$15.00	\$1.50
16 inches long	19.00	1.90
18 inches long	22.00	2.20

Painters Wire Brushes

For Cleaning and Scrubbing Wood-Work, Floors, Stone, Brick, Cement and Iron

These brushes will do better and quicker work than any sandpaper, steel wool or similar abrasives. For removing old varnish they are unequalled and leave the surface with an "egg-shell" finish and the grain open and clean, ready for a new coat of filler. For cleaning stone, brick, cement and metal they are equally efficient and no painter, wood finisher, contractor, iron worker or boat builder can afford to be without them. They are indispensable to any up-to-date workman who now uses sandpaper or steel wool. They actually cost less than sandpaper, because of their long life.

Flat Wire Casting or Foundry Brush



This brush is made of first quality flat tempered steel wire on well finished hardwood blocks and designed for cleaning castings and general use in foundries and similar institutions. It can also be effectively used for removing paint from iron and stone surfaces. Blocks made 4 or 5 rows wide and 10 rows long.

No. 2. Wires 3 inches long, 4x10 rows, block 7½x2½ inches.	
Price per dozen.....\$6.00	Each.....\$0.60
No. 6. Wires 3 inches long, 5x10 rows, block 7½x2½ inches.	
Price per dozen.....\$6.50	Each.....\$0.65
No. 7. Wires 4 inches long, 5x10 rows, block 7½x2½ inches.	
Price per dozen.....\$7.00	Each.....\$0.70

Flat Wire Scrub Brush

This brush is made similar to the flat wire casting brush, with wires 1½ inches long. It is made particularly for scouring and scrubbing stone, iron and metallic surfaces, such as bridges, boilers, engines, etc., from which it is necessary to remove blistered paint scabs, rust or other matter. The short wires will not bend over and get out of shape quickly, and the solid block prevents them from working through the back.

No. 105. Wires 1½ inches long, 5x10 rows, block 7½x2½ inches.	
Price per dozen.....\$6.00	Each.....\$0.60

Round Wire Scratch Brush

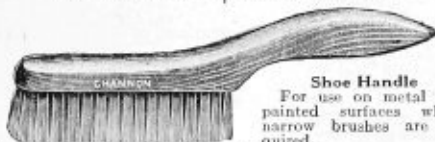


Curved Long Handle

Made of No. 31 black round tempered steel wire. Adapted for architectural iron work, figured brass and finished castings. Extensively used for pattern and braziers work, also as file cleaning cards. It will be found very effective for getting at crevices, grooves, corners and other out-of-the-way places, such as under the eaves of buildings and for removing rust, old paint and discolorations from iron, stone or brick surfaces where only light work is necessary.

No. 177. Wires 1½ inches long, 4x19 rows.	
Price per dozen.....\$6.00	Each.....\$0.60

Round Wire Scratch Brush



Shoe Handle

For use on metal and painted surfaces where narrow brushes are required.

No. 1781. 4 rows wires 1½ inches long.	
Price per dozen.....\$6.50	Each.....\$0.65
No. 1784. 2 rows, wires 1½ inches long, for penetrating into small cracks and seams.	
Price per dozen.....\$6.00	Each.....\$0.60

Curved Hand Scrub Brush



Made of No. 31 round black tempered steel wire and designed for removing paint, varnish and wax from hardwood floors and for cleaning and preparing flat varnished surfaces for refinishing. Recommended for use on floors in connection with paint and varnish remover. The curved face of this brush increases its efficiency, as it gives the user a greater leverage than ordinary straight or flat faced brushes.

No. 1779. Wires 1½ inches long, 9x21 rows, block 7x3 inches.	
Price per dozen.....\$9.00	Each.....\$0.90

Scrub and Scratch Brush

No. 1780. Made of No. 31 gauge round black tempered steel wire and is designed for use on large surfaces, such as sides of buildings, doors, windows, floors and finished hardwood work.

It takes the place of No. 1 sandpaper—does the work quicker, easier and leaves a much smoother finished surface.



Wires 1½ inches long, 6x19 rows, block 7½x2½ inches.	
Price per dozen.....\$7.00	Each.....\$0.70

No. 177. Made same style as No. 1780, of No. 31 round wire, very heavily filled. Suitable for cleaning metal surfaces of all kinds, also for cleaning exterior work of stone-brick, terracotta and rough painted surfaces. The heaviest and most serviceable brush made.

Wires 1½ inches long, 5x11 rows, block 7½x2½ inches.	
Price per dozen.....\$11.00	Each.....\$1.10

Round Steel Wire Duster



This handy brush is made of No. 31 round tempered steel wire and takes the place of an ordinary bristle duster. Used for cleaning molded engravings and in crevices and cracks. It is valuable when crack filler is used, as it penetrates into the cracks and takes all dirt and foreign substances out so that the filler will stay in the crack. A practical brush for cleaning out the base of the walls where a bristle duster is of little or no use. It enables the user to remove all the loose or scaly paint and makes a clean, finished job, close to the floor.

No. 1778. Wires 2½ inches long, 6 rows, block 2½x1½ inches.	
Price per dozen.....\$7.50	Each.....\$0.80

Brooms

For Mills, Factories, Warehouses, Stores, Homes, Streets, Tracks, Frogs and Switches



No. 6-C



No. 4



No. 2



Nos. 10 & 11



No. 9

No. 6-C

For use in mills, factories, warehouses, stores and general heavy sweeping.

A strong, well made broom, built for strength, durability and satisfactory sweeping. Made in all corn or corn and bamboo mixed. We recommend the 36-pound bamboo mixed as the bamboo gives additional strength and elasticity and cuts loose the dirt that corn would skim over.

Made in three sizes. Unless otherwise ordered, 36-pound bamboo mixed will be shipped.

Weight per dozen, pounds.....	32	36	40
Price each.....	\$ 1.30	\$ 1.40	\$ 1.50
Price per dozen.....	13.00	14.00	15.00

No. 2

House Broom. We highly recommend this broom for use on parlor carpets, rugs, etc. It is made of the first quality selected corn and securely sewed with strong twine. French polished handle.

	House	Janitor
Weight per dozen, pounds.....	25	32
Price each.....	\$ 1.30	\$ 1.40
Price per dozen.....	13.00	14.00

No. 9 Mill

Capitol Mill Broom. Made of a combination of selected broom corn and flat bamboo fibre, securely bound to a good hardwood handle with steel band and fastened with wrought nails. Used for sweeping floors or switches, frogs, crossings, etc.

Weight per dozen, pounds.....	35
Price each.....	\$ 1.30
Price per dozen.....	13.00

No. 4

Rattan Push Broom. A well made stapled push broom for cleaning streets and stables and all heavy sweeping. Made of rattan.

Block, Inches	Rows of Fibre	Price Each	Price per Dozen
14	4	\$1.30	\$13.00
16	4	1.50	14.50
16	6	1.60	16.00

No. 5

Snow and Switch Broom. Made from imported all rattan fibre; hardwood handle; securely bound with steel bands. Eleven-inch sweep, impossible for handle or fibre to work loose. Price each.....\$ 1.20 Price per dozen.....12.00

No. 7

Snow Broom with Chisel Point. Same as No. 5, but with chisel point for frogs and switches. Price each.....\$ 1.40 Price per dozen.....14.00

No. 8

Steel Wire Push Broom. Made of 5-inch flat tempered steel. 52-inch hardwood handles. Handles extra: Price each.....\$0.10 Price per dozen.....\$1.00

Block, Inches	Wire, Inches	Sweep, Inches	Price Each	Price per Dozen
12	5	11	\$1.10	\$11.00
16	5	12	1.20	12.00
16	5	13	1.30	13.00

No. 10

Frog Broom. Especially designed for sweeping frogs and switches. Made with 4 1/4-inch steel wire and 11-inch block. Will last indefinitely. Long plain hardwood handle. Price each.....\$ 1.20 Price per dozen.....12.00

No. 11

Frog Broom with Chisel Point. Same as No. 10, only furnished with chisel point for use in frogs and switches. Price each.....\$ 1.40 Price per dozen.....14.00

No. 12

Bass Fibre Broom. Made of best African fibre or coir. A very economical brush for use on sidewalks, floors and basements. Will outlast three ordinary brooms. Handles extra: Price each.....\$0.10 Price per dozen.....\$1.00

Block, Inches	Rows of Fibre	Price Each	Price per Dozen
14	4	\$1.30	\$13.50
16	4	1.50	15.00
16	6	1.70	17.50

H.Channon Company Chicago

Spraying Machines

For Applying Whitewash, Cold Water Paint, Disinfectants, Etc.



Style A



Style E



Style D

Style A. A favorite among all users of spraying machinery. It is recommended for those having a large amount of cleaning to do, continuously or at short intervals. Capacity equal to the work of 30 men with brushes.

Style E. For those desiring a portable machine it is highly recommended. Machine consists of pump similar in construction to Style D only trifle larger in capacity and construction, which is mounted on portable truck together with 30-gallon tank complete with agitator, as illustrated. Capacity equal to the work of 16 men with brushes.

Style D. This is the smallest machine of this type furnished. It is identically the same in construction as Style A, but has shorter pump cylinder and a few other modifications as shown in cut. Capacity equal to the work of 10 men with brushes.

Equipment

All the above machines are furnished complete as illustrated with spray pipe, cock and nozzle, extra spray tip, 200-pound pressure gauge, special galvanized sieve, follower wrench, one length 1-inch suction hose and discharge hose. Style A has 20 feet $\frac{1}{2}$ -inch discharge hose and Style D and E, 10 feet each.

Style A.	Net weight, 80 pounds.	Gross weight, 100 pounds.	Price each.....	\$70.00
Style D.	Net weight, 60 pounds.	Gross weight, 75 pounds.	Price each.....	48.00
Style E.	Net weight, 125 pounds.	Gross weight, 150 pounds.	Price each.....	70.00



Style J

Style J Sprayer

This machine is constructed along the same excellent lines as the other styles. Has brass cylinder, plunger rod, ball valves and brass seats. Will operate against a working pressure of 80 to 90 pounds. Well adapted for those having a small or medium amount of work to do.

Equipment

Furnished complete as illustrated with spray pipe, cock, nozzle, follower wrench and 10 feet $\frac{3}{8}$ -inch discharge hose. Net weight 30 pounds, gross weight 40 pounds.

Price each.....\$22.00

Capacity equal to work of 6 men with brushes.

Style 21 Sprayer

A general purpose sprayer and one of our most popular styles. It is portable, well balanced, light and has many improvements.

Pump cylinder seamless brass tubing, bronze ball valves, seats and all working parts of brass, rigidly bolted to 12-gallon tank. Is equipped with substantial 16-inch steel wire wheels. Has large iron air chamber, which insures a constant steady pressure, and will operate against 125 pounds pressure. Mechanical agitator operates at every stroke of the pump, and at the same time washes all sediment from suction strainer, preventing any possible chance of clogging.



Style 21

Equipment

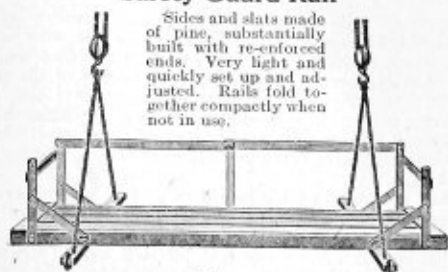
Furnished complete as illustrated and described with 10 feet Star Special $\frac{1}{2}$ -inch discharge hose and couplings, spray pipe, complete with a $\frac{1}{4}$ -inch cock, one Star nozzle. Weight 65 pounds.

Price each.....\$30.00

Ladders, Trestles and Stages

Safety Guard Rail

Sides and slats made of pine, substantially built with re-enforced ends. Very light and quickly set up and adjusted. Rails fold together compactly when not in use.



Stage



Rigid, safe, light and very easily attached to the platform.

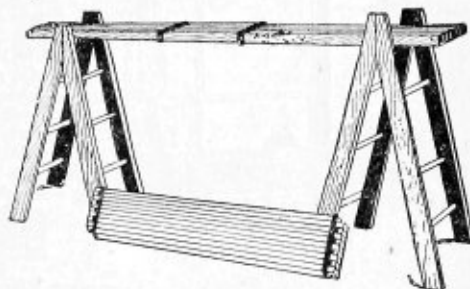
Safety guard rails. Price each.....\$10.00

10 to 20 feet, per foot......56

22 to 24 feet, per foot......60

Unless otherwise specified, the 20-inch width will be furnished.

Extension Plank



This extension plank is made of selected Norway pine and is very light and strong. It is practical and most convenient for any room, no matter what size it may be. Used for papering, painting or calcimining, and may be carried up any stairway.

6-foot extends to 10½ feet. Price each.....\$ 5.50

7-foot extends to 12 feet. Price each..... 7.00

10-foot extends to 18 feet. Price each..... 10.00

Genuine Miller

Painters' Stepladder

The Miller ladder has a full bottom step; braced substantially at every angle. Can be furnished with stair attachment if desired.



Price per Foot

4 to 7 ft.....\$0.52

8 to 12 ft......56

14 ft......90

16 ft......90

Boughton Step Ladder

Every step in this ladder is braced by an iron rod which passes under it. The large iron washers on the sides of the ladder prevent the nails from coming out of the steps. Has iron center spreader and iron bound back. Made with or without pail shelf.

Price per Foot

4 to 10 feet.....\$0.52

12 to 16 feet......56

18 to 20 feet..... 1.40

Pail shelf \$0.00 net extra.



Painters' Trestle



Extension Ladder

This ladder has separate irons on each side of the bottom section, so constructed that they cannot bend or get out of order. Irons are fitted with rollers, which greatly decrease the friction. Made of pine or fir.

Price

16 to 30 ft. \$0.32

32 and 40 ft. .34

42 to 48 ft. .36

In three sections,

extra.....\$2.00



Common Long Ladder

These common long ladders are made of pine. The rungs, which are made of hickory, are securely let into the sides by 1" tenon. A well constructed ladder suitable for use by painters or roofers.

Price per Foot

Length 8 to 16 feet...\$0.24

Length 18 and 20 feet.. .32

Length 22 and 24 feet.. .30



Window Cleaners Ladder

Made of selected pine; hickory rungs; put together with long, heavy screws and wrought iron bolts. 6 to 10 feet. Price per foot.....\$0.64

12 to 16 feet. Price per foot......76

18 feet. Price per foot......80





Painters' Falls

A set of painters' falls consists of two pairs (4) roller bushed wooden shell tackle blocks, each pair has a single block with becket and a double block without becket reaved with our first quality, strictly pure Manila rope and spliced into the becket of the single block; one pair (2) crossbars with rollers; one pair (2) 1-inch Manila rope stirrups with eyes spliced in each end with thimble in center; two 1/2-inch Manila rope guylines; one pair (2) steel cornice hooks and one pair (2) straps for use where hooks cannot be supported from roof.

Painters' falls are usually for a height of 50 feet or greater. In a 50-foot set of falls with single and double blocks 400 feet of rope are required, with 80 feet extra rope for each 10 feet longer. The guylines for 50-foot fall are furnished 50 feet long. Prices of painters' falls change with the price of Manila rope. We furnish falls of any size rope with blocks of any purchase desired.

Complete Painters' Falls (See Above)

Price of 50-foot falls with 5/8 rope, weight about 150 pounds,	\$42.00	For each 10 feet longer, 15 lbs., add.	\$4.50
Price of 50-foot falls with 3/4 rope, weight about 165 pounds,	46.00	For each 10 feet longer, 17 lbs., add.	5.00
Price of 50-foot falls with 7/8 rope, weight about 200 pounds,	55.00	For each 10 feet longer, 22 lbs., add.	5.75

Prices change with the market price of Manila rope.

Painters' Cornice Hooks

Made of 1 1/2 x 2-inch iron; height 37 inches, width 23 inches with 2-inch eye for tackle block hook.

Weight about 40 pounds per pair.

Price per pair . . . \$8.00



Painters' Stirrups

Made of 1-inch pure Manila rope with loops for slipping over cross bars to support the painter's stage. The eye at top has thimble for hook of tackle block.

Weight, about 6 pounds per pair

Price per pair . . . \$4.00



Cross Bars with Rollers

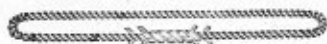


Made of hard maple, with turned roller. These are the cross pieces that go under the stage—the stirrup-eyes are slipped over each end. The roller sets up against the building.

Weight, about 12 pounds.

Price per pair . . . \$2.80

Painters' Straps



Slipped over timber to support stage when cornice hooks are not used. 1-inch Manila rope with short splice. 3 feet long when doubled. Weight, about 5 pounds.

Price per pair . . . \$2.80

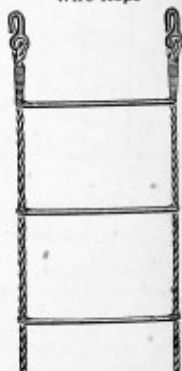
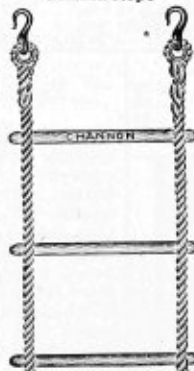
Painters' Drop Cloths

Furnished any size.
Price per square foot . . . \$0.08

Rope Ladders

Manila Rope

Wire Rope



Manila Rope Ladders

Made of pure Manila rope with turned hardwood rungs. Hooks with thimbles at top. Flexible and easily folded up.

Price per foot . . . \$1.60

Wire Rope Ladders

Made with wire rope sides and iron rungs—is considerably stiffer than Manila rope ladders and are chiefly used for suspension in shafts, etc.

Price per foot . . . \$2.60

Boughton Brand Oil and Grease



In offering our Boughton brand of oils and greases to our customers, we take unusual pride in being able to produce oils and greases of exceptional quality. The demand for lubricants of established merit has been so great the last year that we are compelled to devote special attention to our improved and enlarged oil and grease department. Our statement to the effect that Boughton oils and greases are the best to be had, is confirmed by hundreds of our most critical customers who use none other than Boughton brand.

Steam Engine Cylinder Oil

Extra Dark

A very high grade of cylinder oil of superior quality. Has a very high fire test and is especially compounded to meet the requirements of steam engine cylinder oil. Recommended for stationary and traction engines of all makes.

Extra Amber

Practically the same as the extra dark and used for the same purpose. It is furnished in an amber color to meet the demands of those who desire oil of that character.

	Amber	Dark
Single-gal. cans, price each.....	\$1.20	\$1.10
Five-gal. cans, price each.....	5.00	4.80
Half-barrels, wooden, price per gallon.....	.76	.70
Half-barrels, steel, price per gallon.....	.92	.86
Full-barrels, wooden, price per gallon.....	.72	.66
Full-barrels, steel, price per gallon.....	.88	.82

No. 1 Cylinder Oil

This is a medium priced cylinder oil and is of very good quality. Used for the same purposes as our steam engine oil. For those who do not require the more expensive oil we recommend our No. 1 cylinder oil.

Single-gal. cans, price each.....	\$1.00
Five-gal. cans, price each.....	4.50
Half-barrels, wooden, price per gallon.....	.66
Half-barrels, steel, price per gallon.....	.82
Full-barrels, wooden, price per gallon.....	.62
Full-barrels, steel, price per gallon.....	.78

No. 3 Mineral Cylinder Oil

This is a high quality mineral oil which we recommend for all kinds of general use.

Single-gal. cans, price each.....	\$0.90
Five-gal. cans, price each.....	4.00
Half-barrels, wooden, price per gallon.....	.52
Half-barrels, steel, price per gallon.....	.68
Full-barrels, wooden, price per gallon.....	.48
Full-barrels, steel, price per gallon.....	.64

Engine Oil

Extra

Extra engine oil is especially prepared for use on high speed engines, motors, dynamos, etc. Has amber color and can be filtered indefinitely. A fair trial will prove its worth.

Single-gal. cans, price each.....	\$0.80
Five-gal. cans, price each.....	3.50
	Wooden Steel
Half barrels, price per gallon.....	\$0.46 \$0.62
Full barrels, price per gallon.....	.42 .58

Extra Red

Used for the same purpose as Extra engine oil, but intended for those who prefer oil of a red color. Has equally as good lubricating qualities as our Extra engine oil.

Single-gal. cans, price each.....	\$0.80
Five-gal. cans, price each.....	3.50
	Wooden Steel
Half barrels, price per gallon.....	\$0.46 \$0.62
Full barrels, price per gallon.....	.42 .58

No. 1 Red Engine Oil

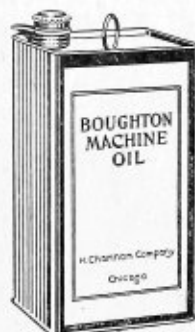
For the lubrication of line shafting and general farm machinery. This is a red oil, lower in gravity than our Extra red engine oil.

Single-gal. cans, price each.....	\$0.76
Five-gal. cans, price each.....	3.40
	Wooden Steel
Half barrels, price per gallon.....	\$0.44 \$0.60
Full barrels, price per gallon.....	.40 .56

Gas or Gasoline Engine Oil

Specially compounded oil for stationary gas and gasoline engines. Cylinders are very often ruined by the use of cheap oils. We are confident that a trial of our Boughton brand will convince you of its superior qualities. It is a strictly high grade oil and warranted pure and clean.

Single-gal. cans, price each.....	\$0.90
Five-gal. cans, price each.....	4.00
Half barrels, wooden, price per gallon.....	.52
Half barrels, steel, price per gallon.....	.68
Full barrels, wooden, price per gallon.....	.48
Full barrels, steel, price per gallon.....	.64



Boughton Machine Oil

Heavy

For lubricating heavy bearings and light running machinery we recommend our Boughton-brand machine oil. It is a heavy grade, red in color and very serviceable. Absolutely clean and carbonless. It is strained and filtered by a modern process which adds to its lubricating qualities.

Light

A light bodied oil for use on all kinds of farm machinery, portable engine bearings and wherever a light bodied oil is required. Color, light red.

	Heavy	Light
Single gallon cans. Price each.....	\$0.80	\$0.70
Five gallon cans. Price each.....	3.60	3.30
Half barrels, wooden. Price per gallon.....	.48	.41
Half barrels, steel. Price per gallon.....	.64	.57
Full barrels, wooden. Price per gallon.....	.44	.37
Full barrels, steel. Price per gallon.....	.60	.53

No. 1 Castor Machine Oil

A heavy grade of castor machine oil for use on light running machinery and open bearings where a lighter oil would run off.

Single gallon cans. Price each.....	\$0.96
Five gallon cans. Price each.....	4.20
Half barrels, wooden. Price per gallon.....	.51
Half barrels, steel. Price per gallon.....	.67
Full barrels, wooden. Price per gallon.....	.47
Full barrels, steel. Price per gallon.....	.63

No. 2 Castor Machine Oil

For winter use we recommend a lighter grade oil. No. 2 Castor is similar to our No. 1 in every respect but its viscosity, No. 2 being somewhat thinner.

Single gallon cans. Price each.....	\$0.90
Five gallon cans. Price each.....	4.00
Half barrels, wooden. Price per gallon.....	.50
Half barrels, steel. Price per gallon.....	.66
Full barrels, wooden. Price per gallon.....	.46
Full barrels, steel. Price per gallon.....	.62

Summer Black Oil

Heavy oil especially adapted for use in sawmills and heavy machinery during the summer months. Has a very high fire test.

Single gallon cans. Price each.....	\$0.60
Five gallon cans. Price each.....	2.20
Half barrels, wooden. Price per gallon.....	.24
Half barrels, steel. Price per gallon.....	.40
Full barrels, wooden. Price per gallon.....	.22
Full barrels, steel. Price per gallon.....	.38

Winter Black Oil

For the same use as above, except to be used in the winter months. Somewhat thinner and will flow freely in zero weather.

Single gallon cans. Price each.....	\$0.64
Five gallon cans. Price each.....	2.40
Half barrels, wooden. Price per gallon.....	.26
Half barrels, steel. Price per gallon.....	.42
Full barrels, wooden. Price per gallon.....	.22
Full barrels, steel. Price per gallon.....	.38

Ice Machine Oil

This is a high grade oil and flows freely in cold weather. Mostly used on ice machines, windmills and other machinery in cold weather. Will not congeal in the coldest weather.

Single gallon cans. Price each.....	\$1.10
Five gallon cans. Price each.....	4.40
Half barrels, wooden. Price per gallon.....	.64
Half barrels, steel. Price per gallon.....	.80
Full barrels, wooden. Price per gallon.....	.60
Full barrels, steel. Price per gallon.....	.76



Boughton Dynamo Oil

Prepared especially for dynamos, automobiles, electric motors, high speed engines and generators with ring oilers. Boughton brand dynamo oil is as near carbonless as it is possible to produce. It is a high grade oil with superior lubricating qualities. A fair trial will prove its value. Sold in quantities from one gallon to full barrels. Barrels of either wood or high grade steel.

Single gal. cans. Each.....	\$0.90
Five gal. cans. Each.....	4.00
Per gallon	
Half barrels, wooden.....	\$0.50
Half barrels, steel.....	.66
Full barrels, wooden.....	.46
Full barrels, steel.....	.62

Worm Gear Oil

This oil is especially prepared for use on worm gear elevators or any other machinery using worm gear drive.

Single gallon cans. Price each.....	\$1.20
Five gallon cans. Price each.....	5.00
Half barrels, wooden. Price per gallon.....	.80
Half barrels, steel. Price per gallon.....	.96
Full barrels, wooden. Price per gallon.....	.76
Full barrels, steel. Price per gallon.....	.92

Separator Oil

A pale oil of exceptionally high flash test, and particularly for use on cream separators and all light running hand and power machinery. Clean, carbonless, refined and strained and filtered by a modern process which greatly improves its lubricating qualities for this particular work. Specify whether for hand or power machinery.

	Hand	Power
Single gallon cans. Price each.....	\$0.70	\$0.85
Five gallon cans. Price each.....	3.20	3.70
Half barrels, wooden. Price per gallon.....	.43	.45
Half barrels, steel. Price per gallon.....	.59	.61
Full barrels, wooden. Price per gallon.....	.39	.41
Full barrels, steel. Price per gallon.....	.55	.57

Lard Oil

We carry in stock the higher grades of lard oil only, but will secure the cheaper goods upon request.

Boughton Thread Cutting Compound

Made from the purest, non-gumming viscous oils, furnished in paste form to the consistency of soft grease, to be mixed with cold water. Will keep the machines clean. Tools will cut clean—no rust—no gum.

Herewith a few formulas for your guidance in estimating quantity required.

For thread-cutting on pipes, bolts and nuts:

Use a solution of 40 pounds of the compound to 50 gallons of water. Very heavy thread-cutting may require a solution of 1 to 8.

For difficult turret lathe work:

Use a solution of 50 pounds of the compound to 50 gallons of water. Ordinary lathe work will stand a solution of 1 to 16 parts, or 25 pounds to 50 gallons of water, while some shops use a solution of 1 to 24 parts for ordinary lathe work.

For drilling, milling and grinding:

Use 17 pounds to 50 gallons of water. Some shops use a solution of 1 part to 40 parts, or 10 pounds to 50 gallons of water.

For nut tapping:

Use 1 to 10 solution.

It will readily be seen from the above that a cutting oil can be secured at a cost of from three to sixteen cents per gallon, depending upon the nature of the work.

Barrels. Price per pound.....	\$0.16
100-pound kegs. Price per pound.....	.18
50-pound pails. Price per pound.....	.20
25-pound pails. Price per pound.....	.24



Boughton Thread Cutting Oil

Especially prepared for use on automatic thread-cutting machinery; also for use by plumbers on hand dies. Will not gum and will give perfect satisfaction under most trying conditions.

1-gal. cans. Price, each.	\$1.80
5-gal. cans. Price, each.	7.60
Half Wooden Barrels.	
Price, per gallon.	1.22
Half Steel Barrels.	
Price, per gallon.	1.38
Full Wooden Barrels.	
Price, per gallon.	1.18
Full Steel Barrels.	
Price, per gallon.	1.34

Boughton Harness Oil

This oil is used for preserving leather, harness, etc. If you have an old dried-out harness, one application of this oil will soften it and prolong its life. We recommend this oil to those who desire a medium price Harness Oil.

Single gallon cans. Price, each.	\$0.70
Five gallon cans. Price, each.	3.30
Half barrels. Wooden. Price, per gallon.	.43
Half barrels. Steel. Price, per gallon.	.59
Full barrels. Wooden. Price, per gallon.	.39
Full barrels. Steel. Price, per gallon.	.55

Boughton Signal Oil

Used by switchmen, night-watchmen, etc., where a first class oil is desired. Gives a good light and will not harden. Half and full barrel prices on application.

1-gallon cans.	\$1.80
5-gallon cans. Price, each.	3.50

Boughton Neatsfoot Oil

Made from pure, clean stock, and especially adapted for oiling leather clutches, leather seats and tops of automobiles, etc.

5-gallon cans. Price, per gallon.	\$2.60
1-gallon cans. Price, per gallon.	2.80
1-quart cans. Price, per can.	.80



Atlantic Rust Preventive

A special preparation for use on any unpainted iron work wearing parts of machinery, tools, farming implements, etc. It is non-gumming and non-hardening. Can be applied with an ordinary paint brush or rag, and easily removed by wiping with kerosene.

One pound can will cover 70 square feet.

1-pound can. Price, per can.	\$0.40
5-pound can. Price, per can.	1.20
10-pound can. Price, per can.	2.00
25-pound can. Price, per can.	4.30
50-pound can. Price, per can.	8.00

Barrels and Half-barrels quoted on application.

Household Lubricant

A light colored, high-grade lubricating oil, intended for general household purposes, such as sewing machines, lawn mowers, typewriters, guns, bicycles, grindstones, etc.

Will not gum or corrode.

Furnished in newly patented cans.

	Price per Doz.	Price Each
Large cans:		
One-half pints.	\$2.00	\$0.20
Small cans:		
One-fourth pints.	1.60	.16

Miscellaneous Oils

Headlight Oil, Signal Oil, Perfection Kerosene, Sperm Oil, Cottonseed Oil, Fish Oil, First and Tempering Grades furnished in gallon, five gallon and ten gallon cans, and in half barrels and barrels at market prices. Any other market or special oils at prevailing market prices.

Boughton Automobile Oil

An automobile engine must be taken care of and fed properly, for without perfect lubrication an engine will soon wear out and be of no value whatever. It is poor policy to buy cheap oil for any automobile engine, for it is only the best oil that enables an engine to run with the highest possible efficiency.

Boughton Automobile Oil has stood every test of gravity, viscosity, fire, flash and freedom from carbon. A modern filtering process removes all excess carbon and insures the user against carbon and friction troubles. We have great confidence in our oil and highly recommend it for use in all automobile engines.

1-gallon can. Price, each.	\$1.10
5-gallon can. Price, each.	4.40
Half Wooden barrels. Price, per gallon.	.64
Half Steel barrels. Price, per gallon.	.80
Full wooden barrels. Price, per gallon.	.60
Full steel barrels. Price, per gallon.	.76



Boughton Harvester Oil

For threshing machines, mowers and all farm machinery. This oil has been especially prepared to meet the requirement of all harvesting machines. It has no equal for lubricating bearings, and its wearing qualities are not impaired even during the warmest weather.

1-gallon can. Price, each.	\$0.96
5-gallon can. Price, each.	4.20
Half barrels. Wooden. Price, per gallon.	.61
Half barrels. Steel. Price, per gallon.	.67
Full barrels. Wooden. Price, per gallon.	.47
Full barrels. Steel. Price, per gallon.	.63

Boughton Motorcycle Oil

For any make of motorcycle or air cooled engine, Boughton Motorcycle Oil will be found suitable and economical. It is a perfect lubricator and will not congeal in the coldest weather. It is as clear carbonless as an oil can be and consequently the spark-plugs will not carbonize as is often the case when using cheaper oil. A fair trial of our Boughton Motorcycle Oil will prove its superior lubricating qualities.

5-gallon can. Price, per can.	\$5.00
1-gallon can. Price, per can.	1.20

Three in One Oil

Lubricates, Prevents Rust, Cleans and Polishes

Three-In-One-Oil is an oil compound that flows right to the heart of every bearing and friction point. It sinks down into the unseen pores of metal surfaces.

For Automobiles—Used for oiling self-starters, electric horns, speedometers, cone clutches, also automobile motor boat magneto etc.

For use in factories, offices and for all-light mechanisms, dynamos, electric fans, hardwood floors, dustless mops, etc.

1-ounce bottle. Price, each.	\$0.20
3-ounce bottle. Price, each.	.50
8-ounce bottle, (1/2 pint), factory size. Price, each.	1.00
3 1/2-ounce handy oil can. Price, each.	.50



Lesoyl

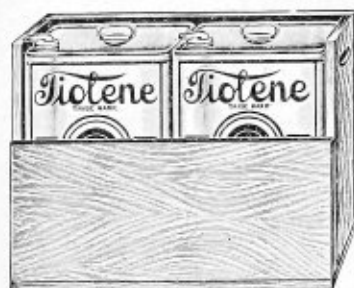
Lesoyl insures proper lubrication of all bearings. It contains only amorphous graphite from which all clay and foreign substances have been removed. Lesoyl, when mixed with oil, forms a perfect lubricant and much less oil is necessary than when using oil alone, thus reducing the oil bill, in some cases more than one-half.

Lesoyl carries a perfect lubricant graphite to all parts of the bearing surface. It will prevent hot bearings.

Lesoyl is a semi-fluid concentrate containing graphite especially prepared to insure the suspension of the graphite when properly mixed with lubricating oil or grease.

No. 1 Can, containing correct quantity of Lesoyl to mix with 5 gallons of lubricating oil or 10 pounds of grease.	
Per can.	\$2.00
No. 10 Can, for 50 gallons of oil, or 100 pounds of grease.	
Per can.	17.00





Tiolene Oil

"The Motor Oil That's Clean"

Tiolene—"The Motor Oil That's Clean"—is made especially for lubricating fine gas and automobile engines.

It is refined solely from Pennsylvania rock oil crude, by a process that preserves the full life of the crude, eliminates every particle of foreign matter, and retains only the absolutely minimum amount of carbon necessary to complete the lubricating properties of the oil.

The prime essential factors in motor oils are, first, to retain their body under high temperatures; second, to be free from gummy substances and to burn clean, leaving no carbon deposit. The improved process of manufacturing Tiolene, the careful filtration—not acid treatment—removes all sediment and foreign substances, making it as near a perfect lubricant as it is possible to refine and insures the auto owner against the multitude of annoyances and expense attached to carbon-full oils.

Tiolene is always uniform—fully guaranteed.

\$3.00 a year. That's the difference between using good or bad oil. One cent a day. It's certainly worth that much to be sure your engine is being properly lubricated. And the way to make sure that it is always properly lubricated is to buy Tiolene, "The Motor Oil That's Clean," in steel drums, and have it constantly on hand.

Tiolene is put up in 1 and 5-gallon cans, and 15, 31 and 55-gallon steel drums.

The steel drums are fitted with invisible faucets that insure safety in shipment—is fire-proof—air-tight—and makes an ideal storage equipment when free of its original contents.

Tiolene Light. A light bodied oil for lubrication of vertical gasoline engines where an oil of light body is required, flowing freely in cold weather.

Tiolene Medium. An amber-colored oil for lubrication of water-cooled gasoline engines, requiring a rich lubricant. It holds its body under extreme heat.

Tiolene Ford Special. Exclusively used for Ford cars.

Tiolene Heavy. For both air and water-cooled gasoline engines. It holds up compression under extreme heat. This oil is especially suitable for lubrication of motorcycles, where a medium heavy bodied oil is desired.

Tiolene Extra Heavy. This oil is especially suited for motorcycle and tractor engines.

Tiolene Transmission Oil. A heavy, dark fluid oil for transmission and differential lubrication.

List Prices

Tiolene Light, Medium, Heavy and Ford Special

	Drums, 55 Gallons	1/2 Drums, 31 Gallons	1/4 Drums, 15 Gallons	Cases 2 5-Gal. Cans	Cases 10 1-Gal. Cans
List price per gallon.....	\$1.26	\$1.32	\$1.40	\$1.50	\$1.80



Tiolene Extra Heavy

	Barrels	Half Barrels	Cases 2 5-Gal. Cans	Cases 10 1-Gal. Cans
List price per gallon.....	\$1.36	\$1.46	\$1.70	\$2.00

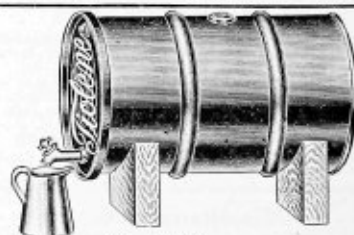
Tiolene Transmission Oil

	Barrels	Half Barrels	Cases 2 5-Gal. Cans	Cases 10 1-Gal. Cans
List price per gallon.....	\$1.00	\$1.06	\$1.30	\$1.60

Channon Oil Filters

Will reclaim all the wasted, high priced, lubricating oils which are drained from automobiles, engines, and other machinery.

Full information and prices, see page 511.



Steel Drum

Buy Your Oil in Steel Drums

Automobile Lubricating Greases

Gredag Automobile Grease



For transmissions, differential and other gears, cups, wheel hubs, universal joints, pumps, steering worms, chains, etc.

Especially prepared for automobile, motor boats and motor-cycle lubrication.

Gredag is better than other graphite greases, because of the absolute purity and the soft, unctuous nature of Acheson graphite which is found in no other grease.

Gredag is better than any plain grease, because the graphite establishes a durable anti-friction surface over the parts lubricated, greatly assisting lubrication and preventing wear. Moreover, the

solid graphite does not squeeze out from between the rubbing surfaces under heavy pressure as a grease would do. This is of vital importance to the long life of gear teeth, and of shaft bearings such as those in the gear cases, subjected to terrific strain and sudden shock.

Gredag withstands a very wide range in temperature changes and easily gives at least double the service of plain grease.

No. 31. Semi-fluid. For gears enclosed in oil-tight cases and running quietly.

No. 32. Soft. For general use. Ideal for wheel hubs, shackle bolts, grease cups, roller and ball bearings.

No. 33. Medium. For cup and general use, universal joints and steering gears.

No. 63. Medium. A fibre grease for general use, excellent for noisy gears.

No. 41. A medium light lubricant designed especially for transmissions and rear axles. It combines the advantages and eliminates the disadvantages of all other lubricants to a really remarkable degree. Stays in the gear cases; will not chafe. Eliminates noise and reduces wear to a minimum. Especially popular for worm drives.

No. 42. A slightly heavier grade than No. 41. Extensively used for Ford differentials on account of its consistency and great lubricating qualities.

		Grades	Grades
		31, 32, 33, 63	41 and 42
1-pound can.	Per pound.....	\$0.70	\$0.50
5-pound can.	Per pound.....	.60	.46
10-pound can.	Per pound.....	.56	.44
25-pound can.	Per pound.....	.52	.40

Larger size packages quoted on application.

Cook's Lubricant

Used for automobile gear cases, and for all kinds of gears in industrial plants where a soft mineral oil grease is desired. It is also very fine for lubrication of chain drives in industrial plants.

Gears in an automobile when improperly lubricated, waste a large percentage of the power generated, and soon grind themselves to pieces. Gears play an important part in the operation of a car, and when properly lubricated mean more power—easier car operation—less noise and less expense.

Cook's lubricant will not run or leak out of a gear case; cannot be thrown off the gears; will not drip from the gears and settle in the bottom of the case; cannot be cut up and packed aside by the gear teeth in action and is not affected by temperature changes.

Cook's lubricant overcomes the wastefulness of gear oils and the many non-lubricating disadvantages of the numerous so-called gear lubricants and ordinary greases.

Made in three consistencies:

Soft—Used in gear cases of new cars and cars which require a light consistency of grease.

Medium—A general all around consistency.

Hard—For use in gear cases having worn bushings or extremely noisy gears.

5, 10 and 25-pound cans.	Price per pound.....	\$0.40
50-pound cans.	Price per pound.....	.40
125-pound kegs.	Price per pound.....	.32
Half barrels.	Price per pound.....	.30
Barrels.	Price per pound.....	.28



Boughton Automobile Cup Grease

Boughton cup grease is prepared especially for grease cups on automobiles, shaftings, crank pins, etc., or wherever a solidified oil or grease is required.

5-pound tins.	Price each.....	\$1.20
10-pound tins.	Price each.....	2.00
25-pound tins.	Price each.....	4.50
Barrels and half barrels.	Price per pound.....	.12



Boughton Automobile Transmission Grease



This is a semi-liquid grease for use in transmissions in automobiles of planetary, selective and sliding type, and also for differentials, gears, motors, etc. Retains the same consistency both winter and summer and can readily be applied by use of grease guns.

5-pound cans.	Price each.....	\$1.20
25-pound cans.	Price each.....	2.00
25-pound tins.	Price each.....	4.50
Half bbls.	Price per pound.....	.12
Full barrels.	Price per pound.....	.12



Boughton Automobile Fibre Grease

This fibre grease is of a spongy nature and adheres perfectly to the gears. Used in grease cups as well as differentials and transmissions. Will not leak out of gear casings.

10 pound tins.	Price each.....	\$2.00
25-pound tins.	Price each.....	4.50
Barrels.	Price per pound.....	.12
Half barrels.	Price per pound.....	.12

Grease-Oil

A liquid grease made from heavy transmission oil and pure mineral oil transmission grease.

Made in three consistencies:

- No. 1.** Very light—for electric cars and trucks.
- No. 2.** Light—for transmissions of all make cars, excepting Fords.
- No. 3.** Medium—for Ford transmissions and differentials.

5-pound cans.	Price per can.....	\$1.50
10-pound cans.	Price per can.....	3.00
Larger package quoted on application.		



Grease in Tubes

This is the quick, modern, clean, improved method of applying grease to grease cups, springs, transmissions and differentials.

Grease in tubes is economical. Just the right amount of grease goes just where it is needed—and the last particle is as pure a lubricant as the first. A compact, easily carried outfit.

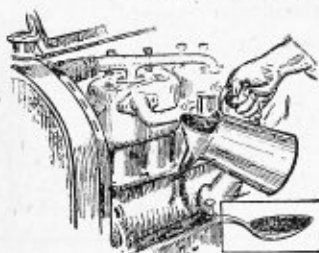


Put up in cartons of three tubes each, Lincoln Highway Kit.—Contains one tube each of gear compound, cup grease and spring grease.

Separate Kits.—Contains three tubes of either grades of grease as above.
Price per kit.....\$2.00

Dixon's Graphite Automobile and Machinery Lubricants

Dixon's Motor Graphite



The purest and most carefully selected grade of flake graphite ground to impalpable fineness. Its function is to eliminate friction and wear of parts and to increase power. Use it in cylinders, on chains, springs, tires, wheel-rims, bearings where-ever friction occurs.

1/2-pound tin cans. Price each.....	\$1.00
5-pound tin cans. Price each.....	8.00
25-pound and larger packages. Price per pound.....	1.20

Dixon's No. 680 Non-Leak Graphite Grease

Car owners who have been annoyed by differential lubricant leaking out on the brake drums and wheels, will appreciate the merit of Dixon's No. 680. It "stays put." If the old lubricant is removed before No. 680 is put in, there will be no more trouble with leaky axles. No. 680 is a special adhesive lubricant not intended for transmission cases. It is recommended for differentials only when No. 677 or No. 675 will not do the work.



2 1/2-pound can, sufficient quantity for Ford or other small cars. Price per can.....	\$1.70
5-pound tin pail. Price per pail.....	3.00
10-pound tin pail. Price per pail.....	5.00
25-pound tin pail. Price per pail.....	12.00
50-pound keg. Price per pound.....	.44
100-pound keg. Price per pound.....	.40

Dixon's No. 676 Graphite Heat Resisting Grease



No. 676 is the best grease for universal joints, water pump cups, overhead valve cups and clutch thrust collars. It positively will not melt and run out. The grease should not be used on gears.

1-lb. tin cans. Price ea. \$0.70	25-lb. tin cans. Price lb. \$0.44
5-lb. tin cans. Price ea. 3.00	50-lb. kegs. Price lb. .40
10-lb. tin cans. Price ea. 5.00	100-lb. kegs. Price lb. .36

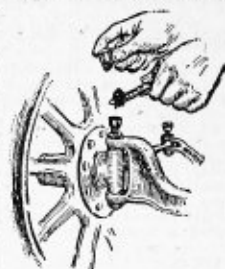
Dixon's No. 677 Graphite

Transmission and Differential Grease

A graphited grease of just the right consistency for all transmission and differential gears, except those intended to be lubricated with light oil. It is the grease the "speed kings" use. There is nothing like it on the market.



1-lb. tin cans, per can. \$0.70	25-lb. tin cans, per lb. \$0.50
5-lb. tin cans, per can. 3.00	50-lb. kegs, per lb. .50
10-lb. tin cans, per can. 5.00	100-lb. kegs, per lb. .40



Dixon's Graphite Cup Grease

Cup greases containing fine flake graphite reduce friction to a minimum. Use Dixon's No. 3 except in hot climates where No. 3 is better. For all grease cups, wheel spindles, etc. By using these high grade graphite greases the bearings soon acquire the well known graphite polish that eliminates friction and causes easy running.



1-pound tin cans. Price per can.....	\$0.70
5-pound tin cans. Price per can.....	3.00
10-pound tin cans. Price per can.....	5.00
25-pound tin cans. Price per pound.....	.44
50-pound tin cans. Price per pound.....	.40
100-pound kegs. Price per pound.....	.36

Dixon's Graphitoleo

This preparation consists of very finely ground choice flake graphite and pure petroleum. Used to pack wheel spindles and steering gear housings of automobiles and wheel and brake hubs of motorcycles and bicycles; also for ball bearings. Will not gum or become rancid.



8-ounce tubes. Price each \$0.90	5-pound cans. Price each. \$5.00
1-ounce cans. Price each. 1.10	10-pound cans. Price each. 9.00

Dixon's Graphite Pipe-Joint Compound



Invaluable for smearing on threaded or flanged connections, nuts, bolts, spark plugs, gaskets, etc. Prevents sticking and rusting.
4-ounce collapsible tubes
Price each.....\$0.40

Dixon's Ticonderoga Flake Graphite

A well known standard lubricating graphite for use in steam engines, gas engines, air compressors, etc. Excellent for coating, packing, gaskets, pipe fittings and the like to prevent them from sticking when taking apart.

Prepared in two forms, No. 1, a coarse flake, and No. 2, a fine flake. Unless otherwise ordered, No. 1 is always furnished.



1/2-pound cans. Price per can.....	\$ 0.60
1-pound paper cans. Price per can.....	.80
5-pound can. Price per can.....	3.50
10-pound can. Price per can.....	6.50
25-pound can. Price per can.....	15.00
50-pound box. Price per pound.....	.55
100-pound kegs. Price per pound.....	.54
200-pound kegs. Price per pound.....	.52
400-pound barrels. Price per pound.....	.50

Dixon's No. 635 Graphite

A special grade of Dixon's Ticonderoga flake graphite ground exceedingly fine. Intended for locomotive mechanisms, type-setting machinery, light, close-fitting bearings, spindle bobbins and other delicate parts of textile and special machinery.

1-pound can. Price per can.....	\$ 1.50
5-pound tin cans. Price per can.....	6.50
10-pound tin cans. Price per can.....	13.00

Write for booklet "Where to use Dixon's Graphite Auto Lubricants."

Lubricating Grease, Axle Grease and Boiler Compound



Albany Cup Grease

Albany grease is a pure tallow compound with a low melting point that does not contain any metal-eating acids or other harmful matter. It does not cake, clog or harden in any grease cup or bearing. It is used by large mines, steel works, railroads, mills, industrial plants and factories for lubricating engine bearings, line shafting and all kinds of machinery. Also for use in automobile grease cups, axle caps, roller and ball bearings and (soft numbers) in all gear cases. Drip pans are unnecessary because there is nothing to drip. As the bearing needs it, Albany grease flows; when it stops, the lubricant stops.

Nos. 0, 1, 2, 3, X, XX and XXX carried in stock.

All consistencies or numbers of Albany grease are of the same quality, but each have a different melting point to suit different operating conditions. To know what number to use under any condition, simply follow these rules:

For bearings that are running cold, use the **soft** numbers—No. 0 or No. 1.

For bearings that are running warm, use the **medium** numbers—No. 2 or No. 3.

For bearings that are running hot use the **hard** numbers—No. X, No. XX or No. XXX.

5, 10 and 25-pound cans. Price per pound.....\$0.40

50-pound cans. Price per pound......40

125-pound kegs. Price per pound......32

Half barrels. Price per pound......30

Barrels. Price per pound......28

Gredag

Factory and Mill Grades

The factory and mill grades of Gredag are made for the best service and have no equal as a grease lubricant. The grease stock is accurately blended with 99.9 per cent pure gritless Acheson graphite. A continuous use of Gredag will make it possible to eliminate break-downs, hot bearings, etc., due from improper lubrication.

A reduction in frictional load of from 10 to 30 per cent where plain bearings are used can be assured if Gredag is continuously used. It is the only graphite grease that can be successfully used on roller or ball bearings.

Made in 5 consistencies:

No. 50. Fluid. Used for ring oil bearings and wherever a fluid grease is required. It can be used in a squirt can.

No. 51. Semi-fluid. For use wherever a semi-fluid is required. Can be used in a squirt can.

No. 52. Soft. For cup and general use. Very fine for fan motor lubrication.

No. 53. Medium. For cups, open bearings and general use. This grade is very popular for general cup use.

No. 55. Hard. Used extensively in compression cups and open bearings. Has a very high melting point.

5-pound cans. Price per pound.....\$0.50

10-pound cans. Price per pound......46

25-pound cans. Price per pound......44

50-pound cans. Price per pound......40

100-pound cans. Price per pound......40

Barrels and half barrels quoted on application.



Boughton Axle Grease

Contains the best of lubricating oil and chemically solidified. Can be used on trucks or vehicles of all kinds either light or heavy.

1-pound cans. Price each.....\$0.05

10-pound tins. Price each......40

25-pound tins. Price each......75

Barrels and half barrels.

Price per pound......02 1/2

Mexican Plumbago Axle Grease

This grease is free from grit, will not gum, harden, dry up or shrink, nor will it "fry out" of hubs or boxes in hottest weather, or freeze in coldest weather.

The most economical axle grease for breweries, livery men, trucking companies, coal and ice dealers.

1-pound tins. Price each.....\$0.14

3 1/2-pound tins. Price each......40

7 1/2-pound tins. Price each......70

12 1/2-pound tins. Price each......1.10

25 -pound pails. Price each......2.00

Boughton Cup Grease



This grease is adapted for general use on crank pins, shafting, loose pulleys, grease cups, open bearings, etc.

Made in three consistencies—light, medium and heavy.

5-pound cans. Price per can.....\$1.20

10-pound cans. Price per can......2.00

25-pound cans. Price per can......4.50

Barrels and half barrels.

Price per pound......12

Boughton Graphite Grease

For Cups, Gears, Chains, Universal Joints, Etc.

This is a high grade grease prepared with the best graphite and especially adapted for chains and gears. It has proven by severe tests to have great wearing qualities. It is especially desirable under severe conditions which demand the extra lubrication of the best graphite. A great remedy for noisy gears, chains, universal joints, etc.

Made in three consistencies—light, medium and heavy.

5-pound cans. Price per can.....\$1.40

10-pound cans. Price per can......2.40

25-pound cans. Price per can......5.50

Barrels and half barrels. Price per pound......16

Metla-Cota

The Boiler Cleaner

Metla-Cota is a preparation for cleaning and coating the interior heating surfaces of steam boilers, plates or tubes. Where boilers are scaled, Metla-Cota will remove; where scale is removed, Metla-Cota will coat it. It penetrates the scale, loosening it from the metal and paints or coats the metal with a soluble coating which prevents the formation of scales.

Metla-Cota is non-corrosive and does not affect the steaming qualities of the boiler.

Can be used in any plant, including steel plants, canneries, laundries, mills and factories of all kinds, breweries, packing houses, hotels, etc.

Metla-Cota is put up in paste form, in barrels, half barrels and 100-pound kegs.

Before using, add sufficient hot water to reduce to a liquid form. The feed varies according to the condition of the boilers. Where boilers are old and badly scaled, recommend one quart per 100 H. P. per 24 hours, the quantity to be reduced from time to time as conditions improve. Where boilers are new or fairly clean, 1/2 pint per 100 H. P. per 24 hours will be found sufficient to keep them in prime condition.

Barrels and half barrels. Price per pound.....\$0.20

100-pound kegs. Price per pound......25



Occidental Boiler Compound

A vegetable compound which keeps water from foaming, prevents pitting and will not injure metal or packing. Will clean boilers and keep them clean. Full directions accompany each shipment.

100-pound kegs. Price per pound.....\$0.25

Full barrels. Price per pound......20

Illinois Boiler Cleaning Compound

Prevents formation of scale, pitting and corrosion in steam boilers.

Price for 3 1/2-pound package.....\$3.00

Use one package to every 25 horse power.

U. S. G. Co.'s Graphite Lubricants Mexican Boiler Graphite



50-pound kegs, price per pound.....	\$0.32
100-pound kegs, price per pound.....	.34
Barrels (about 400 pounds), price per pound.....	.20

A very pure and finely powdered graphite forms the base of Mexican Boiler Graphite. When mixed with the feed water it circulates through the boiler and attacks, softens and so disintegrates old scale that it may be easily removed. A graphite finish or polish is imparted to the steel, on which scale will not readily form. In every sense of the word it makes boiler cleaning easy.

U. S. G. Co.'s Mexican Boiler Graphite does all this without harm to the boiler itself, for there is no possible manner in which it could attack the steel of a boiler. On the other hand, boiler compounds of sufficient chemical strength to be efficient, are unsafe because, naturally such chemicals will likewise attack and pit tubes and shells for only very powerful chemical will work effectively on old hard scale. For that reason there is a great advantage in using Mexican Boiler Graphite. It also acts in a manner which is gently mechanical rather than chemically severe. It is effective in any feed water and can not be the cause of foaming. It will not pass from the boiler with the steam and thereby render it unfit for industrial purposes.

No. 205 Lubricating Graphite

No. 205. Graphite is air-floated, of impalpable fineness, pure, soft, peculiarly adhesive and absolutely gritless. It is a sure preventive and cure for hot pins, hot boxes, groaning cylinders, etc., and especially efficient in gas engine cylinders where, besides minimizing carbonization, it assures better compression and power with less gasoline. If judiciously used it will reduce oil and grease consumption at least one-third.

To use, mix thoroughly with oil in proportion of about one teaspoonful to the pint of oil. With greases use about one ounce, or two teaspoonfuls. The dry powder (about one-half

teaspoonful) may be introduced into cold-air intake of carburetor while engine is in motion. It may also be mixed with oil and used as a joint compound for pipes and gaskets.

1/4-pound screw top cans, price per can.....	\$0.50
1-pound screw top cans, price per can.....	.60
5-pound screw top tin cans, price per can.....	2.80
10-pound screw top tin cans, price per can.....	5.00
25-pound tin cans, price per can.....	9.00
100-pound kegs, price per pound.....	.30
Barrels, about 325 pounds, price per pound.....	.28



Journal and Gear Grease

Made in three consistencies: hard, medium and soft. For the lubrication of journals, gears, etc. Compounded from suitable mineral lubricating oils and contains the right proportion of air-floated lubricating graphite. Does not harden or dry up and is not affected by heat or cold.

5-pound friction top tin pails, price per pail.....	\$1.80
10-pound friction top tin pails, price per pail.....	3.00
25-pound tin cans, price.....	6.00
Kegs (about 140 pounds), price per pound.....	.20
One-half barrels (about 250 pounds), price per pound.....	.19
Barrels (about 450 pounds), price per pound.....	.18

Wood Grease

For heavy gears of all kinds and especially desirable in the enclosed gears of fast running electric cars. Contains just the right proportion of thoroughly graphitized wood pulp (or fibre) to deaden noise by keeping gear surfaces from coming in direct contact and "grinding," thereby saving gear wear as well as power.

No. 500 Machinery Lubricant

A peculiarly adhesive grease of heavy consistency carrying a large percentage of air-floated lubricating graphite. It is especially efficient for use on cog and sprocket wheels, sprocket chains, transmission cables, wire ropes, hydraulic water pumps, heavy gears, conveyors, elevator slides, etc.

Graphite Cup Grease

Made in four consistencies. **Extra soft.** Suited for rapid running machinery, transmissions and sliding gears. **Soft.** For general use on crank pins, cross heads, valve motions, etc. **Medium.** For use in screw cups or in compression cups. **Hard.** Good stiff consistency for heavy open bearings.

1-pound can, price per can.....	\$0.50
5-pound pail, price per pail.....	2.20
10-pound pail, price per pail.....	3.80
25-pound cans, price per can.....	9.00
Kegs (about 125 pounds) price per pound.....	.34
Half barrels (about 200 pounds), price per pound.....	.32
Barrels (about 400 pounds), price per pound.....	.30

Graphite Cable Grease

Mexican Graphite has a special affinity to metals and after a short period of continuous application the graphite contained in this dressing will impart to wire ropes or cables a smooth, slippery, water-proof surface, thereby accomplishing a very appreciable saving in power, noticeably reducing wear and absolutely preventing "cutting" or corrosion.

5-pound pail, price per pail.....	\$1.80
10-pound pail, price per pail.....	3.00
25-pound tin cans price per can.....	6.00
Kegs (about 140 pounds), price per pound.....	.20
Half barrels (about 250 pounds), price per pound.....	.19
Barrels (about 450 pounds), price per pound.....	.18

Pipe Cement

Used by engineers, plumbers, gas and steam fitters for dry or steam pipe joints, gaskets, man and hand-hole plates, etc. A compound suited to all kinds of joints, threaded or flanged. It has for its base pure Mexican Graphite, wholly unaffected by water, heat, cold or chemical action of any nature. Prevents rust.

1-pound cans, price per can.....	\$0.40
5-pound pails, price per pound.....	.36
12 1/2-pound pails, price per pound.....	.32
25-pound pails, price per pound.....	.30
100-pound cans, price per pound.....	.28



Wiping Waste For All Purposes

Channon Quality Waste is made of soft, absorbent threads, uniformly graded throughout the bales and will be found to give more clean wipes than the usual class of waste.

Owing to the confusion caused by the irregular grading and numbering of waste by some manufacturers, we have discontinued classifying our grades in the White Waste by numbers and have adopted the following classifications and brand names:



Finest Fancy White

For wiping highly polished machinery parts. Is composed of selected, long, soft, well machined cop threads. Is very absorbent, and for the purpose intended there is none better on the market, irrespective of number of grading.

In bales of 125 lbs. Per lb. . . . \$0.33
In bales of 500 lbs. Per lb. . . . \$2.12

"Standard" White

By far our most popular grade of white waste, differs from our finest fancy only in the character of the spinning of the yarn. Fills all requirements of machinery and automobile trade.

In bales of 125 lbs. Per lb. . . . \$0.32 1/2
In bales of 500 lbs. Per lb.32



Wool Waste

Used for all-around journal box-stuffing, for packing and similar use. Our stock at all times runs uniform and is clean and of proper lengths.

We carry two grades only.

Standard Wool Waste

In bales of 125 lbs. Per lb. . . . \$0.32

Skein Wool Waste

In bales of 125 lbs. Per lb.33

Egyptian Polishing

For those desiring the highest grade obtainable of Egyptian cop waste. Is used in large quantities by furniture manufacturers and any who have occasion to use a rubbing or polishing waste.

In bales of 125 lbs. Per lb. . . . \$0.36

"Compo"

Our Compo grade carries all the essential qualities of "Standard" white, with just enough colored stock in it to enable it to be sold at a lower price. It can be used where good quality white waste is essential.

In bales of 125 pounds. Per pound \$0.32
In bales of 500 pounds. Per pound31 1/2

"Excelsior" White Waste

A very popular grade, although intended for more diversified work. Is made from selected threads of good length and is generally satisfactory for shop use.

In bales of 125 pounds. Per pound \$0.31 1/2
In bales of 500 pounds. Per pound31

"Fancy" Colored

Very similar in stock to the "Compo," but containing a greater percentage of colored threads. Very popular with the railroads.

In bales of 125 pounds. Per pound \$0.27
In bales of 500 pounds. Per pound26 1/2

"Number One" Colored

Also very popular with the railroads and for all-around shop use. Stock is of good color and clean. The threads are long, not harsh, and for a colored waste we recommend it highly.

In bales of 125 pounds. Per pound \$0.24
In bales of 500 pounds. Per pound23 1/2

"Number Two" Colored

Necessarily made up of lower grade stock, but for those desiring a cheap waste, we know of no better value obtainable.

In bales of 125 pounds. Per pound \$0.22
In bales of 500 pounds. Per pound21 1/2

Blue White Rubbing Waste

This grade is used by furniture manufacturers for rubbing and polishing purposes.

In bales of 125 pounds. Per pound \$0.35

Individual Bales for Auto Owners and Shops



To meet the demand from individual owners, we are putting up miniature bales of "Finest Fancy," "Standard" and "Excelsior" white waste only. These weigh ten pounds each and are convenient for use in a private garage or in small shops.

Standard white, per bale \$1.75
Excelsior white, per bale1.65

Cotton Rag Wipers

These are put through a steam cleaning and sterilizing process and all objectionable features such as buttons, hooks, eyes, etc., are removed.

White, in 125-pound bales. Per pound \$0.20

White, in 300 and 500-pound bales. Per pound19 1/2

Colored, in 125-pound bales. Per pound16

Colored, in 300 and 500-pound bales. Per pound15 1/2

We also carry in stock in 25 lb. bales our Standard and Excelsior grades of white waste at an advance of 1/2 cent per lb.

H.Channon Company Chicago

Channon Approved Oily Waste Can



Inspected and approved by the Board of Fire Underwriters. Waste cans safeguard your engine-room or shop against spontaneous combustion and other dangerous accidents often caused by oily waste, not properly taken care of. This can is one of the best suited for the purpose of taking care of oily waste, thus avoiding the possibilities of fires, produced by oily waste carelessly thrown in boxes, corners or under benches. This can may save you much money, time and inconvenience and costs very little. They are built of heavy galvanized iron, well constructed and have a simple, self-closing, tight-hinged cover. The cover does not work with springs. The heavy iron legs are securely riveted, raising the body of the can four inches from the floor. Can be furnished in other sizes than stated below on application.

No. 11.	11 $\frac{1}{2}$ x13	inches, capacity 6 gallons.	Price each.....	\$ 4.00
No. 22.	14 $\frac{1}{2}$ x14 $\frac{1}{2}$	inches, capacity 10 gallons.	Price each.....	5.00
No. 33.	16 x17	inches, capacity 14 gallons.	Price each.....	6.50
No. 44.	18 $\frac{1}{2}$ x20 $\frac{1}{2}$	inches, capacity 24 gallons.	Price each.....	9.00
No. 55.	22 x25 $\frac{1}{2}$	inches, capacity 40 gallons.	Price each.....	12.00

Standard Oily Waste Can



No. 2	11 $\frac{1}{2}$ x13 $\frac{1}{2}$	\$2.70
No. 3	14 $\frac{1}{2}$ x14 $\frac{1}{2}$	\$3.50
No. 4	16x17	\$4.70
No. 5	18 $\frac{1}{2}$ x20 $\frac{1}{2}$	\$6.50
No. 6	22x25	\$9.50

Very similar in construction to our approved can above, but it has not been approved by the underwriters. Regular size, 11 $\frac{1}{2}$ x13 $\frac{1}{2}$ inches, and always furnished unless otherwise ordered.

Justrite Oily Waste Can

Approved by Underwriters



Foot lever raises cover, leaving hands free, thus saving time. The cover cannot be left open, which eliminates chances of fire. Lasts a life-time and should appeal to every user of waste.

Made in three sizes.

No. 1.	11 $\frac{1}{2}$ x13 inches.	Each.....	\$5.00
No. 2.	12 $\frac{1}{2}$ x14 inches.	Each.....	5.50
No. 3.	13 $\frac{1}{2}$ x15 inches.	Each.....	6.00

Corrugated Oily Waste Can

Approved by Underwriters

Made of corrugated galvanized iron with four legs and a double opening on top. The corrugated material is much stronger than the plain and is lighter in weight. This can has a double bottom, the seams are riveted and soldered. The covers are self-closing. This is the only can that will nest for shipment, securing third-class shipping rate, instead of first.



No. 1.	15x17 inches, 10 gallons.	\$ 6.00
No. 2.	15x22 inches, 15 gallons.	7.50
No. 3.	15x28 inches, 20 gallons.	8.50
No. 6.	17x28 inches, 25 gallons.	10.00

Peerless Ash Can



A heavy well made can which will outwear the ordinary can by a year or more. Built of good grade of galvanized iron with a heavy steel band at top and bottom, the lower one being riveted through the body and bottom. Concave bottom raised 1 $\frac{1}{4}$ inches from the ground. No. 18 gauge steel shields, closely riveted. Guard drop handles.

This can is also made water tight at same prices.

Made in three sizes.

No.	Size	Capacity, Gals.	Gauge Iron, No.	Price Each
2	14 $\frac{1}{2}$ x24	17	26	\$5.00
3	16 x26	22	26	5.50
4	19 x28	32	24	6.80

Prices include cover.

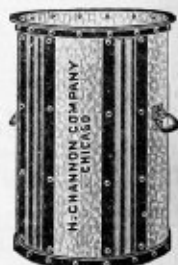
Similar to Peerless ash can with heavy steel hoop on the top to insure can keeping its shape. The heavy steel hoop at the bottom of body is riveted through to the bottom. Has large malleable guard handles. Bottom set up one inch from ground. The can is heavily riveted throughout. Nos. 5 and 6 can have four heavy staves 5 inches wide riveted to body. Nos. 7 and 8 are without staves.

Made in one size only, 19 inches diameter, 30 inches high, 35 gallons.

No.	Gauge Steel, No.	Price Black	Price Galv.
5	22	\$7.70	\$ 8.80
6	20	8.50	10.00
7	18	8.80	10.00
8	16	10.00	11.00

Above prices do not include covers. Covers extra, \$1.00

"Engineers" Steel Ash Can



Corrugated Ash Cans



Without a doubt the strongest ash can made. The material is extra heavy 24 gauge steel. All side, top and bottom seams are electrically welded. Reinforcing hoops and side handle clips are also electrically welded, making the can practically one piece throughout. The vertical corrugations give triple strength to the sides and insure easy and perfect dumping. The cans are galvanized after formation, thus making leakage impossible. The tight fitting covers prevent the escape of disagreeable odors. Can is raised from ground by means of the bottom hoops of bar steel and insure much longer service. Built in three sizes which are sufficient for any purpose. Covers fit tightly owing to the slightly tapered wide flanges.

No.	Size, Inches	Capacity, Gallons	Price
515	15x26	18	\$6.50
518	18x26	27	7.20
520	20x26	34	8.00

Gasoline or Kerosene Tank

Our 3 in 1 out door above ground storage tank—the most complete oil and gasoline tank ever placed on the market. The cover of the tank is hinged and fitted with hasp and staple, so that it can be locked. Under this is a large funnel built into the tank, which has a very fine filter set into the funnel. Set underneath is an airtight screw cap, which is removable when filling the tank. The conical top sheds all water and when locking the top and the faucet, the gasoline and oil are thief proof. The tank is built of heavy galvanized iron and has a wood bottom. Use of this tank eliminates the necessity of building a house over the storage tank.



Capacity 30 gallons.	Price	\$4.50
Capacity 60 gallons.	Price	6.00
Capacity 110 gallons.	Price	8.50

Wood Jacket Oil Cans

Made for service. The wooden jackets are tightened with welded wire hoops, preventing shrinking or warping. Heavily beaded cone top. All cans carefully tested under pressure.

Intended for use in shipping or handling market oils in small quantities, such as kerosene, black oils, linseed oils, turpentine, etc.

Capacity, gallons.	1	2	3	5	10
With spout, each	\$0.58	\$0.74	\$0.88	\$1.08	
Without spout, each	.50	.66	.80	1.00	\$1.70

Guardian Clean Waste Can



Clean waste should be properly and safely stored before using, for nothing will collect dirt quicker than waste. Our Guardian Clean Waste can is made especially for this purpose. Strongly built throughout of heavy galvanized steel. Has a hinged tight fitting cover and steel angle iron for reinforcement of the legs,

raising the bottom 4 inches from the floor.

No.	Size, Inches	Capacity, Bales	Gauge Steel	Price Each
1	22x30x30	1	24	\$21.00
2	22x50x30	2	22	30.00
4	44x50x30	4	20	55.00



Channon Steel Barrels

For shipping and storing lubricating oil, gasoline, kerosene, oils, varnishes, paints and any other liquid. Seams and bungs welded. Equipped with 1½-inch filling hole and ¾-inch vent and heavy brass plated faucet, or, if preferred, with vent in body and 2-inch filling hole and ½-inch vent. Furnished in sizes from 10 to 110 gallons.

Size Gal.	Gauge	Dia., Ins.	Ht., Ins.	Wght., Lbs.	Price Each
15	19	14½	17	22	\$ 4.80
30	19	18	27	29	6.00
50	18	22½	31	50	8.50
55	18	22½	31	55	10.00

No. 93 Lock Lever Petroleum Faucet

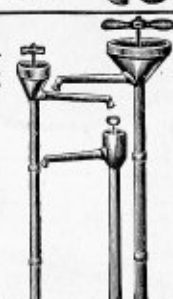


Combines all features of an invisible and a lock faucet. Fits above steel barrel. Weight 12 ounces. Sizes, ½ and ¾-inch. ½ inch size, each.....\$1.10 ¾ inch size, each.....1.20

Tin Transfer Pumps

These pumps can be used for transferring all kinds of light and heavy oils, varnishes etc., and are constructed so they may easily be cleaned.

No.	Price Each	Length, Inches	Diam., Inches
1	\$2.40	34	1¼
1½	4.00	54	1½
2	4.50	64	1¾
3	8.50	78	1½



Gasoline Tanks

Made of No. 26 and No. 24 gauge galvanized iron, with wood bottom beneath metal bottom. Opening in top is securely covered with a 4-inch can screw, making the tank perfectly airtight. Fitted with lock lever faucet.

Capacity gallons.	30	60	110	165	215
Diameter inches.	22	25	30	37	37
Height inches.	24	28	36	36	48
Weight pounds.	30	40	60	80	125
Price each.	\$7.50	\$8.50	\$13.50	\$23.00	\$28.00

H. Channon Company Chicago

Peerless Non-Explosive Can



This can embodies the latest safety improvements for containing explosive and hazardous liquids. It is so constructed that it is easier to fill and gives a more rapid and uniform flow than any other safety can on the market.

The principle governing the non-explosive feature is well known. The can at its opening is fitted with a brass tube, projecting within, through which the liquid flows and the gas, under excessive pressure, can escape. The tube is provided with openings covered with brass wire cloth of close mesh, which does not hinder the flow of the liquid, but through which fire and flame cannot pass. Should the vapor or contents of the can become ignited, the tube prevents the spread of the flame within, confining it to the opening, thereby making explosion impossible. In connection with the tube is a spout with an air pocket to allow a sufficient amount of air to escape while filling and sufficient amount of air to enter the can while emptying it. This permits rapid filling and emptying. The automatic valve, which makes it airtight, prevents evaporation of the liquid.

Prices and Sizes

1 quart.	Price each	\$2.60
1 gallon.	Price each	3.55
3 gallon.	Price each	7.20
5 gallon.	Price each	9.00
10 gallon.	Price each	13.50

Delphos Non-Overflow Factory Dispenser



Any can or hand oiler, no matter what size, can be filled with a Delphos dispenser without wasting one drop of oil. With the use of one of these cans the price of wasted oil in any factory will more than cover its cost in a few months. Fills any size metal oiler quickly—pumps any machine, engine or cylinder oil—can be operated in the dark—gurgles when the receptacle is nearly full—overcomes soiling the clothing or hands. No waste possible—never overfills—the spout is a double tube, one an inlet, the other an outlet—oil cannot rise above the mouth of the outlet tube because it siphons back into tank. The three gallon can does not have shelf.

Made in three sizes:

3 gallon capacity, price each	\$ 5.00
5 gallon capacity, price each	6.00
10 gallon capacity, price each	12.00



Walton Oil Tank

Well constructed can for light and heavy oils. Can't overflow. Made of heavy galvanized steel with wood bottom beneath a metal bottom to protect against nails and rust. When the cover is turned back, it provides a shelf for other oils when filling more than one at a time. Neatly painted and stenciled.

No.	Price each	Capacity gallons	Net Wt. pounds
1	8.00	30	30
2	9.00	60	50
3	14.50	110	65
4	24.00	165	85

Extra pumps:

For tank No.	1	2	3	4
Price, each	\$2.50	2.80	3.00	3.00



Varnish Tanks

For Heavy Oils and Varnishes

Made especially for heavy oils and varnishes, so constructed to permit an even, steady flow, no matter how heavy the oil may be. Made of 26 gauge galvanized iron. Equipped with a 1 1/4 inch oil gate.

Cap. gal.	Dia. in.	Wt. lbs.	Ht. in.	Price each
30	22	30	25	\$9.00
60	24	40	28	10.00
110	30	60	36	15.00



Peerless Ash and Garbage Pail

These pails are made of No. 27 gauge galvanized iron; bottom sets up 3/4 inches from floor; heavy galvanized iron outside fitting cover; heavy ears and bail. Complete with cover.

No.	Dia. In.	Ht. In.	Cap. Gal.	Price Each
4	11 1/4	11 1/4	4 3/4	\$2.50
6	11 1/4	13 1/2	6	2.20
8	12 1/4	14	8	2.50
10	14 1/4	15	10	2.80

Oval Tallow Pots

Made of heavy sheet steel, 2-quart capacity.

Price per dozen	\$20.00
Price each	2.00



Dope Pail

Heavy galvanized iron, 10-quart size with lip.

Price per dozen	\$17.00
Price each	1.70

Car Oil Cans

10-quart, box oiler, galvanized iron.

Price per dozen	\$24.00
Price each	2.50
4-quart, straight spout iron.	
Price per dozen	\$20.00
Price each	2.00





G3405

Lisk Better Quality Galvanized Oil and Gasoline Cans

All made of heavy cold rolled steel, pickled and annealed and galvanized after the goods are made up—filling all seams thoroughly. Each can is tested separately and guaranteed not to leak.

Lisk Legal Gasoline Cans Painted Red

No. G3405. 5-gallon capacity, general storage can, with large pouring spout, 12 1/4 in. high, 11 inches wide, weight 54 pounds to dozen.
Price per dozen \$24.00
Price each 2.40

No. G6605. 5-gallon capacity, automobile storage and filler can, 2-inch spout tapered to 1 1/4-inch, with screw cap, 3 1/2-inch funnel opening in top seamless inset cover, with handle, 12 1/4 inches high, 11 inches wide, weight 58 pounds to dozen.
Price per dozen \$40.00
Price each 4.00



G6605

Lisk Oil Cans

Made of heavy galvanized iron and striped; dome top; extra large spout.

No. G3005. 5-gallon capacity, 12 1/4 inches high, 11 inches wide, weight 54 pounds to the dozen.
Price per dozen \$22.00 Price each \$2.20



G3005

Lisk Lay Down Oil Cans

For Safety and Convenience

Made of heavy galvanized iron, brace on side, 3/8-inch ground and polished brass faucet.

No. G3305. 5-gallon capacity, 12 1/4 inches high, 11 inches wide, weight 56 pounds to dozen.
Price per dozen \$26.00
Price each 2.60



G3305

Lisk Automobile Funnels

Galvanized

Made of heavy galvanized iron, seamless; wired around top; extra ring for chamois; fitted with rapid flow cone-shaped wire strainer cloth.

No. G524. 4-quart capacity, 8 inches high, 10 1/2 inches diameter, weight 24 pounds to dozen.
Price per dozen \$19.00
Price each 1.90



G524



Champion Oil Cans

Strongly built with galvanized iron body and plain stamped fluted tin top. Especially designed for auto owner for storing cylinder and machine oil. Large spouts with 1 1/2-inch screw caps. Banded top and bottom.

With Spout

No.	Cap., Gals.	Diam., Ins.	Price Dozen	Price Each
0	1	6 1/4	\$ 6.50	\$0.60
02	2	8 1/4	11.00	1.10
03	3	9 1/4	14.00	1.40
04	5	10 1/2	17.00	1.70



National Oil Cans

Practically the same as the Champion oil can, but has galvanized stamped fluted top instead of plain tin. Has same size spout and screw caps and banded top and bottom. A very durable and well made can.

With Spout

No.	Cap., Gals.	Diam., Ins.	Price Dozen	Price Each
101	1	6 1/4	\$ 7.00	\$0.70
102	2	8 1/4	11.50	1.20
103	3	9 1/4	14.50	1.40
105	5	10 1/2	18.00	1.80
110	10	12 1/4	30.00	3.00

National Oil Cans

This can is equipped with faucet instead of spout and is more conveniently emptied when the can is on a shelf. Has 3/4-inch metal faucet and the top is made of galvanized fluted iron. Oil flows easily.



With Faucet

No.	Cap., Gals.	Diam., Ins.	Price Dozen	Price Each
205	5	10 1/2	\$20.50	\$2.00
210	10	12 1/4	33.00	3.30



With Spout

National Gasoline Cans

With Spout or Faucet

Heavy galvanized iron, painted red. Permits a clear, rapid flow. Large spout and 1 1/2-inch screw caps:

No.	Cap., Gals.	Diam., Ins.	Price Dozen	Price Each
501	1	6 1/4	\$ 8.00	\$0.80
502	2	8 1/4	12.00	1.20
503	3	9 1/4	16.00	1.60
505	5	10 1/2	20.00	2.00
510	10	12 1/4	33.00	3.30

With 3/4-inch metal faucet:

No.	Cap., Gals.	Diam., Ins.	Price Dozen	Price Each
605	5	10 1/2	\$22.00	\$2.20
610	10	12 1/4	35.00	3.50



With Faucet

Automobile Cans, Funnels and Measures



Automobile Filling Cans

Galvanized

Made of extra heavy galvanized iron with suitable spout for filling in convenient places; wide mouth plug for spout and cap for filling opening attached by a chain.

Five gallon capacity.
Price per dozen \$27.00
Price each 2.70

Automobile Measures

Galvanized

Made of heavy galvanized iron, with bail and back handle. Used for measuring gasoline or oil.

2 gal. capacity. Price per dozen \$40.00
2 gal. capacity. Price each 4.00
3 gal. capacity. Price per dozen 50.00
3 gal. capacity. Price each 5.00
5 gal. capacity. Price per dozen 60.00
5 gal. capacity. Price each 6.00



Copper Measures

U. S. standard. Polished. Tinned inside.

	Nos.	341	342	343
Pints	1 1/2	1 1/2	1 1/2	1 1/2
Inches	2 1/4	2 1/4	2 1/4	2 1/4
Price per dozen		\$6.50	\$9.00	\$12.00
Price each		.60	.90	1.20
Nos.	344	345	346	
Quarts	1	2	4	
Inches	4 1/2	5 1/2	6 1/2	
Price per dozen		\$17.00	\$26.00	\$40.00
Price each		1.70	2.60	4.00

I C Tin Measures

U. S. standard. Good, serviceable tin liquid measure, well made, with lip.

	Nos.	121	122	123
Pints	1 1/2	1 1/2	1 1/2	1 1/2
Price per dozen		\$1.30	\$1.30	\$1.90
Price each		.12	.14	.18
Nos.	124	125	126	
Quarts	1	2	4	
Price per dozen		\$2.70	\$4.00	\$6.00
Price each		.24	.40	.60



Copper Utility Measures

Heavy copper plated with funnel and pouring lip; handle on side. Made to conform to legal requirements of state and municipal inspection bureaus.

Capacity	Price per Doz.	Price Each
1 pint	\$10.00	\$1.00
1 quart	12.00	1.20
2 quart	17.00	1.70
1 gallon	22.00	2.20

Galvanized Utility Measures

Made of galvanized iron; straight sides, with pouring funnel. Conforms to legal requirements of state and municipal inspection bureaus.

Capacity	Price per Doz.	Price Each
1 pint	\$ 7.00	\$0.70
1 quart	8.00	.80
2 quart	10.00	1.00
1 gallon	12.00	1.20



Tin Utility Measures

Made of heavy tin with pouring spouts.

No. 84. 1 quart capacity.
Price per dozen \$4.00
Price each40
No. 85. 2 quart capacity.
Price per dozen \$5.70
Price each50
No. 86. 4 quart capacity.
Price per dozen \$9.30
Price each80

Copper Gasoline Funnel

This funnel is heavily copper plated and has fine mesh brass wire cloth auxiliary strainer over outlet hole in body, with ring top for chamois skin strainer.

	Cap.	quarts	1	2
Diam., ins.	5	5 1/2	5 1/2	5 1/2
Height, ins.	6 1/4	9 1/2	9 1/2	9 1/2
Spout opening, inches		1 1/2	1 1/2	1 1/2
Price, dozen		\$10.00	\$12.00	\$12.00
Price each		1.00	1.20	1.20
Cap., quarts		4	8	
Diam., ins.		9 1/4	12	
Height, inches		11	12	
Spout opening, inches		3/4	3/4	
Price, dozen		\$17.00	\$21.00	
Price each		1.70	2.00	

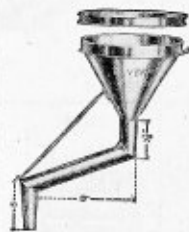


Offset Gasoline Funnel

Copper Plated

Many motor cars are now built with pressure tanks for gasoline located under the rear of body. This funnel has been designed to meet this condition. Has fine mesh brass wire cloth strainer over outlet hole in body, with ring top for chamois skin strainer.

No. 1. 12 1/2 inches diameter, 16 inches high, 1 inch spout opening.
Price per dozen \$35.00
Price each 3.50



Galvanized Gasoline Funnel

Made of extra heavy galvanized iron with ring top for chamois skin strainer and fine mesh brass wire cloth strainer over outlet hole in body. Used in garages and on motor boats.

No. 1. 12 1/2 inches diameter, 16 inches high, 1 inch spout opening.
Price per dozen \$25.00
Price each 2.50
No. 2. 9 3/4 inches diameter, 14 3/4 inches high, 1 inch spout opening.
Price per dozen \$20.00
Price each 2.00



I C Tin Funnels

Made of heavy polished tin with corrugated spout.

	No.	10	15	20	25
Pints		1 1/2	1 1/2	1 1/2	1 1/2
Inches		2 1/4	3 1/4	4 1/4	5 1/4
Dozen		\$0.70	\$0.80	\$1.00	\$1.10
Each		.08	.10	.10	.14
No.		30	35	40	
Quarts		2	4	5	
Inches		6 1/4	8	8 1/4	
Dozen		\$2.00	\$2.80	\$6.00	
Each		.20	.30	.80	



Galvanized Pails

Galvanized Water Pails


Regular

Heavy

Made of sheet steel and galvanized after being made up. Stamped ears.

Regular—Made of No. 29 gauge steel.

Capacity Quarts	Height Inches	Top Inches	Bottom Inches	Weight Dozen Pounds	Price, Dozen	Price, Each
8	8½	9¾	7½	17	\$5.60	\$0.50
10	9	10½	7¾	20	6.00	.60
12	10	11½	8½	23	6.50	.70
14	10½	11¾	9¼	25	7.80	.80
16	11½	11¾	9¼	29	9.20	.90

Heavy—Made of No. 26 gauge steel.

Capacity Quarts	Height Inches	Top Inches	Bottom Inches	Weight Dozen Pounds	Price, Dozen	Price, Each
10	9	10½	7¾	40	\$10.60	\$1.00
12	10	11	8½	44	11.80	1.10
14	10½	11½	9¼	46	13.00	1.20
16	11½	11¾	9¼	51	14.50	1.40

Galvanized Water Pails

Red banded and fitted with Butterfly ears.

This pail is made of No. 26 gauge sheet steel, galvanized and fitted with new style butterfly ears and with natural wood finish. Wood roll on bail. Body has two red bands and bottom is swedged and soldered.

Capacity quarts.....	14	16
Height, inches.....	10½	12¼
Top inches.....	11½	12¼
Bottom inches.....	9¾	9¾
Weight, doz. lbs.....	47	52
Price dozen.....	\$14.00	\$15.00
Price, each.....	1.40	1.50

Galvanized Cement Pails


Standard

Hercules

Standard—14 quart capacity, 11¼ inches wide, 10½ inches high, made of 24 gauge steel, double bottom braces, weight, 85 pounds per dozen.

Price, per dozen.....	\$18.50
Price, each.....	\$1.50

Hercules—14 quart capacity, 11¼ inches wide, 10½ inches high, made of 24 gauge steel, double bottom braces, reinforcing hoop around top, weight, 98 pounds, per dozen.

Price, per dozen.....	\$31.00
Price, each.....	\$3.10

Galvanized Stock Pails



Made of No. 26 gauge steel, stamped ears.

Capacity Quarts.....	14	16
Size, inches 12¾x9¾ 13½x9½		
Wt. Doz. pounds.....	34	37
Price, dozen.....	\$13.50	\$15.00
Price, each.....	1.30	1.50
Capacity quarts.....	18	20
Size, inches 14 x9¾ 15x10½		
Wt. doz. pounds.....	43	45
Price, dozen.....	\$17.00	\$19.00
Price, each.....	1.70	1.90

Lisk Heavy Galvanized Pails

All made of heavy cold rolled steel pickled and annealed and galvanized after the goods are made up—filling all seams thoroughly and guaranteed against leaking or galvanizing flaking off.



Steel Clad Heavy Pattern

Made of No. 26 gauge steel, re-enforced ears, ¼-inch iron bail.

Used largely by factories and packing houses.

No. G5212—12 quart capacity, 9¼ inches high, 11¼ inches wide at top, 9¼ inches wide at bottom, weight, 43 pounds to dozen.
Price, per dozen.....\$14.00
Price, each.....1.40

No. G5214—14 quart capacity, 10½ inches high, 11¾ inches wide at top, 9¾ inches wide at bottom, weight, 44 pounds to dozen.
Price, per dozen.....\$15.50
Price, each.....1.50

Flaring Pattern

Extra Heavy

A splendid pail for general all around outdoor work.

Made of No. 24 gauge steel, with extra heavy ½-inch iron bail and heavy forged U. S. A. drop ears.

No. G8514—14 quart capacity, 9¾ inches high, 12¾ inches wide at top, 9¼ inches wide at bottom, weight, 54 pounds to dozen.
Price, per dozen.....\$18.00
Price, each.....1.80



Extra Heavy Contractors Pails

Made to comply with Navy department specifications of extra heavy material. It is galvanized after being made and thoroughly tested and guaranteed not to leak. Has malleable split ears, very heavy bails and double braces on bottoms.

No. G12414—14 quart capacity, 10½ inches high, 11¾ inches wide at top, 9¾ inches wide at bottom, weight, 78 pounds to dozen.
Price, per dozen.....\$26.00
Price, each.....2.60



Pails, Galvanized, Wood and Fibre

Galvanized Fire Pails

Round Bottom



Capacity	Size, Inches	Price Dozen	Price Each
Quarts			
10	10 $\frac{3}{4}$ x 10 $\frac{1}{2}$	\$ 8.50	\$0.80
12	11 $\frac{1}{4}$ x 11 $\frac{1}{2}$	9.20	.90
14	11 $\frac{3}{4}$ x 12	10.50	1.00

Galvanized Sand Pails

Flat Bottom



This pail is made of galvanized iron, and furnished with cover. Stencilled in red "Sand" and used for fire purposes.

10 quart capacity.

Price dozen.....\$10.00

Price each.....1.00

Waggoner Sanatory Fire Bucket



Approved by National Board of Fire Underwriters, Associates Factory Mutuals and Boards of Health.

Will not freeze 30 degrees below zero—will not evaporate or become foul—will not corrode—Costs nothing to maintain. Complete with charge.

Price per dozen.....\$48.00

Price each.....4.80

Indurated Fibre Pails, Wood Fibre

Fibre Fire Pails

Flat Bottom



10 quart capacity, 13 inches deep, 8 inches diameter.

Price per dozen.....\$20.00

Price each.....2.00

Fibre Fire Pails

Round Bottom



12 quart capacity, 10 inches high, 12 inches wide.

Price per dozen.....\$19.20

Price each.....1.90

Star Fibre Water Pails

Flat Bottom



12 quart capacity, 10 inches high, 12 inches wide.

Price per dozen.....\$10.00

Price each.....1.00

Common Pine Pails



Prices

2 hoops. Per dozen.....\$7.00

2 hoops. Price each......70

3 hoops. Price per dozen.....8.00

3 hoops. Price each......80

Oak Pails

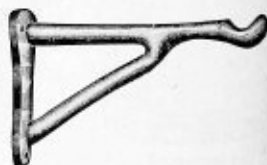


O. I. C. wooden pails made of heavy oak with iron bails and reinforced.

14 quart capacity. Per dozen.....\$13.00

14 quart capacity. Price each.....1.30

Fire Pail Hooks



Made of cast iron painted black and used with our fire pails.

Price per dozen.....\$5.00

Price each......50

Oil Gates

For Handling Heavy or Thick Liquids. Japanned Iron, Screw Shanks.



The oil gates can be furnished with either wood thread or on pipe thread at the same price. State which is required when ordering. Wood thread will be sent unless otherwise specified.

Perfection

Size, inches..	1/2	3/4	1	1 1/4	1 1/2	2	3
Wt. per doz., pounds....	17	19	20	33	44	59	76
Price per doz.	\$9.50	\$12.00	\$14.00	\$16.50	\$20.00	\$28.00	\$36.00
Price each....	.95	1.20	1.40	1.65	2.00	2.80	3.60



"Lock Fast"

Oil or Molasses Gate

Especially adapted for oil or molasses. Gate can be locked to prevent leakage or pilfering.

Prices Without Locks

Size, inches..	1/2	3/4	1	1 1/4	1 1/2
Price per dozen.....	\$9.50	\$12.00	\$14.00	\$16.50	\$20.00
Price each.....	.95	1.20	1.40	1.65	2.00

No. 93 Lock Lever Faucet

Particularly adapted for use on gasoline containers. The principle of this faucet is that either the 1/2 or 3/4-inch size has a flow equal to any 1-inch brass lock faucet. It is made of malleable iron heavily brass plated, and every part is reinforced against wear and breakage. Sold in 1/2 and 3/4 size only.

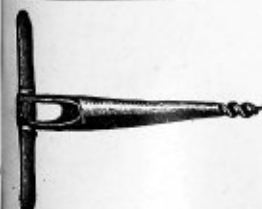
1/2-inch size. Price each.....	\$1.10
3/4-inch size. Price each.....	1.20



Petroleum Faucets

Japanned iron faucets, brass lined, with brass lever lock and screw shank. Used for handling kerosene, gasoline and other light oils.

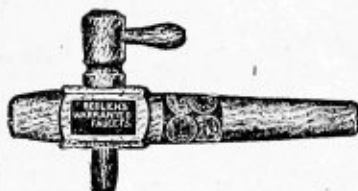
No.....	1	2	3	4
Size, inches..	1/2	3/4	1	1 1/4
Weight per dozen, pounds....	9	13	18	28
Price per dozen.....	\$11.00	\$13.00	\$16.00	\$23.00
Price each.....	1.10	1.30	1.60	2.30



Enterprise Augers

Small size, 6 1/2 to 1 1/2 inches. Price each.....	\$1.50
Medium size, 1 1/2 to 2 inches. Price each.....	2.00
Large size, 2 to 3 inches. Price each.....	3.00

Redlich's Warranted Faucets



Cork lined. Fully saturated with India rubber.

No.	Lgth., Ins.	Price Each	Price Dozen	No.	Lgth., Ins.	Price Each	Price Dozen
1	7	\$0.10	\$1.00	4	9 1/2	\$0.18	\$1.75
2	8	.13	1.25	5	10 1/2	.20	2.00
3	8 1/2	.15	1.50	6	11 1/2	.23	2.25

Lock Faucet No. 35

Made in 1/2, 3/4 (which has a 1/2-inch threaded intake and 1/2-inch outlet), 1, 1 1/4 and 1 1/2-inch sizes.

All sizes can be made with threaded outlet for pipe or hose connection.

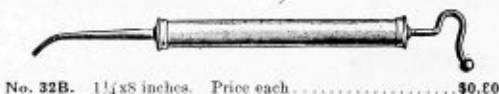
This faucet is made in solid brass only.

1/2-inch. Price each....	\$1.30	5/8-inch. Price each....	\$1.60
3/4-inch. Price each....	2.20	1-inch. Price each....	2.80
1 1/4-inch. Price each....	5.00	1 1/2-inch. Price each....	7.00



Improved Oil Syringes and Grease Guns

Will handle thin or heavy oil or grease equally well. Will suck oil from a drip pan or can. Has two sets of plungers, one for suction and one for force. Simply constructed with nothing to get out of order.



No. 32B. 1 1/4 x 8 inches. Price each.....\$0.20



No. 33A. A grease gun with screw rod having four threads to the inch, allowing quick action. Four-inch straight spout with large opening. Cork plunger and metal handle. Price each.....\$1.40



No. 40. A combination oil and grease gun which can be used for light oil or hard grease. Price each.....\$5.00



Old Method

Lap cement, nails and tin caps.



Fig. 1. Tin caps allow the roofing to buckle at the laps.



Fig. 2. When nails are used without caps, the roofing is bound to tear.



Fig. 3. Illustration shows how a leak could be started by a nail driven into a crack and not holding.



Fig. 4. Showing how a nail may cut the roofing. Often a nail is not driven straight or it bends while being driven.

Boughton Asphalt Roofing

"The Roofing with the Hold-Tite Cleat"

Boughton asphalt roofing is made of high grade wool felt, a tough fabric far better than the cheap "shoddy" substitutes used in ordinary roofings, and is saturated and double coated on both sides with genuine Trinidad Lake asphalt, the greatest weather proofer known. An important feature in the application of Boughton asphalt roofing is our Hold-Tite cleat which is far superior to nails and lap cement, because this cleat grips the roofing so tightly that it can't possibly be blown off by high winds which would ordinarily whip a nailed roof loose. This cleat fastens the laps together with a vise-like grip and makes them absolutely water-tight without the use of sticky lap cement. No sticky hands and sticky tools to work with.

Fully 90 per cent of roofing troubles can be laid to faulty application, and we illustrate below the advantages of our Hold-Tite cleat over the old style lap cement and nails.

New Method Hold-Tite Cleats



Fig. 1. No further use for lap cement or tin caps. Our metal cleat nailed firmly exerts a continuous pressure. With four nails to each joint, an absolutely tight joint is made. If ordinary care is used in the application, nail head cuts, buckled laps and leaks due to drawn nails, are practically impossible.

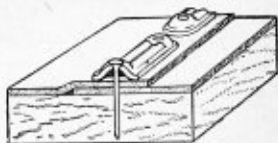


Fig. 2. If one or two nails do strike a crack or poor spot in the roofing boards, no harm is done, for there will still be two other nails holding the cleat and roofing securely.

Boughton Roofing Prices

Boughton asphalt roofing is furnished in rolls 32 inches wide and either 1, 2 or 3-ply. All plies are packed in rolls containing 108 square feet, enough to fully cover 100 square feet of surface.

We carry in stock Boughton asphalt roofing, with and without Hold-Tite cleats. Prices always include Hold-Tite cleats and nails, or galvanized nails and lap cement.

1-ply. Weight about 3 pounds.
Price per roll, with Hold-Tite cleats \$4.40
Price per roll, without Hold-Tite cleats 3.80

2-ply. Weight about 45 pounds.
Price per roll, with Hold-Tite cleats \$4.90
Price per roll, without Hold-Tite cleats 4.30

3-ply. Weight about 50 pounds.
Price per roll, with Hold-Tite cleats \$5.40
Price per roll, without Hold-Tite cleats 4.80

Boughton asphalt roofing is furnished ready for use. It is not necessary to paint at time of applying. Send for free model of roofing showing the Hold-Tite cleat applied.



Helmer Asphalt Roofing

With Nails and Lap Cement

For those who want a high grade roofing at a low price we recommend our Helmer brand, which is second in quality to our Boughton brand.

It is made of strong, fibrous felt uniformly saturated with a combination of asphalts which is properly processed to withstand the changes of temperature and make a tough but pliable fabric. It is absolutely impervious to all elements by being heavily coated on both sides. The coating on the under side protects against rising steam, vapors, etc., and on the upper side makes a durable wear and weather resisting surface. It will give long service and will not shrink or crack in winter weather, neither will it run during the hottest days nor become dry and hard.

It can be used on all classes of buildings, and makes an air-tight, water-tight, weather-proof roof and meets every requirement of a practical, serviceable roofing material.

Made in 1, 2 and 3-ply, packed in rolls 36 inches wide containing 108 square feet; enough to cover 100 square feet of surface. Large head galvanized nails and lap cement in every roll.

No additional coating is necessary at time of applying except for cementing between laps and painting tops of laps and caps.

Prices

1-ply, weighing about 35 pounds to roll.	Per roll.....	\$3.50
2-ply, weighing about 45 pounds to roll.	Per roll.....	4.00
3-ply, weighing about 55 pounds to roll.	Per roll.....	4.50



Boughton Granite Surfaced Roofing

The manufacturers of this grade were the first to make a stone surfaced prepared roofing. By the use of carefully crushed and screened Wisconsin granite they are able to furnish a roofing with a surface impervious to the wear and tear to which a roofing is subjected. No painting or re-coating is ever necessary. The first coat is the only coat. Does not crack in winter nor does it run, melt or slip in hot weather. Furnished with a standard lap 1/2 inches in width, and put up in rolls containing 108 square feet. Galvanized nails and cement are included in each roll. Weight about 90 pounds.

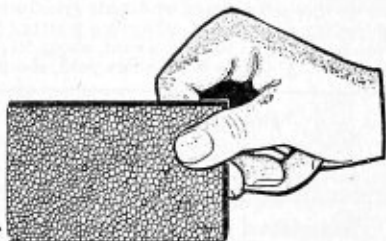
Price per roll.....\$5.00

Red and Green Rock Surfaced Roofing

The demand for a prepared roofing of a color to please the eye and improve the general effect has, in late years, grown very strong. Our red and green rock surfaced roofing has an excellent appearance beside being heavy, strong, tough and exceptionally durable and lasting. The colors are non-fading and the roof need never be painted.

Furnished in rolls of 108 square feet, weight about 80 pounds. Galvanized nails and cement packed in center of roll.

Price per roll.....\$6.00



Red and Green Rock Surfaced Shingles

There has been a call for a substitute for wood shingles—Why? Because wood shingles are not fire-proof. They are dangerous—they do not last—they are very unsightly after the first year or two.

Our shingles are made of the same materials as the red and green surfaced roofing and are the best quality. They are beautiful in color and do not fade or wash off. Ten years after application the color is the same as when first applied.

They make a perfect roof for public buildings, churches, residences, etc., and all kinds of buildings having a pitched roof. To be laid 4 inches to the weather, 1/2 inch apart. 424 shingles to the square, put up in 4 cartons to the square. These shingles measure 8x12 1/2 inches.

Weight per square, 220 pounds.

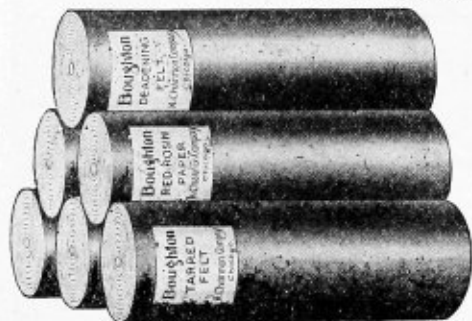
Price per square.....\$11.00

Write for sample.

All orders will be given our usual prompt attention.



Boughton Building Paper



felt, about 12 pounds to 100 square feet. Price, per roll.

Specify the weight stock you want—otherwise No. 2 will be shipped.

Boughton Tarred Felt

Made of selected long fibre felt, evenly saturated with distilled coal tar. It is widely used for temporary roofs and siding—keeping out the wind and dampness. Used under weatherboarding and floors to make warmer houses. Suitable for contractors camp houses, tool and supply sheds, to cover fresh cement and brick work.

Comes in rolls of about 55 pounds each, 36 inches wide.

No. 1 Tarred Felt. Heaviest weight made—about 25 pounds to 100 square feet. Used as temporary roofing and sheathing for lumber camps, farm buildings, etc. Price per roll.....\$3.50

No. 2 Tarred Felt. Medium weight—about 16 pounds to 100 square feet. The popular weight for sheathing and roofing purposes. Price per roll.....\$3.50

No. 3 Tarred Felt. A light weight sheathing and roofing.....\$3.50

Boughton Red Rosin Sized Sheathing Paper

Boughton red rosin sized sheathing paper is tough, strong, durable, damp and moisture proof, well calendered, and thoroughly rosin sized. Used largely to make buildings snug, wind tight, and comfortable. It is applied under the siding and saves many times its cost in the fuel bill. Never expose to weather. Supplied in full rolls, containing 500 square feet, and weighing 20, 25, 30, 35 and 40 pounds per roll. Specify the weight stock you want, otherwise we will ship 30 pound weight.

No. 20.	20 pounds to roll, price per roll.....	\$1.60
No. 25.	25 pounds to roll, price per roll.....	2.00
No. 30.	30 pounds to roll, price per roll.....	2.40
No. 35.	35 pounds to roll, price per roll.....	2.80
No. 40.	40 pounds to roll, price per roll.....	3.20

Boughton Deadenning Felt

Boughton Deadenning Felt. Modern buildings require thoroughly sound proof walls and floors. This grade meets this requirement and adds greatly to the warmth of the structure. It is made from selected stock and is free from lumps and all foreign matter. Supplied in rolls 36 inches wide.

No. 1.	1 pound to square yard, about 50 pounds to roll, price per roll.....	\$6.00
No. 1½.	1½ pounds to square yard, about 75 pounds to roll, price per roll.....	9.00

Boughton Slaters' Felt

A light weight tarred paper used under slate, tile, shingles, metal roofs, also for sheathing. Rolls contain 500 square feet, 36 inches wide, weight 35 pounds.

Price per roll.....\$2.50

Boughton Roof Coating

Made especially for coating our Boughton and Helmer Asphalt Roofing, as well as all kinds of prepared roofing. Made in black only.

Full barrels, price per gallon.....	\$1.10
Half barrels, price per gallon.....	1.20
5 and 10-gallon cans, price per gallon.....	1.30



Boughton Roof Paint

For a complete line of metal and roofing paint, refer to our paint section. Like all other Boughton Brand Paints, they are made of lasting qualities and are absolutely rust and weather proof.



Cement and Roof Coating Brushes

Each knot made and set, as in an oval paint brush, to the heavy black as shown in cut. Handles extra. Gray bristles with Tampico center, ¾ inches wide.

	Dosen	Each
2-knot.....	\$16.12	\$1.60
3-knot.....	23.00	2.30
4-knot.....	30.00	3.00

Roofing Cement

Elastic Roof Cement will repair cracked joints, nail holes, breaks in slate, tile, tin, sheet metal, felt, paper, canvas or composition roofs, also for pointing up foundations and chimneys, sealing up tin flashing, joining broken glass in skylights, sealing up leaks and seams in pumps, tanks, cisterns and silos. Seals cracks and crevices in all building material, adheres to any surface, wet or dry, hot or cold. Will make an absolutely water-tight patch and will not dry out, run or become brittle, but retains its plasticity indefinitely. Furnished in black only.



	Per Lb.	Per Lb.
5-pound can.....	\$0.24	50-pound kegs..... \$0.18
10-pound can.....	.24	100-pound kegs..... .16
25-pound can.....	.20	Barrels..... .12

Tin Caps and Roofing Nails

Tin roofing caps—Each square of roofing requires 1½ pounds of caps.

Wire roofing nails—To be used with tin caps. It requires about 1 pound of 1-inch or 1½ inch nails or about 1½ pounds of 1½-inch nails for each square of roofing.

Large Head Roofing Nails

The required amount is furnished with each roll of roofing. No caps needed. A larger nail 1½ inches long can be furnished if roofing is applied over shingles. 1-inch nails, 180 to the pound. 1½-inch nails, 115 to the pound.

We have a paint for every purpose. See paint section.

Sheet Steel Roofing and Siding

2½ inch Corrugated Sheets



10 Corrugations to Sheet

1¼ inch Corrugated Sheets



20 Corrugations to Sheet

2½-inch Corrugated Sheets are practical for all kinds of buildings such as mill buildings, factories, barns and similar structures; the sheets are easily and quickly applied. The full width of the sheets is 26 inches, covering width 24 inches, which allows a lap of one corrugation. The corrugations measure 2½ inches from center to center and are ½ inch deep. Furnished in painted and galvanized 16 gauge and lighter.

1¼-inch Corrugated Sheets make a very neat appearance and have greater rigidity. Used for roofing, siding and ceiling. For roofing, however, the 2½ corrugation is preferable. If the smaller size is used we recommend a lap of two corrugations to prevent any possible leakage. Full width of sheets is 26 inches, covering width 24 inches, which allows a lap of one corrugation. The corrugations measure 1¼ inches from center to center and are ½ inch deep. Furnished in painted and galvanized No. 20 gauge and lighter.

Regular lengths 5, 6, 7, 8, 9 and 10. The 12 ft. length takes advance of \$0.10 per square. Allow 3 to 6 inches end lap, and 2 to 4 inches projection at the eaves. The selling width of all corrugated sheets is the full width after corrugating. No allowance for laps. This applies to both 2½ and 1¼ inch size.

Prices on all sheet metal roofing quoted upon application.

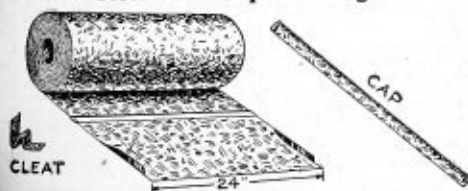
Two V and Three V Crimped Sheets



This style of roofing has been in use probably longer than any other. The sheets can be nailed to sheathing boards or directly over old shingles without ruining them. In placing the sheets on the roof the crimps shown in the illustration serve to support the joints and brace the sheets firmly, and can be fastened down more securely than any other style of roofing. It is therefore very serviceable in parts of the country where high winds are frequent.

Sheets are 24 inches wide from center to center of outside crimps. Furnished in painted and galvanized No. 20 gauge and lighter. Regular lengths 5, 6, 7, 8, 9 and 10 feet. Sticks for side and center crimps are furnished when ordered. Prices quoted upon application.

Roll and Cap Roofing



Plain Roll Roofing



Roll and Cap roofing.—The distinctive feature of this roofing is that the cap is locked to the cleat, which holds it firmly to the standing seam, making it impossible for the caps to work free, and the cleats being protected from the weather are not liable to rust or loosen. Sheets are 26 inches wide, covering width 24 inches.

Plain Roll Roofing.—Figure A shows cleat as shipped. Figure B. Cleat in position and nailed to sheathing. Figure C. Cleat turned down over the 1½ inch turned-up edge. Figure D. Shows the 1½ inch edge and the cleat folded over the 1 inch turned-up edge. Sheets are 26½ inches wide, covering width 24 inches.

Furnished in painted or galvanized, No. 24 gauge and lighter. Rolls contain 50 lineal feet and will cover 100 square feet.

Pressed Standing Seam Roofing

This style of roofing is highly satisfactory for any roof and is especially desirable for dwelling houses. When used on dwelling houses, we recommend that building paper be used under the sheets, as it not only protects the sheets but also prevents rattling, which is so often objectionable.



The cut illustrates the Pressed Standing Seam which is self capping. Covering width 24 inches. Made in painted or galvanized No. 20 gauge and lighter. Regular lengths, 6, 7, 8, 9 and 10 feet. Can be applied easily and quickly without the use of special tools. Roof pitch should be at least 2 inches to the foot. Prices upon application.

Information regarding application of roofing gladly furnished.

Plain Pressed Brick Siding



Full length of sheets, 60 inches, width 28 inches. Size of brick 2 1/2 x 8 1/2 inches. Furnished in either painted or galvanized No. 24 gauge and lighter.

Rock Face Stone Siding is also furnished in either painted or galvanized No. 24 gauge and lighter. Size of stones 7 x 12 inches. Size sheets 28 x 60.

Beaded Steel Ceiling and Siding



This style is very desirable in stores, warehouses, factories, engine-rooms, boiler-rooms, etc., where it is necessary to have a fireproof and durable ceiling and siding.

Beads are 3 inches from center to center, and sheets cover 24 inches in width after lapping over 1 crimp at the sides of sheets.

Regular lengths 5, 6, 7, 8, 9 and 10 feet. No. 26 gauge and lighter. Made in painted and galvanized.

Steel Ridge Coverings

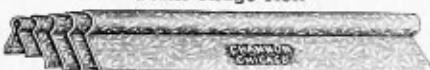
It is important that sheet metal ridging of some pattern be used for covering ridges of roofs.

Ridge roll cap adds a finished appearance to a building and prevents storms from blowing underneath the steel roofing sheets.

Corrugated Ridge Roll



Plain Ridge Roll



Plain Ridge Capping



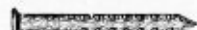
Corrugated V Capping



Furnished in painted or galvanized.

Either the plain V ridge cap or the plain ridge roll illustrated above can be used for corrugated steel roofing as effectively as the corrugated ridge, and makes a substantial protector wherever applied.

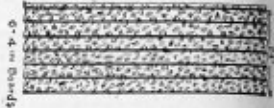
Barbed Roofing Nails



We furnish nails made especially for roofings in the following sizes: 1 inch, 1 1/4 inch, 1 3/4 inch, 2 inch, either common wire or galvanized.

Weatherboard Siding

Regular lengths 5, 6, 7, 8, 9 and 10 feet. Covering width of sheet 24 inches. Each board measures 4 inches. Finished in either painted or galvanized, No. 24 gauge or lighter.



Lead Washers



Washer No. 8
3/4 in. hole

We strongly recommend the use of lead washers in connection with roofings, as their use makes a water-tight joint, prevents rust and protects sheets from being cut through by the nail head.

Made in 3 sizes, Nos. 1, 2 and 3. No. 2 is the size generally used, 325 to the pound. One pound sufficient for three squares of roofing.

Expanded Metal Lath



Any gauge furnished plain or painted. Number 24 and 26 gauges only furnished galvanized after manufacture. Stock sheets 18 x 96 inches

No. Gauge	Weight per Sq. Yd.	Yards per Bundle	Sheets per Bundle
27	2 1/4 lbs.	12	9
26	2 1/2 lbs.	12	9
25	3.0 lbs.	12	9
24	3.5 lbs.	12	9

Approximate Weights
Per Square of Roofing and Siding

Gauge	29	28	27	26	24	22	20	18	16
2 1/2-in. Corrugated, painted...	68	76	83	110	136	163	217	271	326
2 1/2-in. Corrugated, galv'd...	77	85	91	98	124	151	178	232	287
1 1/2-in. Corrugated, painted...	72	79	86	114	142	170			
1 1/2-in. Corrugated, galv'd...	80	87	94	101	129	157	185		
2-V Crimp, painted...	70	76	83	111	137	164			
2-V Crimp, galvanized...	77	83	91	98	125	152	179		
3-V Crimp, painted...	72	79	86	114	142	170			
3-V Crimp, galvanized...	79	88	95	102	130	158	186		
Pressed Stand'g Seam, ptd...	73	79	86	113	141	169			
Pressed Stand'g Seam, gal'd...	79	87	94	101	128	156	184		
Plain Roll, painted...	72	79	86	114					
Plain Roll, galvanized...	77	88	95	102	130				
Roll & Cap—Caps & Cfts, ptd...	77	84	91	119					
Roll & Cap—Caps & Cfts, gal...	81	95	100	105	134				
Pressed Brick Siding, ptd...	64	71	77						
Pressed Brick Siding, gal'd...	71	78	85	91					
Beaded Ceiling, painted...	70	76	83	110					
Beaded Ceiling, galvanized...	77	85	91	98	125				
Rock Face Siding, painted...	65	72	78						
Rock Face Siding, galvanized...	71	79	86	92					
Weatherboard Siding, ptd...	72	79	86	113					
Weatherboard Siding, gal'd...	83	88	95	102	130				

All prices on this page quoted upon application.

Roofing and Calking Tools



No. 1 Hoisting Pail No. 1 Dipper No. 1 Mop Pail
All No. 1 dippers and pails are made of double annealed steel with Norway iron trimmings closely riveted. The dipper handle is riveted to a heavy plate and brazed then riveted to body of dipper. The pails are made with the latest approved convex bottom.

No. 1. Hoisting pail, capacity 6 gallons, weight, 9½ pounds. Price each \$8.00

No. 1. Dipper, capacity 1¼ gallons, weight 4¼ pounds. Price each \$5.00

No. 1. Mop pail, capacity 8 gallons, weight 13 pounds. Price each \$9.00

For those desiring a cheaper set of pails and dippers, we recommend our No. 2 grade. These are machine seamed and made of one grade lighter iron.

No. 2. Hoisting pail, capacity 6 gallons, weight 8½ pounds. Price each \$5.50

No. 2. Dipper, capacity 1¼ gallons, weight 4¼ pounds. Price each \$3.20

No. 2. Mop pail, capacity 8 gallons, weight 12 pounds. Price each \$6.00

Carrying and Pay Off Pails



No. 1 Pay Off Pails

Made of heavy black steel. All joints are closely riveted and brazed. The bottom is raised from the floor. Swing handles. The top, bottom and hood are protected with heavy bands. Spouts riveted and brazed. Capacity 4 gallons. Weight 8½ pounds.

Price each \$10.00

Extra spouts, for wood or stone. Weight 1 pound. Price each \$2.00

No. 2 Pay Off Pails

These are made from galvanized sheet stock. All seams riveted and soldered. This is an exceptionally good low price pail. Price includes either flat or round spout. State which is desired when ordering. Capacity 3½ gallons; weight 6½ pounds.

Price each \$6.00

Carrying Pails

Heavy black steel, closely riveted and made with two handles, one swinging. Capacity 5 gallons; weight 8½ pounds.

Price each \$6.00

No. 1 Pouring Cans

Made especially for filling seams in wood or brick pavements. Strongly built of galvanized iron with a cast iron point. It measures 13 inches in length and 7 inches



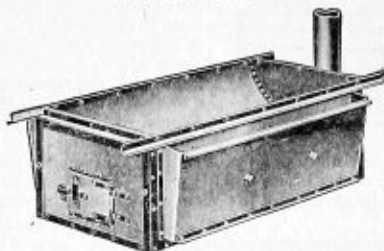
in diameter. Capacity about 2 gallons. The controlling rod is ½ inch in diameter.

Price each \$3.00

"Channon" Pouring Can is similar to above but lower in price for smaller jobs. Strongly made and will give good service.

Price each \$1.50

Mastic Boilers



This boiler is very substantially made, the material being heavy black steel and all corners being riveted and strongly braced. Provided with special bottoms so constructed that they may be knocked down to clean or for shipping. Provided with sand pockets and extra large fire space. Capacity 100 gallons, weight 450 pounds.

Price each \$120.00

Round Tar and Asphalt Heaters

These heaters are made of heavy black steel and are built in two parts, outside jacket and kettle. They have an exceptionally large fire space and are very quick heaters. Can be furnished in three stock sizes, either with or without sand pockets. Larger sizes can be made on short notice.

1½-barrel capacity (very popular for use on small repair jobs), including tray; weight 110 pounds. Price each \$70.00

Without tray. Price each \$60.00

1½-barrel capacity, without tray. Price each \$90.00

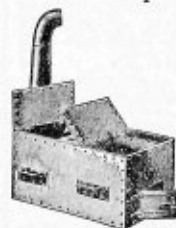
3-barrel capacity, without tray. Price each \$120.00

Sand pockets are extra and will be quoted on application.



Square Asphalt Kettle

This is a very popular kettle especially for large jobs. The fire space runs the full length of the tank, thus insuring perfect and even heating. Made of No. 12 black steel with No. 14 black steel sides. All sides and corners are heavily braced with strong angle iron. Made in three sizes.

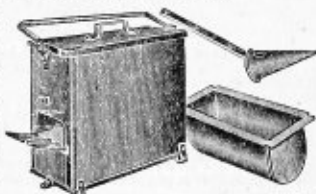


Capacity, Barrels	Weight, Pounds	Price Each
1	200	\$ 90.00
2	325	100.00
3	425	120.00

Sidewalk Calking Furnace

A very handy small furnace for repair work or small jobs. Compartments provided for overalls, tools and oakum and also handle, making it very easy to carry from place to place. Measures 18 inches long, 9 inches wide and 17 inches high. Weight 19 pounds.

Price each \$15.00



Calking Ladle

Capacity 1 qt., 18-in. handle, wt 2 lbs. Price each \$1.00

Roofing Mops

4-ply carpet warp with handle, wt. 2 lbs. Price each \$3.00

Small Wool Pitch Mops

With handle. Price each \$1.00 Price per dozen \$9.00

We can also quote on any other style pails, heaters, etc.

Oakum



All unspun oakum must be spun by hand before it can be used. In some sections, professional calkers insist upon spinning their own, but the demand for machine spun oakum is constantly increasing.

A calker will generally spin about 100 pounds (2 bales) of oakum per day at a cost of from 2½ to 4 cents per pound, depending upon rate of wages. Besides this there is a waste in hand spinning of from 2 to 5 per cent and sometimes more. There is also the loss of time to be taken into consideration.

Machine Spun Oakum is always ready for immediate use—there is no waste and it is evenly spun.

Spun oakum is put up in balls of convenient size and baled in the usual 50-pound bales. These balls unwind from the center like a ball of twine. The thread or spun-yarn can be made to run from 40 to 80 feet to the pound and can be given any practical degree of twist desired.

All Oakum in 50-Pound Bales

"Best" machine spun oakum. Per bale.....	\$19.50	Plumbers' spun oakum for plumbers only. Bale.....	\$8.00
"Best" unspun oakum. Per bale.....	18.50	Rope oakum, or tarred jute packing, 50 or 100-pound coil. Per pound.....	\$0.17
"U. S. Navy" unspun oakum. Per bale.....	17.00	Untarred jute packing, 50 or 100-lb. coils. Per lb.....	\$0.17

Roofing and Calking Pitch
Composition or Coal Tar Pitch

Barrels, approximate weight 350 pounds. Price cwt.....\$3.00

Yankee Pitch

A superior grade of calking pitch.	
100-pound boxes. Price per box.....	\$10.00
50-pound cans. Price per box.....	5.00
35-pound cans. Price per box.....	2.50
15-pound cans. Price per box.....	1.50
5-pound cans. Price per box.....	.60

Pine Pitch

Barrels, approximate weight 200 pounds. Price cwt.....	\$7.50
50-pound boxes. Price per box.....	6.00
25-pound boxes. Price per box.....	3.00
5-pound boxes. Price per box.....	.80

The above pitch is used for roofing, calking and all weather-proofing purposes.

Tar
Refined Liquid Coal Tar

Used with pitch for gravel roofs and also for weatherproofing purposes.

Barrels, approximate 50 gallons. Price per barrel.....	\$9.50
Half barrels, approximate 28 gallons. Price each.....	6.50
5-gallon cans. Price each.....	4.00
2-gallon cans. Price each.....	2.20
1-gallon cans. Price each.....	1.10
½-gallon cans. Price each.....	.60

Pine Tar

Used for tarring seines, rope, steel cables and many other purposes.

Barrels, approximate 50 gallons. Price per gallon.....	\$0.52
Half barrels, approximate 30 gallons. Price per gallon.....	.60
5-gallon cans. Each.....	\$4.20
2-gallon cans. Each.....	2.30
1-gallon cans. Each.....	1.20
½-gallon cans. Each.....	.60

Rosin

5-lb. boxes. Per box.....	\$0.60	25-lb. boxes. Per box.....	\$2.50
15-lb. boxes. Per box.....	1.60	50-lb. boxes. Per box.....	5.00
Barrels (about 500 pounds).....			Market

Candles

"Electric"

Candles made of paraffine wax. Smokeless, odorless and dripless. Eight to the pound in full 40-pound cases.

Full cases. Price per pound.....	\$0.18
Broken cases. Price per pound.....	.22

Coach Candles

3 and 5 to pound, in full 40-pound cases. Per pound.....	\$0.20
In broken cases. Price per pound.....	.24

Plumbers' Acid Candles

Very popular with plumbers, steam fitters and all who need a high grade candle.

3, 5 and 12 to the pound, in full 40-pound cases only. Price per pound.....	\$0.24
Broken cases. Price per pound.....	.28

Prices subject to market change.

Tallow

We carry a full stock of high grade refined cylinder tallow in bulk and barrels.

Barrels, about 400 pounds. Price per pound.....	\$0.30
Case lots, 20 5-pound cakes. Price per pound.....	.36
Lesser quantities.....	.40

Calking Cotton

Used for smaller seams than oakum.

Yacht spun, 5-ply, 50-pound bales. Price per pound.....	\$0.30
Navy spun, 3-ply, 50-pound bales. Price per pound.....	.33

Calking Irons



Calking or Making



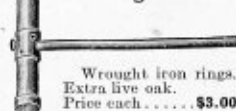
Deck or Dumb



Bent

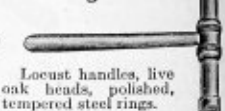
No.	Style	Common per Doz.
No. 0.	Crease ½-in. thick	\$9.00
No. 1.	Crease (or making) ½-in. thick	9.30
No. 2.	Crease (or making) ¾-in. thick	9.50
No. 3.	Crease (or making) 1-in. thick	9.70
	Deck or dumb irons	10.50
	Crooked or bent irons	10.50
	Double bent irons	11.50
	Spoke irons	10.80
	Sharp or butt irons	12.00
	Clearing or reefing irons	10.40

Hawsing Beetles



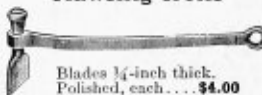
Wrought iron rings. Extra live oak. Price each.....\$3.00

Calking Mallets



Locust handles, live oak heads, polished, tempered steel rings.

Hawsing Irons



Blades ¼-inch thick. Polished, each.....\$4.00

Blackened, each.....	\$3.00
Polished, bent, each.....	5.00
Blackened, bent, each.....	4.00

No. 000. Price each.....	\$6.00
No. 00. Price each.....	5.70
No. 0. Price each.....	5.00
No. 1. Price each.....	4.50

Blades for hawsing irons ½ and ¾ furnished at same price.

Creosote Oil

Coal tar creosote oil is recognized everywhere as a wood preservative that has stood the test of time under all conditions. This oil is a pure coal tar distillate, from which all objectionable properties of crude creosote oil have been completely eliminated. The railroad steamship companies have always found creosote oil to be the best wood preservative and they continue to use it to protect their vast properties against decaying bridges, trestles, wharves, docks and trestles. We highly recommend it for use on fences, tanks, walks, silos and windmills.

Full barrels. Price per gallon.....	\$1.00
Half barrels. Price per gallon.....	1.10
5 and 10-gallon cans. Price, each.....	1.20



Janitors' Supplies



Cotton Mops

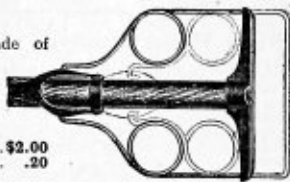
These mops are made of the best selected carded cotton, spun into strong, fine yarns. The ends are cut. Carried in stock in the following sizes: 12 lb., 15 lb. and 18 lb., to the dozen, one dozen to the bundle, one gross to the bale.

	Price per lb.
Eclipse, in full bales	\$0.48
Lesser quantities	.52
Eureka, in full bales	.46
Lesser quantities	.50

Mop Sticks

No. 4 Mop Stick, made of No. 9 gauge steel wire spring, cold rolled steel lever and bands; hardwood smoothly finished handles.

Price per dozen	\$2.00
Price each	.20



Combination Mop and Brush Holder

This Combination Mop and Brush Holder will hold a brush as well as a mop. It is strongly built and will last indefinitely. Malleable iron head and hardwood handle. Weight about 1½ pounds.

Price per dozen	\$4.00
Price each	.40



Beach Mop Wringer

A good strong and durable mop wringer which will not tear or pull mops apart. Will wring a mop dry and scalding water may be used.

The wringer is built of steel throughout and braced with angle iron.

Price each complete with 14-quart heavy galvanized pail \$6.00



Iron Clad Mop Wringer



The crank mop wringers are built on the principle of the clothes wringer and give a dry mop, at the same time not tearing or pulling the mop to pieces. The wringers have large openings, great leverage and the guards used prevent any slopping of water. The weight of the wringer is carried by the steel frame and not the pail.

The No. 3 wringer as shown in illustration is perfect in construction and built of all steel. The frame work is ¼-inch by ¾-inch steel and has steel swivel castors.

Price each \$5.00

The No. 5 is furnished with a one-inch Georgia pine board platform, otherwise it is the same as the No. 3 Iron Clad.

Price each \$5.00

Challenge

Made with an all steel frame and can be used with almost any pail. Can be furnished with different pails as described below. The galvanized pail is extra heavy and of 14-quart capacity, fastened in a ¼-inch by ¾-inch frame of steel. It never swells or dries out.

No. 1. Wringer	\$3.00
No. 2. With galvanized pail	5.00
No. 3. With three hooped cedar pail	5.00
No. 4. Same as No. 3 but smaller and furnished with a 12-quart pail	4.00



Extra Heavy Challenge



A wood sledged extra large roller wringer with a long leverage, giving an enormous pressure. The simplicity of this three-piece construction with all ½-inch rivets and ¼-inch by 1-inch steel, only brings the total weight to 15 pounds. It is large enough to hold a 20-quart pail.

Price each, without pail \$6.00

Gem Floor Brush



No. 940. Black horse hair, wire drawn, with red polished backs and handles. Prices include handles.

12 inches long. Dozen	\$20.50	Each	\$2.00
14 inches long. Dozen	23.50	Each	2.20
16 inches long. Dozen	28.00	Each	2.60
18 inches long. Dozen	32.00	Each	3.00
24 inches long. Dozen	41.00	Each	4.00

Challenge Floor Brush

No. 949. Made with the best bristles and is a splendid wearing brush. Similar to No. 940.

12-inch. Per dozen	\$38.00	Each	\$3.80
14-inch. Per dozen	44.00	Each	4.40
16-inch. Per dozen	50.00	Each	5.00
18-inch. Per dozen	54.00	Each	5.40
20-inch. Per dozen	59.50	Each	5.95
24-inch. Per dozen	72.00	Each	7.20

Tampico Fibre Floor Brush



No. 934

Red polished blocks, wire drawn. Double screw holes and handles.

No. 22. 12-inch. Per dozen	\$14.00	Each	\$1.40
No. 25. 15-inch. Per dozen	18.00	Each	1.80

Hand Brushes

Made of white Tampico, with all solid back in three sizes. Nos. 3-0 and 6 are unfinished, while No. 20 is finished in red.

No. 3-0. 4½x1½-inch block. Dozen	\$1.00	Each	\$0.10
No. 6. 4½x1½-inch block. Dozen	1.40	Each	.14
No. 20. 5½x1½-inch block. Dozen	3.00	Each	.30



Lavatory Brushes

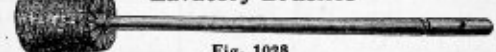


Fig. 1028

A good strong fibre brush for cleaning lavatories.

No. 1. Gray Fibre. Per dozen	\$2.20	Each	\$0.92
No. 3. Cuspidore, palmetto fibre. Per doz	5.80	Each	.58

H. Channon Company Chicago

Janitor's Supplies

White Cloud Floating Soap

A white floating soap, exceptionally good for laundry use. Makes a good lather.

100 large bars to box, per box	\$9.50
Single bars, per bar	.12
100 small bars to box, per box	7.50
Single bars, per bar	.10



Savon Imperial Soap

Gives a good heavy lather in hard water. Used for laundry and scrubbing purposes.

60 14-ounce bars to box, per box	\$6.80
Single bars, per bar	.10



Hardwater Hand Pumice

Used by printers, engineers, etc., for removing dirt and grease stains.

Per box of 50 cakes, Each	\$4.50	Single cakes, Price each	\$0.10
---------------------------	--------	--------------------------	--------

Kirkoline Washing Powder

Price per box			
100 12-oz. packages to box	\$9.00	Single packages, Price each	\$0.10
24 4-lb. packages to box	9.00	Single packages, Price each	.40

Crystola Scouring Soap

Recommended for all scouring purposes.

72 bars to box, Price per box	\$5.50	Single bars, Price each	\$0.10
-------------------------------	--------	-------------------------	--------



Champion Lye

Champion lye is a high test lye thoroughly granulated and is used for removing old paint, varnish, grease, tar and paint before recoating any surface.

Single cans, Price each	\$0.30
Dozen cans, Price	2.00
Case of 4 dozen cans, Price	7.80



Flash Hand Cleaner

For removing dirt, grease, oil, paint, ink and stains of all kinds from the hands.

Cleans better and quicker than soap and leaves the skin absolutely clean and free from injurious and unhealthy matter.

Paste form in tin cans weighing one pound.

Cases, 60 dozen cans, each full 16 ounces, Per case	\$11.50
Cases, 1 dozen cans, each full 16 ounces, Per case	2.00
Single cans, price each, full 16 ounces, per case	.20

In ordering single cans, send postage for mailing via parcel post.



No. 926 Window Wash Brush

	Dozen	Each
No. A. Gray mixed	\$3.00	\$0.30
No. B. Black hair, wire drawn	5.00	.50
No. 00. Gray hair	6.00	.60
No. 0. Wire drawn	8.80	.88
No. 1. Wire drawn	12.40	1.24

Scrub Brushes



No.	Size	Fibre	Selected white Tampico	Dozen	Each
No. 33.	Size 2 1/2 x 9 1/2			\$3.00	\$0.30
No. 170.	Size 2 1/2 x 10 1/2	Palmetto fibre, rectangular shape		3.60	.36

Rubber Window Cleaner

	Dozen	Each
12-inch	\$4.00	\$0.40
14-inch	4.50	.45
16-inch	5.30	.53
18-inch	6.50	.65

Floor Scrubber

A most useful article for scrubbing and cleaning floors and sidewalks.

No.	Size	Dozen	Each
No. 1A.	16-inch	\$7.50	\$0.75
No. 1B.	18-inch	8.00	.80



Dusters

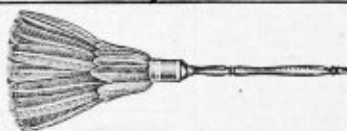
Made of the best feathers. Re-enforced throughout.

Janitor

200 soft tail feathers		
14-inch	Dozen \$25.00	Each \$2.50
16-inch	Dozen 33.00	Each 3.30
18-inch	Dozen 38.00	Each 3.80

Hotel

150 selected tail and wing feathers		
14-inch	Dozen \$15.00	Each \$1.50
16-inch	Dozen 19.00	Each 1.90
18-inch	Dozen 22.00	Each 2.20



"Dust-Arrester"

Chemically treated dust cloths. Substance in them gives gloss to wood. Catch and "arrest" dust.

30x36	\$0.50	36x54	\$0.80
36x72	1.00		

Burnishine Metal Polish For Every Metal

One application and rubbing removes all grime and stain. Does not scratch or mar the surface or hurt the hands. Never sticks or gums.

One-gallon cans, Price each	\$2.50
Half-gallon cans, Price each	1.40
Quart cans, Price each	.90
Pint cans, Price each	.60
Half-pint cans, Price each	.40



Wool Dusters



No.	Lgth. of Wool, Ins.	Lgth. of Handle, Ins.	Price Dozen	Price Each
4	9	12	\$15.00	\$1.50
6	10	14	20.00	2.00

Use Gripwell Automobile Tires. They are guaranteed 3,500 miles and the price is right.

Le Page's Liquid Glue



In special cans for use in shops or factories.

Cans have large opening with patent top that requires quarter turn to open or seal.

No heating required. Glue always ready for use. Last drop is as good as the first.

	Doz.	Each
Five-gal. can.....		\$14.00
One-gal. can (6 to a case).....	\$30.00	3.00
Half-gal. can (6 to a case).....	17.50	1.75
Quart can (12 to a case).....	10.00	1.00
Pint can (12 to a case).....	6.00	.60
Half-pint can (24 a case).....	4.00	.40



Dry Glues No. 101

Pure Hide Gelatine Flake Glue

Very thin cut and clear. Satisfactory for all work. Serves as an adhesive in fine cabinet making with hard woods. Being free from greases and acids, it makes a splendid casein binder.

Five to 25-pound lots, per pound.....\$1.60

No. 102—Special Cabinet Flake Glue

Made from absolutely pure hide stock, especially for cabinet making and other wood working.

Five to 25-pound lots, per pound.....\$0.90

No. 103—Emery Special Glue

Unexcelled for emery work. Furnished either ground or in flake form.

Five to 25-pound lots, per pound.....\$0.90

No. 104—Ground Sizing Glue

A very satisfactory sizing glue made from bone and animal stock. Used largely for wall and paper sizing and as a binder in the making of casein. Very popular with the book binders and often used in cabinet making with soft woods.

Five to 25-pound lots, per pound.....\$0.44

Special quotations on larger quantities.

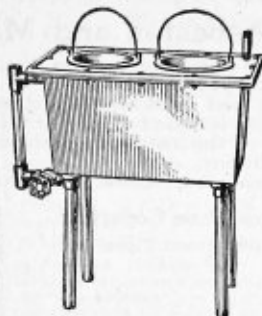
Cast Iron Glue Pots



No.	Cap. Cup	Cap. Pot	Plain	Per Dozen Galv. or Porcelain Lined
000	3 gills	1 1/2 pts.	\$8.50	\$10.00
00	1 pt.	2 pts.	9.50	11.00
0	1 1/4 pts.	3 pts.	10.00	12.00
1	1 1/2 pts.	2 qts.	12.00	13.50
2	2 pts.	2 1/2 qts.	13.00	15.50
3	3 pts.	3 1/2 qts.	15.00	20.52
4	2 qts.	4 1/2 qts.	23.00	24.84
5	2 1/4 qts.	5 qts.	27.00	29.16
6	2 1/2 qts.	6 qts.	30.00	33.88
7	3 qts.	7 qts.	35.00	40.00

Burlington Glue Heater

Quick and Economical



The live steam goes directly into water chambers and heats the glue very quickly.

Tank is plain iron japanned, 20 inches long, 11 inches wide, 9 inches deep. Fitted with 1/2-inch pipe connections.

No. 1-P. Has one each 2 and 3-quart cups. Plain iron lining. Price each.....	\$25.00
No. 1-E. Has one each 2 and 3-quart cups. Porcelain lining. Price each.....	\$26.00
No. 1-G. Has one each 2 and 3-quart cups. Galvanized lining. Price each.....	\$26.50
No. 10-P. Has two 1 1/4-quart and one 1-quart cup. Plain iron lining. Price each.....	\$26.00
No. 10-E. Has two 1 1/4-quart and one 1-quart cup. Porcelain lining. Price each.....	\$26.50
No. 10-G. Has two 1 1/4-quart and one 1-quart cup. Galvanized lining. Price each.....	\$27.00

Steam Glue Pots and Stands



Consists of stand, with steam pot and either tinned or porcelain lined inner kettles. Prices do not include connections. Used in mills and factories, in pattern making shops, binderies and sometimes for inks in print shops.

No. of pot	1	2	3	4	5	6
Price.....	\$20.00	\$35.00	\$52.00	\$66.00	\$80.00	\$100.00
Extra steam pots, each.....						\$11.00
Extra inside kettles (5-quart cap.), tinned or porcelain lined, Each.....						\$2.80
Plain inside kettles.....						\$1.76

Channon Kerosene Burning Glue Heater



Every shop should have a glue heater of some sort. This type is very satisfactory where a large equipment is unnecessary. Furnished with either tin or copper cup and pail.

No.	Cap. Cup	Cap. Pot	Plain	Per Dozen Galv. or Porcelain Lined
No. 1.	1 pint tin cup and pail.....		\$24.00	\$24.40
No. 2.	2 pint tin cup and pail.....		26.00	2.60
No. 3.	3 pint tin cup and pail.....		30.00	3.00
No. 10.	1 pint copper cup and pail.....		32.00	3.20
No. 20.	2 pint copper cup and pail.....		34.00	3.40
No. 30.	3 pint copper cup and pail.....		36.00	3.60

Extra Cups				Extra Pails			
No.	Doz.	Each	Doz.	No.	Doz.	Each	Doz.
1.....	\$3.50	\$0.35	\$7.50	1.....	\$3.70	\$0.38	\$8.50
2.....	4.00	.40	8.50	2.....	4.30	.44	9.50
3.....	4.50	.50	9.50	3.....	4.80	.48	10.50

Asbestos and Magnesia Products

The loss from radiation and condensation due to uncovered or improperly covered pipes, boilers or furnaces directly affects your pocketbook.

Every dollar wasted in fuel consumption detracts from the earning capacity and profits of your plant. The best insulation is none too good to meet the increasing severity of modern requirements. We have made a study of the insulation problem and are prepared to offer economical suggestions covering individual conditions.

We handle anything made from asbestos and magnesia, and invite your inquiries.

Magnesia Sectional Pipe Covering For High Pressure Steam Pipes



This well-known form of high pressure covering is made of 85 per cent magnesia and combines the high non-conducting qualities of carbonate of magnesia and asbestos in a light, highly efficient insulation.

It is recommended for high pressure and super-heated steam surfaces. Made in sections three feet long. Standard thickness 1 inch.

For list prices see next page.

Wool Felt Sectional Pipe Covering For Cold and Hot Water Pipes



This covering is composed of soft but firm wool felt secured with a heavy interlining of asbestos felt.

For use out of doors and in damp places, a waterproof jacket will be furnished at a slight extra expense.

Made in sections 3 feet long, $\frac{1}{2}$, $\frac{3}{4}$ or 1-inch thick.

For list prices see next page.

Expanded Asbestos Felt Pipe Covering For High and Low Pressure Steam Pipes

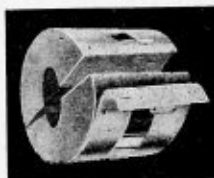
This covering is built up of successive laminations of expanded asbestos felt in such a manner that the process fills the covering with dead air spaces, thus forming an extremely effective insulation for high or low pressure surfaces. Is not affected by extreme vibration, and is therefore particularly suited for use on pipes in railway cars, factories, etc.

Made in sections 3 feet long, $\frac{1}{2}$, $\frac{3}{4}$ or 1-inch thick.

For list prices see next page.



"Sweat No" Sectional Pipe Covering To Prevent Pipes from Sweating, Dripping, Etc.



Effectually prevents condensation and dripping on cold water pipe lines. In warm weather condensation from cold water pipes causes considerable trouble and damage to stocks of merchandise in stores as well as to draperies, furnishings, etc., in hotels. Sweat-No covering prevents this by insulating the pipe from the warm air. Will also make pipes frost-proof. Made of wool felt with a waterproof lining on the inside.

In sections three feet long, $\frac{1}{2}$ -inch thick.

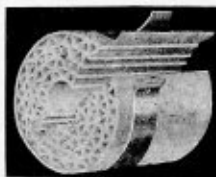
For list prices see next page.

Asbestos Air Cell Pipe Covering For Medium and Low Pressure Steam and Hot Water Pipes

The best all around covering manufactured. Is especially adapted for medium and low pressure steam and hot water pipes. 75 per cent of all the pipe covering made and sold is asbestos air cell, thus proving its popularity. No covering on the market can be applied to pipes as quickly or as cheaply as air cell covering. Is very durable and not liable to breakage in shipment or handling.

Made in sections 3 feet long, $\frac{1}{2}$, $\frac{3}{4}$ or 1-inch thick.

For list prices see next page.



"Freeze No" Sectional Pipe Covering For Protecting Water and Gas Pipes from Freezing

This covering prevents freezing of pipes even in zero weather. It is designed specially to resist extreme cold. For use on weather exposed pipes, a water-proof jacket is furnished at slight extra cost.

This covering is composed of solid wool felt $\frac{1}{2}$ -inch thick, lined with $\frac{1}{2}$ -inch of hair felt.

Made in sections three feet long and 1 inch thick.

For list prices see next page.



Asbestos Furnace Cement

For setting up furnaces, ranges, heaters, stoves and repairing broken joints, etc., asbestos furnace cement is most durable and efficient. It adheres firmly to all metals, fire brick, fire boxes, etc. It is absolutely fire-proof and will not crack or shrink away from the iron after being subjected to great heat. This cement is specially adapted for "setting up" furnaces, heaters, etc., and insures a tight joint, thus effectually preventing the escape of smoke and gas.

Asbestos Retort Cement

Asbestos retort cement is used in gas and chemical works for repairing broken clay and iron retorts and cementing pipes, fittings and flange joints; also for cementing joints in metal. It vitrifies without shrinking and is fire and acid proof.

Prices of Asbestos Furnaces and Retort Cements

In 2-pound cans.	Price per can.....	\$0.30
In 5-pound cans.	Price per can.....	.50
In 10-pound cans.	Price per can.....	1.00

In 25-pound pails.	Price per pail.....	\$2.00
In 50-pound pails.	Price per pail.....	3.70

Asbestos Dry Paste



In condensed powder form. Fuller's Asbestos Dry paste solves the problem of paste for heating contractors, manufacturers, mechanics, plumbers and electrical workers.

It is a reliable adhesive paste for pasting asbestos coverings on heating plants. Extreme high temperature will not affect it, so that coverings will not peel off.

It is also unsurpassed for pasting paper, cloth and leather on all kinds of hard, smooth surfaces—glass, iron,

tin, brick, painted and enameled ware.

Can be prepared by simply mixing the powder with cold water. One pound of the powder makes ten pounds, or over a gallon, of smooth, white liquid paste ready for use.

200-pound barrels.	Price per pound	.....	\$0.13
100-pound kegs.	Price per pound	.....	.15
50-pound drums.	Price per pound	.....	.17
35-pound pails.	Price per pound	.....	.18
10 and 5-pound bags.	Price per pound	.....	.20
5-pound cartons.	Price per pound	.....	.24
2½-pound cartons.	Price per pound	.....	.24

Asbestos Corrugated Fire-Proof Paper

For Wrapping Hot Air Pipes, Furnaces, Etc.

A great saving in fuel is effected by the use of Asbestos Air Cell paper as a wrapping around the body of hot air furnaces and pipes. It is also efficient in preventing rust or corrosion when the pipes are not in use. This paper is not expensive and is very easily put on, merely having to be cut the proper length and placed around the furnace or pipes, and wired, and the insulation is complete.

Furnished in rolls 36 inches wide containing 250 square feet each.

List Prices

Sectional Pipe Covering and Fittings Standard Thicknesses

Inside Diameter of Pipe, Inches	Price per Lin. Foot	Elbows	Tees	Crosses	Globe Valve	Flange Covers
1/8	\$0.22	\$0.30	\$0.36	\$0.48	\$0.54	\$0.50
1/4	.24	.30	.36	.48	.54	.50
3/8	.27	.30	.36	.48	.54	.50
1/2	.30	.30	.36	.48	.54	.50
3/4	.33	.30	.36	.48	.54	.50
1	.36	.36	.42	.54	.60	.60
1 1/4	.40	.42	.48	.60	.78	.70
1 1/2	.45	.48	.54	.70	.96	.80
2	.50	.54	.60	.80	1.20	.90
2 1/2	.60	.60	.75	.96	1.50	1.00
3	.65	.72	.90	1.10	1.85	1.30
3 1/2	.70	.90	1.20	1.50	2.25	1.60
4	.80	1.30	1.60	2.00	2.80	1.90
5	1.00	1.80	2.20	2.80	3.60	2.20
6	1.10	2.40	3.00	3.60	4.40	2.50
7	1.20	3.00	3.80	4.40	5.30	2.90
8	1.30	3.60	4.60	5.20	6.20	3.30

All pipe coverings are supplied in sections 3 feet long, canvased and with bands.

Covering Accessories

We can furnish the following used in connection with our insulation materials.

Rosin sized paper. Twine (sewing and wrapping). Wire (hexagonal, binding, air space and lath). Pipe covering bands, canvas, air space studs, water paste.

Prices upon application.

Asbestos and Magnesia Insulating Cements 85% Magnesia Cement

For high pressure and superheated steam surfaces. Makes a highly efficient insulation for boilers, domes, flues, stacks, pump and engine cylinders.

In 60-pound bags. Price per bag.....\$2.75

Asbestos Magnesia Cement

A special high-grade cement for both high and low-pressure work. In addition to asbestos fibre it contains a large percentage of 85% magnesia which at once assures its efficiency, insulating quality and increased covering capacity. Insulation on the boiler surface is vital to increased radiation on a fuel saving basis.

Do not merely cover your boilers—insulate them with Asbestos Magnesia cement.

In 100-pound bags. Price per bag.....\$2.00

Standard Asbestos Cement

This grade of cement is used for covering and insulating boilers, domes, breechings, house heaters, etc. Composed of asbestos fibre and other fireproof insulating materials compounded to secure efficiency at a low cost. In 100-pound bags. Price per bag.....\$1.20

Directions for Applying Different Grades of Cement

Mix the cement thoroughly with water about the consistency of ordinary mortar. Apply first coat rough about 1/2-inch thick. After it is dry apply second coat to desired thickness and smooth down with trowel. In some cases this is all that is necessary, but to make a durable and efficient covering, especially on vertical boilers and large heated surfaces subject to vibration, it is well to apply over the second coat hexagonal wire. Over this apply the cement troweled to a hard finish to cover the wire and make a smooth surface for painting or canvas jacketing. **Mineral Wool**

Our new process wool is blown by compressed air, hence it is free from sulphur. Is made from magnesia, limestone and other minerals; is fireproof, odorless, free from decay and very efficient in non-conduction.

In bags weighing about 50 pounds, each.....\$3.00

Asbestos Sheet Millboard

This millboard is 98% pure asbestos, and is fire and acid-proof. It is used for fire screens, protecting ceilings and walls exposed to heating apparatus, lining stoves, ovens, fire-boxes, electric insulation, for glass workers use, and many other purposes requiring protection from fire and heat.

Asbestos sheet millboard comes in standard size sheets 40x40 inches. Thicknesses range from 1/8 to 1/2 inch. Furnished in medium and hard quality. Medium regularly furnished.

Approximate Weight per Sheet

1/8-inch thick, 2 lbs. per sheet	3/8-inch thick, 12 lbs. per sheet
1/4-inch thick, 3 lbs. per sheet	1/2-inch thick, 14 lbs. per sheet
3/8-inch thick, 4 lbs. per sheet	3/4-inch thick, 23 lbs. per sheet
1/2-inch thick, 6 lbs. per sheet	1-inch thick, 27 lbs. per sheet
3/4-inch thick, 8 lbs. per sheet	

Full case lots weigh about 300 pounds.

Asbestos Fire-Proof Paper or Roll Board

For lining walls, floors, covering heater pipes and all fireproofing purposes.

This paper is fireproof and especially adapted for use where an extremely efficient non-conductor of heat, cold or sound is required. Its flexibility, its perfect fireproof, vermin-proof and insulating qualities and its very reasonable cost have made it most popular as a fire stop in floors, walls and ceiling. For wrapping heater pipes, lining elevator shafts, etc.

Made in rolls 36 inches wide, weighing about 100 pounds. Furnished in weights of 6, 8, 10, 12, 14, 16 and 32 pounds per 100 feet.

Cordage and Twine for Tying and Sewing

Sisal Cordage

Is made from a fiber grown chiefly in Yucatan and Mexico. This fiber is very much inferior to Manila hemp as to strength, and though made into rope, is used principally for tying.

Sisal Rope



We carry only one grade, which is strictly pure and first quality. Sisal is sold in full coils only of weights given below.

Diameter, inches	1 1/2	2	2 1/2	3	3 1/2	4	4 1/2	5	5 1/2	6	6 1/2	7	7 1/2	8	8 1/2	9	9 1/2	10	10 1/2	11	11 1/2	12	12 1/2	13	13 1/2	14	14 1/2	15	15 1/2	16	16 1/2	17	17 1/2	18	18 1/2	19	19 1/2	20	20 1/2	21	21 1/2	22	22 1/2	23	23 1/2	24	24 1/2	25	25 1/2	26	26 1/2	27	27 1/2	28	28 1/2	29	29 1/2	30	30 1/2	31	31 1/2	32	32 1/2	33	33 1/2	34	34 1/2	35	35 1/2	36	36 1/2	37	37 1/2	38	38 1/2	39	39 1/2	40	40 1/2	41	41 1/2	42	42 1/2	43	43 1/2	44	44 1/2	45	45 1/2	46	46 1/2	47	47 1/2	48	48 1/2	49	49 1/2	50	50 1/2	51	51 1/2	52	52 1/2	53	53 1/2	54	54 1/2	55	55 1/2	56	56 1/2	57	57 1/2	58	58 1/2	59	59 1/2	60	60 1/2	61	61 1/2	62	62 1/2	63	63 1/2	64	64 1/2	65	65 1/2	66	66 1/2	67	67 1/2	68	68 1/2	69	69 1/2	70	70 1/2	71	71 1/2	72	72 1/2	73	73 1/2	74	74 1/2	75	75 1/2	76	76 1/2	77	77 1/2	78	78 1/2	79	79 1/2	80	80 1/2	81	81 1/2	82	82 1/2	83	83 1/2	84	84 1/2	85	85 1/2	86	86 1/2	87	87 1/2	88	88 1/2	89	89 1/2	90	90 1/2	91	91 1/2	92	92 1/2	93	93 1/2	94	94 1/2	95	95 1/2	96	96 1/2	97	97 1/2	98	98 1/2	99	99 1/2	100	100 1/2	101	101 1/2	102	102 1/2	103	103 1/2	104	104 1/2	105	105 1/2	106	106 1/2	107	107 1/2	108	108 1/2	109	109 1/2	110	110 1/2	111	111 1/2	112	112 1/2	113	113 1/2	114	114 1/2	115	115 1/2	116	116 1/2	117	117 1/2	118	118 1/2	119	119 1/2	120	120 1/2	121	121 1/2	122	122 1/2	123	123 1/2	124	124 1/2	125	125 1/2	126	126 1/2	127	127 1/2	128	128 1/2	129	129 1/2	130	130 1/2	131	131 1/2	132	132 1/2	133	133 1/2	134	134 1/2	135	135 1/2	136	136 1/2	137	137 1/2	138	138 1/2	139	139 1/2	140	140 1/2	141	141 1/2	142	142 1/2	143	143 1/2	144	144 1/2	145	145 1/2	146	146 1/2	147	147 1/2	148	148 1/2	149	149 1/2	150	150 1/2	151	151 1/2	152	152 1/2	153	153 1/2	154	154 1/2	155	155 1/2	156	156 1/2	157	157 1/2	158	158 1/2	159	159 1/2	160	160 1/2	161	161 1/2	162	162 1/2	163	163 1/2	164	164 1/2	165	165 1/2	166	166 1/2	167	167 1/2	168	168 1/2	169	169 1/2	170	170 1/2	171	171 1/2	172	172 1/2	173	173 1/2	174	174 1/2	175	175 1/2	176	176 1/2	177	177 1/2	178	178 1/2	179	179 1/2	180	180 1/2	181	181 1/2	182	182 1/2	183	183 1/2	184	184 1/2	185	185 1/2	186	186 1/2	187	187 1/2	188	188 1/2	189	189 1/2	190	190 1/2	191	191 1/2	192	192 1/2	193	193 1/2	194	194 1/2	195	195 1/2	196	196 1/2	197	197 1/2	198	198 1/2	199	199 1/2	200	200 1/2	201	201 1/2	202	202 1/2	203	203 1/2	204	204 1/2	205	205 1/2	206	206 1/2	207	207 1/2	208	208 1/2	209	209 1/2	210	210 1/2	211	211 1/2	212	212 1/2	213	213 1/2	214	214 1/2	215	215 1/2	216	216 1/2	217	217 1/2	218	218 1/2	219	219 1/2	220	220 1/2	221	221 1/2	222	222 1/2	223	223 1/2	224	224 1/2	225	225 1/2	226	226 1/2	227	227 1/2	228	228 1/2	229	229 1/2	230	230 1/2	231	231 1/2	232	232 1/2	233	233 1/2	234	234 1/2	235	235 1/2	236	236 1/2	237	237 1/2	238	238 1/2	239	239 1/2	240	240 1/2	241	241 1/2	242	242 1/2	243	243 1/2	244	244 1/2	245	245 1/2	246	246 1/2	247	247 1/2	248	248 1/2	249	249 1/2	250	250 1/2	251	251 1/2	252	252 1/2	253	253 1/2	254	254 1/2	255	255 1/2	256	256 1/2	257	257 1/2	258	258 1/2	259	259 1/2	260	260 1/2	261	261 1/2	262	262 1/2	263	263 1/2	264	264 1/2	265	265 1/2	266	266 1/2	267	267 1/2	268	268 1/2	269	269 1/2	270	270 1/2	271	271 1/2	272	272 1/2	273	273 1/2	274	274 1/2	275	275 1/2	276	276 1/2	277	277 1/2	278	278 1/2	279	279 1/2	280	280 1/2	281	281 1/2	282	282 1/2	283	283 1/2	284	284 1/2	285	285 1/2	286	286 1/2	287	287 1/2	288	288 1/2	289	289 1/2	290	290 1/2	291	291 1/2	292	292 1/2	293	293 1/2	294	294 1/2	295	295 1/2	296	296 1/2	297	297 1/2	298	298 1/2	299	299 1/2	300	300 1/2	301	301 1/2	302	302 1/2	303	303 1/2	304	304 1/2	305	305 1/2	306	306 1/2	307	307 1/2	308	308 1/2	309	309 1/2	310	310 1/2	311	311 1/2	312	312 1/2	313	313 1/2	314	314 1/2	315	315 1/2	316	316 1/2	317	317 1/2	318	318 1/2	319	319 1/2	320	320 1/2	321	321 1/2	322	322 1/2	323	323 1/2	324	324 1/2	325	325 1/2	326	326 1/2	327	327 1/2	328	328 1/2	329	329 1/2	330	330 1/2	331	331 1/2	332	332 1/2	333	333 1/2	334	334 1/2	335	335 1/2	336	336 1/2	337	337 1/2	338	338 1/2	339	339 1/2	340	340 1/2	341	341 1/2	342	342 1/2	343	343 1/2	344	344 1/2	345	345 1/2	346	346 1/2	347	347 1/2	348	348 1/2	349	349 1/2	350	350 1/2	351	351 1/2	352	352 1/2	353	353 1/2	354	354 1/2	355	355 1/2	356	356 1/2	357	357 1/2	358	358 1/2	359	359 1/2	360	360 1/2	361	361 1/2	362	362 1/2	363	363 1/2	364	364 1/2	365	365 1/2	366	366 1/2	367	367 1/2	368	368 1/2	369	369 1/2	370	370 1/2	371	371 1/2	372	372 1/2	373	373 1/2	374	374 1/2	375	375 1/2	376	376 1/2	377	377 1/2	378	378 1/2	379	379 1/2	380	380 1/2	381	381 1/2	382	382 1/2	383	383 1/2	384	384 1/2	385	385 1/2	386	386 1/2	387	387 1/2	388	388 1/2	389	389 1/2	390	390 1/2	391	391 1/2	392	392 1/2	393	393 1/2	394	394 1/2	395	395 1/2	396	396 1/2	397	397 1/2	398	398 1/2	399	399 1/2	400	400 1/2	401	401 1/2	402	402 1/2	403	403 1/2	404	404 1/2	405	405 1/2	406	406 1/2	407	407 1/2	408	408 1/2	409	409 1/2	410	410 1/2	411	411 1/2	412	412 1/2	413	413 1/2	414	414 1/2	415	415 1/2	416	416 1/2	417	417 1/2	418	418 1/2	419	419 1/2	420	420 1/2	421	421 1/2	422	422 1/2	423	423 1/2	424	424 1/2	425	425 1/2	426	426 1/2	427	427 1/2	428	428 1/2	429	429 1/2	430	430 1/2	431	431 1/2	432	432 1/2	433	433 1/2	434	434 1/2	435	435 1/2	436	436 1/2	437	437 1/2	438	438 1/2	439	439 1/2	440	440 1/2	441	441 1/2	442	442 1/2	443	443 1/2	444	444 1/2	445	445 1/2	446	446 1/2	447	447 1/2	448	448 1/2	449	449 1/2	450	450 1/2	451	451 1/2	452	452 1/2	453	453 1/2	454	454 1/2	455	455 1/2	456	456 1/2	457	457 1/2	458	458 1/2	459	459 1/2	460	460 1/2	461	461 1/2	462	462 1/2	463	463 1/2	464	464 1/2	465	465 1/2	466	466 1/2	467	467 1/2	468	468 1/2	469	469 1/2	470	470 1/2	471	471 1/2	472	472 1/2	473	473 1/2	474	474 1/2	475	475 1/2	476	476 1/2	477	477 1/2	478	478 1/2	479	479 1/2	480	480 1/2	481	481 1/2	482	482 1/2	483	483 1/2	484	484 1/2	485	485 1/2	486	486 1/2	487	487 1/2	488	488 1/2	489	489 1/2	490	490 1/2	491	491 1/2	492	492 1/2	493	493 1/2	494	494 1/2	495	495 1/2	496	496 1/2	497	497 1/2	498	498 1/2	499	499 1/2	500	500 1/2	501	501 1/2	502	502 1/2	503	503 1/2	504	504 1/2	505	505 1/2	506	506 1/2	507	507 1/2	508	508 1/2	509	509 1/2	510	510 1/2	511	511 1/2	512	512 1/2	513	513 1/2	514	514 1/2	515	515 1/2	516	516 1/2	517	517 1/2	518	518 1/2	519	519 1/2	520	520 1/2	521	521 1/2	522	522 1/2	523	523 1/2	524	524 1/2	525	525 1/2	526	526 1/2	527	527 1/2	528	528 1/2	529	529 1/2	530	530 1/2	531	531 1/2	532	532 1/2	533	533 1/2	534	534 1/2	535	535 1/2	536	536 1/2	537	537 1/2	538	538 1/2	539	539 1/2	540	540 1/2	541	541 1/2	542	542 1/2	543	543 1/2	544	544 1/2	545	545 1/2	546	546 1/2	547	547 1/2	548	548 1/2	549	549 1/2	550	550 1/2	551	551 1/2	552	552 1/2	553	553 1/2	554	554 1/2	555	555 1/2	556	556 1/2	557	557 1/2	558	558 1/2	559	559 1/2	560	560 1/2	561	561 1/2	562	562 1/2	563	563 1/2	564	564 1/2	565	565 1/2	566	566 1/2	567	567 1/2	568	568 1/2	569	569 1/2	570	570 1/2	571	571 1/2	572	572 1/2	573	573 1/2	574	574 1/2	575	575 1/2	576	576 1/2	577	577 1/2	578	578 1/2	579	579 1/2	580	580 1/2	581	581 1/2	582	582 1/2	583	583 1/2	584	584 1/2	585	585 1/2	586	586 1/2	587	587 1/2	588	588 1/2	589	589 1/2	590	590 1/2	591	591 1/2	592	592 1/2	593	593 1/2	594	594 1/2	595	595 1/2	596	596 1/2	597	597 1/2	598	598 1/2	599	599 1/2	600	600 1/2	601	601 1/2	602	602 1/2	603	603 1/2	604	604 1/2	605	605 1/2	606	606 1/2	607	607 1/2	608	608 1/2	609	609 1/2	610	610 1/2	611
------------------	-------	---	-------	---	-------	---	-------	---	-------	---	-------	---	-------	---	-------	---	-------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----	---------	-----

TENTS, CANVAS GOODS AND CAMPERS' SUPPLIES



Something About Tents



Advice Regarding Making a Selection

SELECTING THE TYPE In selecting a tent, one should be guided by the requirements of the party, the method of transportation, the nature of the locality and the season of the year. The Standard Wall Tent with Fly is without question the most popular and widely used tent at the present time. However, where lightness is essential, a single pole tent is preferred by some sportsmen. With this style, the pole may be dispensed with as one can be cut from a neighboring wood each time the tent is erected. For a canoe or walking trip the Sibley, Lumberman's, Wedge or Miner's Tents are recommended. The Family Compartment and Camping Tents are the most suitable for larger parties and are as habitable as a house.

SELECTING THE MATERIAL A tent made of 10 oz. duck means that the duck used weighs 10 ozs. to the yard, and the same with 12 oz., etc. Three kinds of material are used, white duck, khaki duck, and Somerset silk. *U. S. Standard Army Khaki Duck* sheds the water better than white duck and if properly cared for will give better and longer service than any other material. *U. S. Standard Army Duck* is made in strict accordance with the requirements of the United States Government and is the best grade of duck that is used for white tents. *Double Filling Duck* will stand hard wear and rough weather. *Single Filling Duck* is not adapted for hard usage or bad weather, and is not recommended for general use. *Somerset Silk* has the advantage of being very light and a large tent can be rolled into a very compact bundle, which is easy to carry.

WHEN MAKING PRICE COMPARISONS To meet price competition, there are various ways used to cheapen the construction of tents, which are hard for the buyer to detect until the tent is in use. One of the most common methods is to lower the height of the tent from four to eight inches or even more, thus saving considerable material. The pitch of the roof, however, would not be sufficient to shed the rain properly and the tent will leak. The saving effected by the manufacturer is from \$1.00 to \$3.00. Another plan practiced is to substitute 9 oz. duck for 10 oz., 11 oz. for 12 oz., etc., and the saving by this method would amount to \$1.25 to \$3.00 on a regular small size tent. Another point to take into consideration and a very important one is the seams. By skimping them, a considerable saving may be effected. If jute rope is substituted for manila or sisal the cost is still further lowered, but jute rope is utterly worthless after once being wet. This will serve to show you how imperfect a tent may be if the maker wishes to make it.

CHANNON MADE TENTS When a tent is purchased from us, the buyer does so with the distinct understanding that it is without flaws of any kind, and the price will be low as consistent with first quality materials and workmanship. There are no substitutions or improper cutting. We have built up a reputation for making good tents, tents that can be depended upon under the most trying circumstances.

ALLOW SUFFICIENT TIME WHEN ORDERING May, June, July and August are our busiest months. If a tent is needed in May, it should be ordered in April to be on the safe side. Our capacity is large, however, and in most cases we are able to make deliveries in from four to five days' time. It is much better to order early and obviate the chance of disappointment.

Wall Tents



Cut of Wall Tent with Fly

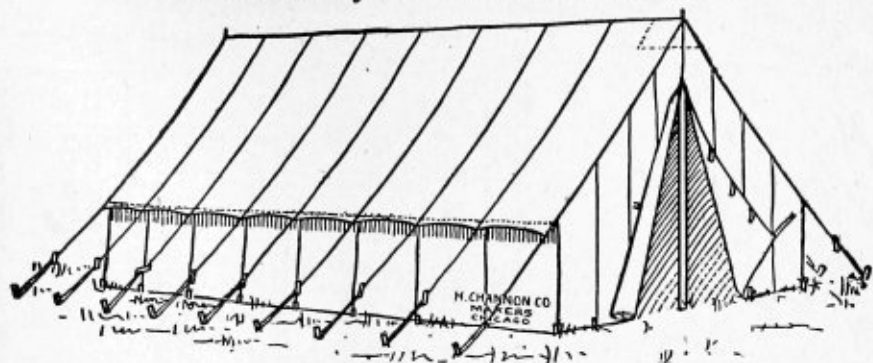
Regular Wall Tents, Complete with Poles, Ropes, Stakes and Keys

New Sizes	Center Height	Wall Height	8 oz. S. F.	10 oz. S. F.	12 oz. S. F.	8 oz. D. F.	10 oz. D. F.	12 oz. D. F.	8 oz. U. S. A.	10 oz. U. S. A.	12 oz. U. S. A.
7x 7	6 1/2	3	\$10.65	\$12.75	\$14.85	\$11.50	\$13.75	\$16.10	\$13.45	\$16.00	\$18.20
7x 9-4	6 1/2	3	12.95	15.50	18.05	13.95	16.70	19.55	16.35	19.40	22.10
7x11-8	6 1/2	3	15.20	18.20	21.20	16.40	19.60	23.00	19.20	22.50	26.00
8x10	6 1/2	3	14.10	16.85	19.65	15.20	18.15	21.30	17.80	21.10	24.05
8x11-8	6 1/2	3	15.60	18.65	21.75	16.85	20.10	23.60	19.70	23.40	26.65
9-4x9-4	7	3	15.60	18.65	21.75	16.85	20.10	23.60	19.70	23.40	26.65
9-4x11-8	7	3	18.25	21.85	25.45	19.70	23.55	27.60	23.05	27.40	31.20
9-4x14	7	3	20.55	24.60	28.65	22.15	26.50	31.05	25.95	30.80	35.10
11-8x11-8	8	3 1/2	22.80	27.30	31.80	24.60	29.40	34.50	28.80	34.20	39.00
11-8x14	8	3 1/2	25.50	30.50	35.55	27.50	32.85	38.55	32.20	38.20	43.55
11-8x16-4	8	3 1/2	28.35	33.90	39.50	31.40	37.50	44.00	36.75	43.60	49.75
11-8x18-8	8	3 1/2	31.20	37.35	43.50	34.85	41.65	48.90	40.80	48.45	55.25
11-8x21	8	3 1/2	34.20	40.95	47.70	38.15	45.60	53.50	44.65	53.05	60.45
11-8x23-4	8	3 1/2	37.25	44.60	51.95	41.45	49.50	58.10	48.50	57.60	65.65
14x14	9	4	30.80	36.85	42.95	33.25	39.70	46.60	38.90	46.20	52.65
14x16-4	9	4	34.20	40.95	47.70	37.75	45.10	52.90	44.20	52.45	59.80
14x18-8	9	4	37.65	45.05	52.50	41.85	50.00	58.55	49.00	58.15	66.30
14x21	9	4	41.05	49.15	57.25	45.55	54.40	63.85	53.30	63.30	72.15
14x23-4	9	4	44.10	52.80	61.50	49.20	58.80	69.00	57.60	68.40	78.00
16-4x16-4	10 1/2	5	42.20	50.50	58.85	46.75	55.90	65.55	54.75	65.00	74.10
16-4x18-8	10 1/2	5	46.40	55.55	64.70	51.25	61.25	71.90	60.00	71.25	81.25
16-4x21	10 1/2	5	50.00	59.85	69.70	55.35	66.15	77.65	64.80	76.95	87.75
16-4x23-4	10 1/2	5	54.35	65.05	75.80	59.90	71.55	83.95	70.10	83.25	94.90
16-4x30-4	10 1/2	5	72.00	85.00	99.00	77.40	91.80	107.00	90.00	106.20	120.60
16-4x35	10 1/2	5	80.40	95.50	110.55	86.45	102.50	119.60	100.50	118.60	134.70
18-8x18-8	11	5	62.10	72.35	82.65	67.40	79.60	92.80	77.20	91.00	105.00
18-8x21	11	5	66.25	77.35	87.45	71.95	84.00	97.85	81.10	95.15	109.15
18-8x13-4	11	5	61.20	72.35	82.65	67.40	79.60	92.80	77.20	91.00	105.00
18-8x30-4	11	5	80.00	95.00	110.00	86.00	102.00	119.00	100.00	118.00	134.00
18-8x35	11	5	89.20	105.95	122.65	95.90	113.75	132.70	111.55	131.60	149.45
18-8x42	11	5	102.40	121.60	140.80	110.10	130.00	152.30	128.00	151.05	171.55
21x21	12	5	61.95	74.20	86.40	68.10	81.35	95.45	79.70	94.65	107.90
21x23-4	12	5	67.30	80.55	93.85	73.40	87.75	102.95	85.95	102.05	116.35
21x30-4	12	5	86.80	103.10	119.35	93.35	110.70	129.15	108.50	128.05	145.40
21x35	12	5	97.20	115.45	133.65	104.50	123.95	144.60	121.55	143.40	162.85
21x42	12	5	112.40	133.60	154.55	120.85	143.30	167.20	140.80	165.80	188.30
21x49	13	5	126.80	150.60	174.35	136.35	161.70	188.65	158.50	187.10	212.45
23-4x28	13	5	92.00	109.25	126.50	98.90	117.90	136.85	115.00	135.70	154.10
23-4x30-4	13	5	97.20	115.45	133.65	104.50	123.95	144.55	121.50	143.40	162.80
23-4x35	13	5	108.40	128.75	149.05	115.55	138.20	161.25	135.50	159.30	181.60
23-4x42	13	5	123.55	145.80	169.95	132.90	157.60	183.85	154.50	182.30	207.00
23-4x49	13	5	141.20	167.65	194.15	151.80	180.00	210.00	176.50	208.25	235.50
23-4x56	13	5	157.20	186.65	216.15	189.00	200.45	233.85	196.50	231.90	263.30
23-4x63	13	5	172.40	204.75	237.05	185.55	219.80	256.45	215.50	254.30	288.80

Regular Flies which extend 6 inches over the eaves of tents will be furnished without poles at one-half the price of the tent.

If higher walls than list specifies are wanted, add 5% to list for each additional 6 inches. Sod cloths of 8 oz. S. F., 9 inches wide, sewed around the bottom of tent wall at 2 1/2 cents per lineal foot net. Jointed poles uprights, 50 cents for each joint; ridge poles, 75 cents for each joint.

U. S. Army Khaki Duck Tents



Our khaki tents are the highest grade in every respect, being made of the genuine U. S. Army khaki duck, as described on page 6. The khaki color makes them more desirable than the ordinary white tents because it does not absorb the sun's rays as much. It does not attract insects in the same manner and soils less easily.

We pay special attention to finishing these tents in the very finest way. They are fitted with pure manila rope and hand sewed galvanized rings which will not cut or tear the duck. A tent of this kind will give better satisfaction and outwear any other tent made.

Price List of Wall Tents Made of U. S. Army Khaki Duck

Length and Breadth, Feet	Height of Wall, Feet	Height of Center Pole, Feet	8-oz. Khaki Drill	8-oz. Khaki Duck	10-oz. Khaki Duck	12-oz. Khaki Duck	Length and Breadth, Feet	Height of Wall, Feet	Height of Center Pole, Feet	8-oz. Khaki Drill	8-oz. Khaki Duck	10-oz. Khaki Duck	12-oz. Khaki Duck
7 x 7	3	6½	\$17.30	\$18.20	\$20.70	\$23.00	14 x 23-4	4	9	\$67.70	\$71.20	\$82.00	\$91.50
7 x 9-4	3	6½	20.50	21.80	25.00	27.50	16-4x16-4	5	10½	79.50	72.80	43.20	91.80
9-4x9-4	3	7	25.00	26.20	30.00	33.30	16-4x18-8	5	10½	74.40	78.00	89.00	96.50
9-4x11-8	3	7	28.30	29.70	37.00	38.00	16-4x21	5	10½	79.00	82.80	94.50	104.50
9-4x14	3	7	31.60	33.20	38.20	42.70	16-4x23-4	5	10½	90.50	94.60	105.40	119.40
11-8x11-8	3½	8	33.20	35.00	40.80	45.00	16-4x30-4	5	10½	110.30	115.20	128.80	145.50
11-8x14	3½	8	37.60	39.60	46.30	51.00	16-4x35	5	10½	123.50	129.20	147.50	162.80
11-8x16-4	3½	8	42.00	44.00	51.00	56.70	18-8x18-8	5	11	80.40	84.00	96.00	106.00
11-8x18-8	3½	8	45.80	48.20	55.60	62.00	18-8x21	5	11	86.00	90.00	102.50	113.00
14 x14	4	9	46.20	48.50	55.90	62.50	18-8x23-4	5	11	99.40	104.00	118.70	131.00
14 x16-4	4	9	51.00	53.50	61.80	68.80	18-8x30-4	5	11	120.70	126.00	144.00	159.00
14 x18-8	4	9	54.30	57.00	66.00	73.00	18-8x35	5	11	134.80	142.50	161.00	177.80
14 x21	4	9	58.50	61.40	69.00	78.80	18-8x42	5	11	150.30	157.20	179.50	198.00

Somerset Silk Wall Tents

These so-called silk tents are made of a special fabric woven from the best quality of carefully prepared Sea Island cotton, with silk finish. This material is very light—a little less than half the weight of 8-ounce duck—but closely woven. Tents made of Somerset silk can be packed very small and are ideal for outing where space and light weight are desired; for instance on a canoe trip.

We quote on the following small sizes of wall tents where we know this material is desirable and will prove satisfactory.

Price List of Wall Tents Made of Somerset Silk

Size, Feet	Height of Pole, Feet	Height of Wall, Feet	Price Each	Size, Feet	Height of Pole, Feet	Height of Wall, Feet	Price Each
7 x 7	3	6½	\$21.20	9-4x14	3	7	\$39.00
7 x 9-4	3	6½	25.50	11-8x11-8	3½	8	41.00
9-4x9-4	3	7	30.50	11-8x14	3½	8	46.50
9-4x11-8	3	7	34.50				

Our Prices Include Poles, Stakes and Guy Ropes. Tents Are Packed in Heavy Canvas Bags.

Prices given above are for pole ridges; rope ridges can be furnished at 5 per cent additional cost.

If poles are not wanted we will allow a 5 per cent deduction from the price of an 8 oz. khaki drill tent.

Flies are not included in the above prices, but we will furnish them for one-half the price of tent of corresponding size and weight of duck. Double flies cost same price as tent.

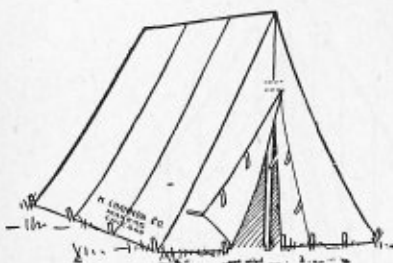
Windows, stovepipe holes and mosquito and fly proof fronts furnished for any of our tents. See pages for prices. If higher walls are desired add 5 per cent for each 6 inches of wall.

Prices on larger sized wall tents quoted on application.

We have a special catalog on tents, canvas goods and campers' supplies. Send for it.

A or Wedge Tents

Complete with Poles, Stakes and Guy Ropes

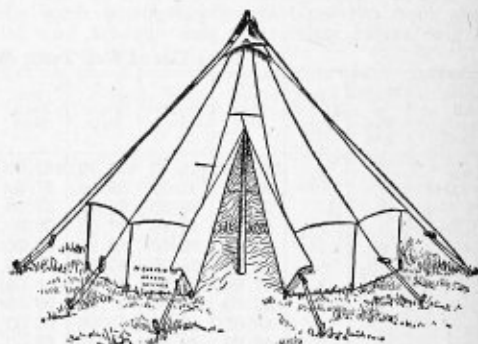


Size	Height of Pole	8-oz. S. F.	10-oz. S. F.	12-oz. S. F.	10-oz. D. F.	12-oz. D. F.
5 x 7	6	\$ 6.66	\$ 8.05	\$ 9.43	\$ 8.74	\$10.26
7 x 7	7	8.82	10.66	12.50	11.58	13.60
7 x 9	7	10.80	13.05	15.30	14.18	16.65
9 x 9	7	12.24	14.79	17.34	16.07	18.87
9½ x 12	7	14.22	17.18	20.14	18.66	21.92
12 x 12	8	17.28	20.88	24.48	22.68	26.64
12 x 14	8	20.16	24.36	28.56	26.46	31.08
Army						
5 x 7	6	\$ 8.52	\$10.17	\$11.66		
7 x 7	7	11.27	13.47	15.43		
7 x 9	7	13.80	16.50	18.90		
9 x 9	7	15.64	18.70	21.42		
9½ x 12	7	18.17	21.72	24.88		
12 x 12	8	22.08	26.40	30.24		
12 x 14	8	25.76	30.80	35.28		

Sibley Tents with Walls

With 2 ft. 6 in. Wall, Complete with Poles, Stakes and Guy Ropes

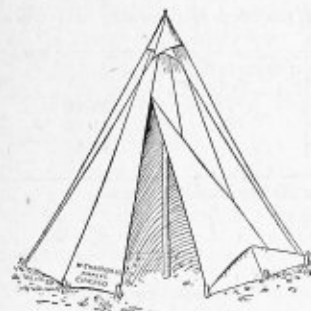
Diam.	Goods	Height of Pole, Feet	8-oz.	10-oz.	12-oz.
10-ft.	S. F. Duck	8	\$12.54	\$15.02	\$17.49
12-ft.	S. F. "	9	15.20	18.20	21.20
14-ft.	S. F. "	10	18.62	22.30	25.97
16-ft.	S. F. "	11	24.70	29.58	34.46
20-ft.	S. F. "	13	36.86	44.14	51.41
10 ft.	D. F. "	8	13.53	16.25	18.98
12 ft.	D. F. "	9	16.40	19.70	23.00
14 ft.	D. F. "	10	20.09	24.13	28.18
16 ft.	D. F. "	11	26.65	32.61	37.38
20-ft.	D. F. "	13	39.77	47.77	55.78
10-ft.	Army "	8	15.84	19.81	21.45
12-ft.	Army "	9	19.20	23.80	26.00
14-ft.	Army "	10	23.52	27.93	31.85
16-ft.	Army "	11	31.20	37.05	42.25
20-ft.	Army "	13	46.56	55.29	63.05



Sibley Tent with Wall

Sibley Tents Without Wall

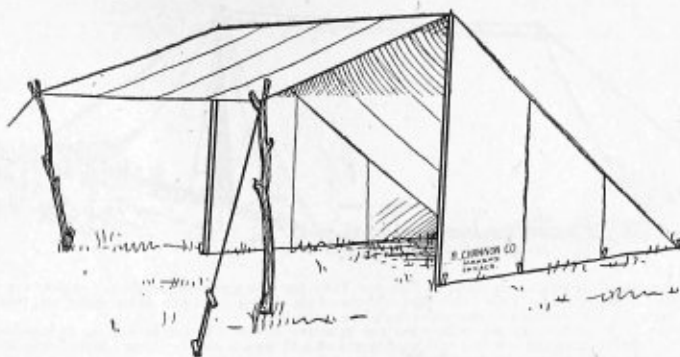
Complete with Poles, Stakes and Guy Ropes



Cut Shows Tent Without Wall

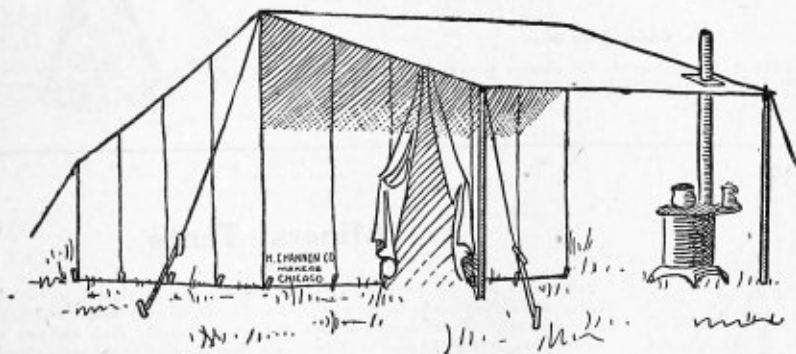
Diam.	Goods	Height of Pole, Feet	8-oz.	10-oz.	12-oz.
5-ft.	S. F. Duck	5½	\$ 3.04	\$ 3.64	\$ 4.24
7-ft.	S. F. "	7	5.70	6.83	7.95
10-ft.	S. F. "	8	9.12	10.92	12.72
12-ft.	S. F. "	9	12.54	15.02	17.49
14-ft.	S. F. "	10	16.72	20.02	23.32
16-ft.	S. F. "	11	20.14	24.12	28.00
5-ft.	D. F. "	5½	3.28	3.94	4.60
7-ft.	D. F. "	7	6.15	7.39	8.63
10-ft.	D. F. "	8	9.84	11.82	13.80
12-ft.	D. F. "	9	13.53	16.25	18.98
14-ft.	D. F. "	10	18.04	21.67	25.30
16-ft.	D. F. "	11	21.73	26.10	30.48
5-ft.	Army "	5½	3.84	4.56	5.20
7-ft.	Army "	7	7.20	8.55	9.75
10-ft.	Army "	8	11.52	13.68	15.60
12-ft.	Army "	9	15.84	18.81	21.45
14-ft.	Army "	10	21.12	25.08	28.60
16-ft.	Army "	11	25.44	30.21	34.45

Lumberman's or Herders' Tents



Size, Feet	Height of Poles, Feet	8-oz. Single Filling Duck	10-oz. Single Filling Duck	10-oz. Double Filling or 8-oz. Army	12-oz. Double Filling or 10-oz. Army	Somerset Silk	8-oz. Khaki Drill	8-oz. Khaki Duck	10-oz. Khaki Duck	12-oz. Khaki Duck
9 x 9	7	\$13.60	\$16.20	\$17.74	\$20.66	\$23.50	\$19.90	\$20.80	\$24.00	\$26.60
9 x 12	7	16.40	19.50	21.30	25.00	28.30	24.00	25.30	29.00	32.20
9 x 14	7	18.80	22.50	24.50	28.60	32.40	27.60	29.00	33.20	36.80
9 x 16 1/2	7	21.20	25.20	27.60	32.20	36.40	31.20	32.60	37.50	41.50
9 x 19	7	23.60	28.00	30.80	36.00	40.60	34.70	36.40	41.70	46.50
9 x 21	7	26.00	30.80	33.90	39.50	44.80	38.20	39.90	45.90	51.00
9 x 23 1/2	7	28.40	33.50	37.00	43.20	48.80	41.60	43.70	50.00	55.50

Amazon Tents

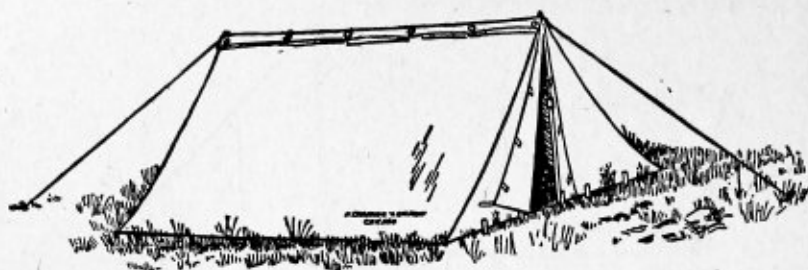


Amazon Tents Complete With Poles, Stakes and Guy Ropes

Size, Feet	Height of Pole	Height of Wall	8-oz. S. F.	10-oz. S. F.	10-oz. D. F.	12-oz. D. F.
7 x 7	8	3	\$15.58	\$18.66	\$20.20	\$23.58
7 x 9	8	3	19.38	23.21	25.12	29.32
7 x 12	8	3	23.18	27.76	30.04	35.08
9 x 9	9	3	23.18	27.76	30.04	35.08
9 x 12	9	3	27.36	32.76	35.46	41.40
9 x 14	9	3	31.54	37.76	40.88	47.73
9 x 16	9	3	35.72	42.77	46.30	54.05

H. Channon Company Chicago

Scout or Shelter Tents



Here's just the tent you want when you go camping or fishing. They are also used for temporary shelter for troops, made in two sections that button together along the ridge pole. One tent affords ample shelter from the damp night air, from rain and wind, for two persons, each soldier carrying one section and one pole; the poles are spliced.

Just the kind of a tent the U. S. soldiers use when they are out in active service. It can be put up or knocked down in a minute. Every boy scout—every boy—who loves outdoor life and adventures should own a shelter tent. Size 5 feet 3 inches long, 3 feet 8 inches wide, 3 feet 9 inches high. Can be sent by parcel post.

No. 1 special white cloth; weight 9 lbs. Each.....\$5.00
No. 2 special khaki cloth; weight 9½ lbs. Each.....6.00

No. 3 yacht drill; weight 10 lbs. Each.....\$7.50
No. 4 khaki drill; weight 11 lbs. Each.....9.50

Channon's Wigwams

A practical wigwam made on the style of the Indian tepee without a center pole, thus affording a large free floor space.

The canvas is supported by a tripod, the poles of which are hinged in the center. Thus the entire outfit can be folded, wrapped in a bundle and carried like a gun.

Each wigwam is decorated in Indian designs, is 7 feet 6 inches high, 7 feet 6 inches in diameter and weighs 12 pounds when packed in canvas bag.

Price of Outfit

No. 1. Extra heavy white drill.....\$ 9.00
No. 2. 8-ounce white duck.....10.00
No. 3. Standard colored drill.....10.00

No. 4 Special for Boys

Made of heavy sheeting and decorated, this wigwam is suitable for boys' play. Is 4 feet high, 5 feet in diameter and weighs 4 pounds packed.

Price, including tripod and canvas.....\$3.00



Miners' Tents

Particularly intended for miners and prospectors, but invaluable to the canoeist and camper who is continually on the move. These tents are very simple and light in weight, and can be conveniently carried as part of a personal outfit. Only one pole is needed for erecting the tent, and the general shape is such that the pitch of the walls allows the canvas to shed water more readily than any other style of tent made.

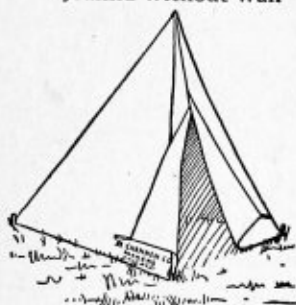
Miner's Tents—Without Walls

Size	Height of Pole	8-oz. S. F.	10-oz. S. F.	12-oz. S. F.	10-oz. D. F.	12-oz. D. F.	8-oz. Army	10-oz. Army	12-oz. Army	15-oz. Army
5 x 5	6	\$ 3.42	\$ 4.13	\$ 4.85	\$ 4.48	\$ 5.27	\$ 4.37	\$ 5.23	\$ 5.99	\$ 7.34
7 x 7	7	6.30	7.61	8.93	8.27	9.71	8.05	9.63	11.03	13.52
7 x 9	7	7.56	9.14	10.71	9.92	11.66	9.66	11.55	13.23	16.22
9 x 9	7	9.00	10.88	12.75	11.81	13.88	11.60	13.75	15.75	19.31
12 x 12	8	12.96	15.66	18.36	17.02	19.98	16.56	19.80	22.68	27.81

Canoe or Automobiling Tents

As an aid in the selection of an automobilist or canoeist tent, we have listed on this page a line of tents that may easily be carried on the baggage rack of a touring car or in a canoe, and without being dependent upon a hotel for sleeping accommodations. All the tents listed below are made from a fabric called Somerset silk, which although is light in weight, weighing only 3½ ounces to the yard, is strong and perfectly water and wind proof; it is a light khaki color, absolutely fast, will not fade under any conditions and is less sensible than white to the glare of a strong sun. You can make no mistake in ordering any one of these tents.

Pyramid Without Wall



Pyramid—without wall. These tents are very simple to erect, having only one pole. The pitch of the wall allows the canvas to shed water more readily than any other style of tent made.

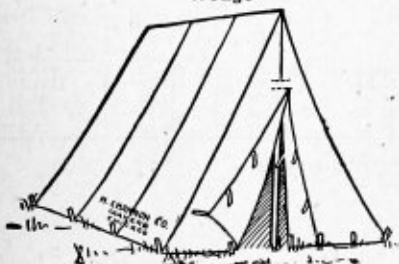
Size 7x7 ft., 7 ft. high, weight 5 lbs., each...\$11.80

Size 9x9 ft., 8 ft. high, weight 7 lbs., each...17.80

Size 12x12 ft., 9 ft. high, weight 9 lbs., each...26.00

With spliced center pole \$1.50 extra.

Wedge



Wedge. This is a pattern similar to a wall tent, but without walls, and is widely used by campers, canoeists and those who require a tent that can be quickly erected. The poles may be dispensed with entirely and cut from a convenient thicket at the time of each erection. When poles are not wanted, deduct 5% from the following prices.

Size 5x7 ft., 6 ft. high, weight 5 lbs., each....\$13.80

Size 7x7 ft., 7 ft. high, weight 7 lbs., each....17.20

Size 7x9 ft., 7 ft. high, weight 8 lbs., each....22.50

Size 9x9 ft., 7 ft. high, weight 9 lbs., each....23.40

Rope ridge furnished at an additional cost... 1.00



Pyramid With Wall



Pyramid—with walls. Especially adapted for those who wish a roomy tent at a small cost. It has only one pole and is easy to erect. The walls are 2½ feet high.

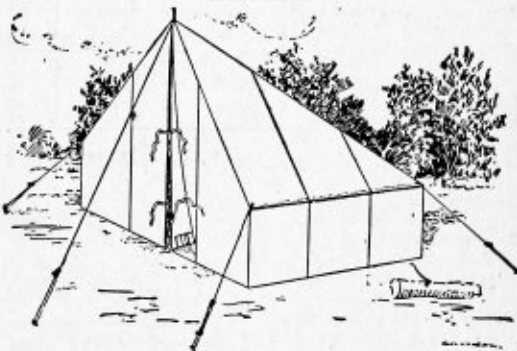
Size 7x7 ft., 7 ft. high, weight 6 lbs., each...\$17.00

Size 9x9 ft., 8 ft. high, weight 9 lbs., each...22.80

Size 12x12 ft., 9 ft. high, weight 13 lbs., each...33.50

With spliced center pole \$1.50 extra.

Autocanoe



The large sleeping capacity as compared with the small size when folded makes this a most popular style of tent. Only a single pole is necessary to rig it, and while the size, including stakes, joined pole and ropes is only 42x8 inches when folded, the floor space when set up is 5x7 feet.

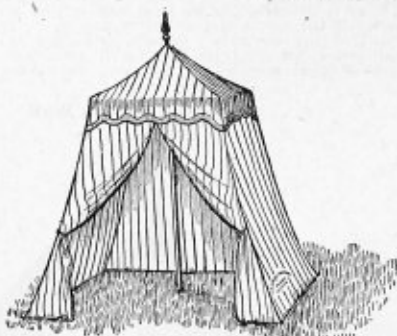
Size 5x7 feet, 7 feet high, 2½ foot wall, weight 9 lbs., each\$19.00

Protean

This form of tent is very popular with canoeist as well as with those who wish a tent for automobilizing. It has but one pole and is easily erected. The pole is jointed and when wrapped in the tent makes a small package.

Size, Feet	Height, Feet	Wall, Feet	Weight, Lbs.	Price
5x7½	6	1½	6	\$17.00
7½x7½	7	2	10	21.50
7½x9½	7½	3	12	24.00
9½x9½	7½	3	13	27.50

Palmetto Tents



Without Awning Extension



With Awning Extension

Palmetto Lawn Tents—Without Awning Extension

Complete with Poles and Stakes

Size of Base	Size of Top	Height of Side	Height of Pole	8-oz. S. F.	10-oz. S. F.	10-oz. D. F.	Duplex Stripe	Red and White, Blue and White, Stripe or Brown and White Army
5 x 5	2 ft.	4 ft. 6 in.	6	\$ 5.20	\$ 6.18	\$ 6.66	\$ 6.76	\$ 8.32
7 x 7	2 ft. 4 in.	6 ft.	7-6	8.80	10.45	11.28	11.44	14.08
8 x 8	2 ft. 4 in.	6 ft. 6 in.	8	10.00	11.88	12.81	13.00	16.00
9 x 9	3 ft. 6 in.	7 ft.	8-6	13.60	16.15	17.43	17.68	21.76

Palmetto Lawn Tents—With Awning Extension

Complete with Poles and Stakes

Size of Base	Size of Top	Height of Side	Height of Pole	8-oz. S. F.	10-oz. S. F.	10-oz. D. F.	Duplex Stripe	Red and White, Blue and White, Stripe or Brown and White Army
7 x 7	3 ft. 6 in.	6 ft. 6 in.	8	\$11.76	\$13.86	\$14.91	\$15.12	\$18.48
8 x 8	3 ft. 6 in.	6 ft. 6 in.	8	13.44	15.84	17.04	17.28	21.12
9 x 9	4 ft. 8 in.	7 ft.	9	16.38	19.31	20.77	21.06	25.74
10 x 10	4 ft. 8 in.	8 ft.	10	18.48	21.78	23.43	23.76	29.04
12 x 12	5 ft. 6 in.	8 ft.	10	21.00	24.75	26.63	27.00	33.00

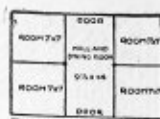
Square Hip Roof Tents



Square Garden Tent Complete with Poles, Stakes and Guy Ropes

Size	Height of Pole	Height of Wall	8-oz. S. F.	10-oz. S. F.	12-oz. S. F.	12-oz. D. F.	12-oz. D. F.	10-oz. Army	12-oz. Army	15-oz. Army
7 x 7	9-6	6	\$20.88	\$24.14	\$27.41	\$26.77	\$29.36	\$29.15	\$32.63	\$38.82
9 x 9	10	6	28.32	32.75	37.17	34.96	39.83	39.53	44.25	52.46
9 x 12	10	6	31.44	36.35	41.27	38.82	44.21	43.89	49.13	58.30
12 x 12	11	6	38.40	44.40	50.40	47.40	54.00	53.60	60.00	71.40
12 x 14	11	6	42.72	49.40	56.07	52.73	60.08	59.63	66.75	79.43
14 x 14	12	6	48.00	55.50	63.00	59.25	67.50	67.00	75.00	89.25
16 x 16	13	6	72.60	81.68	90.75	86.21	96.20	95.59	105.27	123.81
18 x 18	14	6	87.60	98.55	109.50	104.03	116.07	115.34	127.02	147.83
20 x 20	14	6	98.40	110.70	123.00	116.85	130.39	129.56	142.65	166.05
24 x 24	15	6	127.80	143.76	159.75	151.76	169.34	168.27	185.31	215.66
30 x 30	15	6	177.00	199.13	221.25	210.19	234.53	233.05	256.65	298.69
40 x 40	20	6	279.00	313.88	348.75	331.31	369.68	367.35	404.55	470.81

Compartment Tents

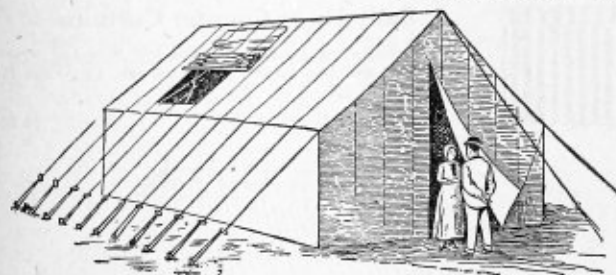


This is the most desirable tent made for families or large parties. It is divided off into separate rooms, insuring privacy, or the whole may be thrown into a large single tent. We make them both of white and striped duck. The awning is part of the wall, which can be raised on one side of the tent to give shade and free circulation of air. When lowered and secured it is absolute protection against the weather. The partitions for the rooms are of sheeting, same height as the wall, attached to cords stretched from center poles to sides and ends. You can make no mistake in purchasing a compartment tent, as absolute freedom is assured, together with all the comforts of your own home.

Hip Roof Family Compartment Tents, Complete with Poles, Stakes and Guy Ropes

Size	Height of Pole	Height of Wall	8-oz. S. F.	10-oz. S. F.	12-oz. S. F.	8-oz. D. F.	10-oz. D. F.	12-oz. D. F.	10-oz. Army	12-oz. Army	15-oz. Army
9 x 18½	10	6	\$41.40	\$48.15	\$ 54.90	\$44.10	\$ 51.53	\$ 58.95	\$ 58.50	\$ 65.70	\$ 78.53
12 x 19	11	6	49.68	57.78	65.88	52.92	61.83	70.74	70.20	78.84	94.23
12 x 21	11	6	54.28	63.13	71.98	57.52	67.56	77.29	76.70	86.14	102.96
14 x 21	12	6	59.80	69.55	79.30	63.70	74.43	85.15	84.50	94.90	113.43
14 x 23	12	6	65.55	76.24	86.93	69.83	81.59	93.33	92.62	104.03	124.33
16 x 23	13	6	72.22	84.00	95.77	76.93	89.88	102.84	102.05	114.61	135.98
16 x 26	13	6	77.74	90.42	103.10	82.81	96.75	110.70	109.88	123.37	147.45
16 x 28	13	6	83.26	96.94	110.41	88.69	103.62	118.55	117.65	132.13	157.92

Photographers' Tents



The photographers' tents are fitted with single or double skylight openings, extending close to the eaves of the tent, or down the wall, and furnished with flap for a covering when not in use. The greatest care in the manufacture of photographers' tents is necessary. Most tents of this description are made similar to wall tents, and can therefore be sold at wall tent prices. Ours are the result of careful thought and in accordance with the ideas of the most experienced photographers. They embody all the practical details of such a tent, and are the best photographers' tents made at the present time. Particular attention is given to the

finish of the tent, which adds to its attractiveness. Dark room complete with four poles to set up 4½x4½ feet, \$5.00 each. 6x6 feet, \$6.00 each. Additional skylight or sidelight, 75 cents each extra.

Photographer's Tents Complete with Poles, Stakes, Guy Ropes and Keys

Size	Height of Pole	Height of Wall	8-oz. S. F.	10-oz. S. F.	12-oz. S. F.	10-oz. D. F.	12-oz. D. F.
12 x 14	11	6	\$40.92	\$ 47.90	\$ 54.87	\$ 51.38	\$ 59.06
12 x 16	11	6	45.32	53.05	60.77	56.91	65.41
12 x 18	11	6	49.72	58.20	66.67	62.43	71.76
12 x 21	11	6	54.12	63.35	72.57	67.96	78.11
12 x 24	11	6	58.52	68.50	78.47	74.48	84.46
12 x 28	11	6	66.00	77.25	88.50	82.88	95.25
12 x 30	11	6	70.40	82.40	94.40	88.40	101.60
14 x 16	12	6	51.92	60.77	69.62	65.20	74.93
14 x 18	12	6	56.76	66.44	76.11	71.27	81.92
14 x 21	12	6	61.60	72.10	82.60	77.35	88.90
14 x 24	12	6	66.44	77.76	89.09	83.43	96.89
14 x 28	12	6	76.12	89.10	102.07	95.58	109.86
14 x 30	12	6	80.96	94.76	108.56	101.66	116.84
16 x 18	13	6	62.48	73.13	83.78	78.46	90.17
16 x 21	13	6	68.64	80.34	92.04	86.19	99.06
16 x 24	13	6	73.92	86.52	99.12	92.82	106.68
16 x 28	13	6	84.92	99.40	113.88	106.63	122.56
16 x 30	13	6	89.76	105.06	120.36	112.71	129.54

Concession Tents



Very practical design for concession men at fairs, carnivals, amusement parks and outdoor occasions.

Can be put up or taken down quickly and easily packed for shipment. Roped on eaves and gables.

Prices include seven foot loose side walls made in two pieces. The back and sides form one piece and the front the other so that it can be taken off easily when not in use. Walls are fitted for snapping or lacing together at the corners as desired. A 14-inch scalloped bound curtain or border goes all around the eave, and for the front we supply a scalloped counter curtain 2 ft. 6 in. high. We do not furnish frames.

Hip Roof or Gable End Style

Size, feet		8 oz. Red, White and Blue	10-oz. D. F. White or 8 oz. Solid Red or Blue	Common Blue or Brown Stripe	Fancy Blue or Brown Stripe
Length in Front	Depth of Ends				
10	8	\$33.20	\$39.30	\$41.40	\$47.50
12	10	34.00	40.20	44.00	51.00
12	12	39.20	46.20	50.00	58.80
14	12	43.00	51.20	55.40	64.40
15	12	57.40	56.00	61.00	71.00



Bally-Ho or Counter Curtains

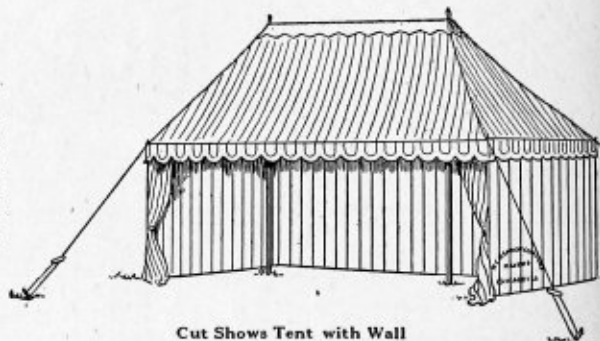
Attractive patterns, red and white and blue and white stripe, with scalloped border. Height 3 feet with rings to attach to Bally-Ho.

Price, per running foot.....\$0.30

Refreshment Tents

With Portable Walls

This style of tent is used at fairs, carnivals and outdoor gatherings for vending purposes. It is very convenient, and when striped duck is used it has a very attractive appearance. You are always assured of the very best when you order tents from us. Our refreshment tents are particularly fine examples of the tent maker's art.



Cut Shows Tent with Wall

Size	Height of Pole	Height of Wall	8-oz. S. F.	10-oz. S. F.	10-oz. D. F.	12-oz. D. F.	Duplex Stripe	Army Stripe
9x14.....	10	7	\$41.76	\$48.29	\$51.55	\$58.73	\$52.20	\$62.64
9x16.....	10	7	46.56	53.84	57.47	65.48	58.20	69.84
9x19.....	10	7	51.36	59.39	63.40	72.23	64.20	77.04
12x16.....	11	7	53.76	62.16	66.36	75.60	67.20	80.64
12x19.....	11	7	59.04	68.27	72.88	83.03	73.80	88.56
12x21.....	11	7	64.32	74.37	79.40	90.45	80.40	96.48
14x21.....	12	7	72.00	83.26	88.88	101.25	90.00	108.00
14x23.....	12	7	77.76	89.91	95.99	109.35	97.20	116.64

Garage Tents



Portable Automobile Garage

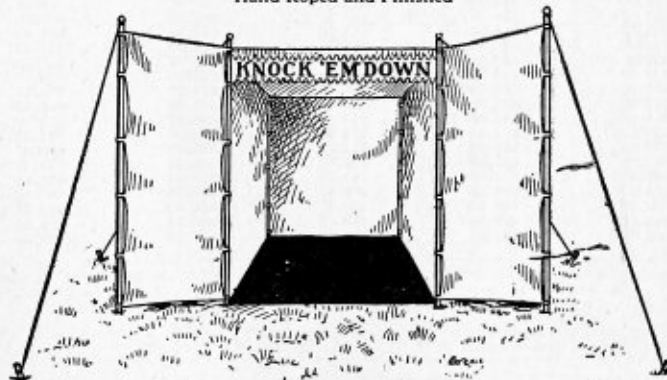
These tents are made for use over frames and are re-inforced along the ridge and eaves and wherever the frame comes in contact with the tent. A rear door is placed in each tent, unless otherwise ordered.

Size, Feet	Height of Center, Feet	Height of Wall, Feet	10-oz. Army Duck	12-oz. Army Duck	10-oz. Khaki Duck	12-oz. Khaki Duck
11½ x 11½	11	7	\$45.00	\$ 49.00	\$ 56.50	\$ 61.10
11½ x 13½	11	7	51.30	55.00	64.00	69.00
13½ x 13½	12	7	57.40	65.00	71.50	71.50
16½ x 13½	12	7	66.80	75.00	83.50	90.00
16½ x 20½	13	7	91.80	102.50	114.50	124.00
16½ x 23	13	7	97.60	108.30	134.00	131.80

Note.—Prices do not include frames. These should be made by your local carpenter.

Doll Rack Tents

Hand Roped and Finished



Especially designed for doll rack men needing a tent for street fair work. Strongly constructed; fitted with loops for round poles and furnished with an attractive scalloped curtain on top in front as shown in cut. Prices include doors and an incline return for balls, but not poles.

Price List of Doll Rack Tents

Width in Front, Feet	Width in Back, Feet	Height in Front, Feet	Height in Back, Feet	Depth, Feet	8-oz. White	8-oz. Solid Red	8-oz. Solid Yellow	Blue and White Stripes
7½	7½	10	8	7	\$25.50	\$30.50	\$30.50	\$30.50
9	7½	10	8	7	31.00	36.50	36.50	36.50
12	9	10	8	7	34.70	41.00	41.00	41.00
12	9	11	8	7	36.00	43.00	43.00	43.00

Black Tents

For Moving Picture Work.



Style No. 1

Round end front. Gable end back.



Style No. 2

Hip roof end front. Gable end back.



Style No. 3

Round end front. Hip roof end back.



Style No. 4

Round end front. Back end with two section poles as shown.

For moving picture work our black tents are unsurpassed. We make them of black duck either lined or unlined as may be desired and exercise the greatest care in cutting, sewing and finishing them in order to furnish the strongest and most serviceable tent it is possible to make for show purposes. Every tent is thoroughly roped with pure Manila rope and fitted with a full width plain curtain on the inside and a half width scalloped border on the outside. Sod cloth runs all around bottom of wall.

All sizes up to and including 28x65 are made in any of the styles 1, 2 or 3, but the sizes larger than this are made with two round ends the same as show tents.

We make our black tent linings of either black canton flannel or heavy black drill and sew them securely to the tent. This produces an absolutely dark tent. If lining is desired only for the top or walls and not throughout write us for special prices.

Price List of Black Tents, Styles 1, 2 or 3

Size, Feet	UNLINED			LINED		
	8-oz.	10-oz. Top 8-oz. Walls	10-oz.	8-oz.	10-oz. Top 8-oz. Walls	10-oz.
20 x 40	\$220.80	\$233.00	\$251.20	\$342.50	\$361.00	\$372.50
20 x 50	281.00	294.00	319.50	434.00	455.50	473.00
20 x 60	303.00	320.00	352.50	480.00	503.50	522.00
20 x 70	353.50	396.00	413.00	562.50	590.00	612.00
22 x 55	315.00	341.50	358.50	288.00	312.00	330.00
22 x 60	321.50	351.00	382.00	302.00	325.00	346.50
22 x 70	373.50	405.00	427.00	379.00	406.00	430.00
24 x 40	242.80	262.50	274.50	376.50	392.50	409.50
24 x 48	284.50	309.50	324.50	441.00	462.00	479.50
24 x 54	320.00	347.20	364.00	496.00	520.50	540.00
24 x 60	342.00	371.00	389.00	529.50	555.00	576.00
24 x 65	358.00	389.50	411.00	554.00	582.00	603.00
28 x 54	347.00	378.00	394.50	536.50	564.00	584.00
28 x 65	405.50	442.00	461.00	623.50	659.50	684.00
30 x 60	376.00	399.00	416.50	566.50	594.50	617.50
30 x 72	419.50	456.00	477.00	650.00	682.50	707.50
60 x 00	429.50	469.00	489.00	666.50	699.50	720.00
00 x 00	429.00	467.50	487.80	663.00	703.50	723.60

All the above tents are made with ten-foot side walls. Prices include poles, stakes and guy ropes. Tents are complete, ready to set up.

Be sure to state what style of tent you want when ordering.

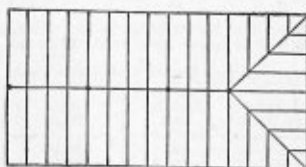
Prices on Style 4 quoted on application.

All other styles or sizes quoted on according to your specifications.

Chafing sacks with roped handles preserve your tents. Prices on application.



Style 1

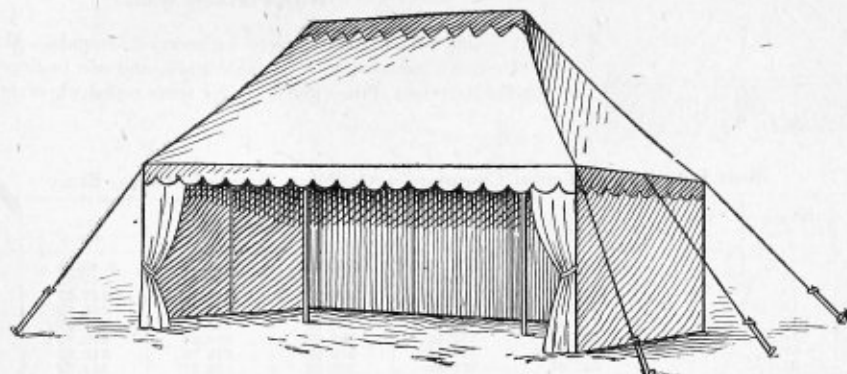


Style 2



Style 3

Grave Tents



Price List of Grave Tents Without Walls

Size, Feet	Height of Wall Feet	Height of Center Feet	Number of Side Poles	Number of Center Poles	Our Prices Include Poles, Stakes and Guy Ropes. Tents Are Complete, Ready to Set Up.		
					8-oz. Single Filling Duck	10-oz. Single Filling Duck	12-oz. Single Filling Duck
7 x12	5	8	4	2	\$13.60	\$15.70	\$17.60
7 x14	5	8	4	2	15.00	17.30	19.50
9 x14	6	10	10	2	16.80	19.40	21.60
9 x16 ¹ / ₂	6	10	10	2	19.00	21.50	24.00
9 x19	6	10	10	2	21.80	25.00	28.00
12 x19	6	11	10	2	27.20	31.20	34.80
12 x21 ¹ / ₂	6	11	12	2	31.20	35.60	39.60
14 x21 ¹ / ₂	6	12	12	2	33.60	38.50	43.20
14 x23 ¹ / ₂	6	12	12	2	39.50	45.50	50.80
16 ¹ / ₂ x23 ¹ / ₂	6	13	14	2	49.00	59.40	65.30
16 ¹ / ₂ x26	6	13	14	2	60.00	67.50	74.00
16 ¹ / ₂ x28	6	13	14	2	62.00	70.80	77.80
19 x28	6	14	14	2	70.20	79.00	86.50
19 x33	6	14	14	2	78.00	87.50	97.00

Price List of Grave Tents with Walls Half Way Round

Size, Feet	Height of Wall Feet	Height of Center Feet	Number of Side Poles	Number of Center Poles	8-oz. Single Filling Duck	10-oz. Single Filling Duck	12-oz. Single Filling Duck
7 x12	5	8	4	2	\$17.80	\$20.50	\$23.00
7 x14	5	8	4	2	17.80	22.20	25.00
9 x14	6	10	10	2	24.80	28.50	32.00
9 x16 ¹ / ₂	6	10	10	2	28.00	32.50	36.50
9 x19	6	10	10	2	32.50	37.50	42.00
12 x19	6	11	10	2	38.40	44.50	49.80
12 x21 ¹ / ₂	6	11	12	2	42.50	49.00	55.20
14 x21 ¹ / ₂	6	12	12	2	46.50	53.48	60.00
14 x23 ¹ / ₂	6	12	12	2	51.40	59.40	66.80
16 ¹ / ₂ x23 ¹ / ₂	6	13	14	2	70.00	80.00	87.00
16 ¹ / ₂ x26	6	13	14	2	77.50	87.40	96.50
16 ¹ / ₂ x28	6	13	14	2	82.00	92.50	102.00
19 x28	6	14	14	2	91.00	102.50	112.94
19 x33	6	14	14	2	102.00	115.00	127.00

Price List of Grave Tents with Walls and Sides

Size, Feet	Height of Wall Feet	Height of Center Feet	Number of Side Poles	Number of Center Poles	8-oz. Single Filling Duck	10-oz. Single Filling Duck	12-oz. Single Filling Duck
7 x12	5	8	4	2	\$21.50	\$25.00	\$28.00
7 x14	5	8	4	2	24.50	28.20	31.60
9 x14	6	10	10	2	31.40	36.50	41.20
9 x16 ¹ / ₂	6	10	10	2	36.50	42.60	48.00
9 x19	6	10	10	2	41.00	47.80	54.00
12 x19	6	11	10	2	47.60	55.50	63.00
12 x21 ¹ / ₂	6	11	12	2	52.00	60.50	69.00
14 x21 ¹ / ₂	6	12	12	2	56.50	65.80	74.50
14 x23 ¹ / ₂	6	12	12	2	69.20	79.40	83.50
16 ¹ / ₂ x23 ¹ / ₂	6	13	14	2	85.00	96.50	107.00
16 ¹ / ₂ x26	6	13	14	2	92.00	104.20	115.50
16 ¹ / ₂ x28	6	13	14	2	98.00	111.00	123.00
19 x28	6	14	14	2	106.50	118.50	131.50
19 x33	6	14	14	2	121.40	137.60	153.00

If poles are not wanted, deduct 5 per cent from the price of the tent.

H.Channon Company Chicago



Round Tents

With Portable Walls

A design of tent used largely for merry-go-rounds. Made in the best possible manner, with portable walls, and can be depended upon for hard service. Prices given are for tents roped wherever necessary.

Push Pole Round Tents, Complete with Poles, Banded Stakes, Etc.

Diameter, Feet	Height of Pole	Height of Wall	250 Drill or 6½-oz.	8-oz. D. F.	10-oz. D. F.	8-oz. Army	10-oz. Army	12-oz. Army
12	11½	6	\$ 32.40	\$ 36.72	\$ 42.66	\$ 41.76	\$ 48.24	\$ 54.00
18	13	6	53.56	60.69	70.51	69.02	79.73	89.25
23	15	7	82.80	93.84	109.02	106.72	123.28	138.00
26	16	7	120.51	133.90	150.90	148.32	166.86	183.34
30	16	7	149.18	165.75	186.79	183.60	206.55	226.95
35	17	7	182.52	202.80	228.54	224.64	252.72	277.68
40	19	7	224.06	248.95	280.55	275.76	310.23	340.87
44	21	7	262.67	291.85	328.90	323.25	363.70	399.60

Round Tents

Diameter, Feet	Center, Feet	Height of Walls	250 Drill or 6½-oz.	8-oz. D. F.	10-oz. D. F.	8-oz. Army	10-oz. Army
52	23	8	\$ 414.96	\$ 455.52	\$ 507.00	\$ 499.20	\$ 555.36
60	25	8	547.96	601.52	669.50	659.20	733.36
70	25	8	678.97	745.33	829.56	816.80	908.69
80	26	8	822.60	903.01	1005.06	989.60	1100.93
90	30	9	1147.79	1259.98	1402.38	1380.80	1536.14

Golf or Canopy Tents



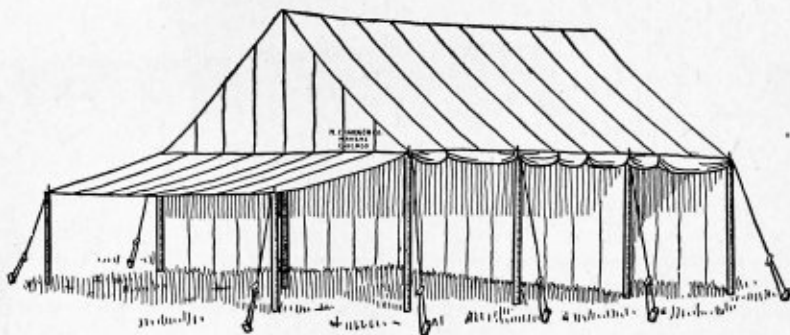
It furnishes shade and as there are no side walls it permits a cool breeze. It is a very desirable tent for golf games, field sports, or lawn use and is much used as a hammock tent, to protect from sun during the day and the dew at evening. We sell a great many for use at outdoor receptions or social gatherings, where a protection from the heat or dampness is absolutely necessary. We make them regularly of white duck, but most people prefer striped canvas. Our list of materials given below for this tent will enable you to select one in exact accordance with your wishes.

Golf Tents or Canopy Top, Complete with Poles, Stakes, Guy Ropes, Etc.

Size	Height of Pole	Height of Wall	8-oz. S. F.	10-oz. S. F.	10-oz. D. F.	12-oz. D. F.	Duplex Straps	Army Straps
7 x 12	9	6	\$11.04	\$12.77	\$13.63	\$15.53	\$13.80	\$16.56
7 x 14	9	6	12.96	14.99	16.00	18.23	16.20	19.44
9 x 14	10	6	16.32	18.87	20.15	22.95	20.40	24.48
9 x 16½	10	6	19.72	21.65	23.11	26.33	23.40	28.08
9 x 19	10	6	21.60	24.98	26.65	30.38	27.00	32.40
12 x 19	11	6	28.32	32.75	34.98	39.83	35.40	42.48
12 x 21	11	6	31.68	36.63	39.11	44.55	39.60	47.52
12 x 23½	11	6	35.04	40.52	43.25	49.28	43.80	52.56
14 x 21	11	6	34.56	39.96	42.66	48.60	43.20	51.84
14 x 23½	11	6	37.92	43.85	46.81	53.33	47.40	56.88
16½ x 23½	13	6	45.12	52.17	55.70	63.45	56.40	67.68
16½ x 26	13	6	49.44	57.17	61.03	69.53	61.50	74.16
16½ x 28	13	6	53.76	62.16	66.36	75.60	67.20	80.64
19 x 28	14	6	61.92	71.60	76.43	87.08	77.40	92.88
19 x 33	14	6	72.00	83.25	88.88	101.25	90.00	108.00

Camping Tents

With Portable Walls and Partitions



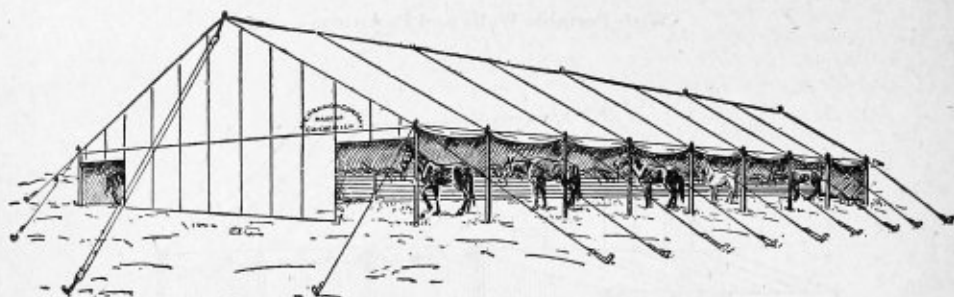
Designed for large camping parties, where separate rooms are desired. The interior may be changed about at will, and affords almost as much convenience as a house.

Camping Tents

Complete with Poles, Stakes and Guy Ropes

Size	Height of Pole	Height of Wall	8-oz. S. F.	10-oz. S. F.	12-oz. S. F.	8-oz. D. F.	10-oz. D. F.	12-oz. D. F.	10-oz. Army	12-oz. Army	15-oz. Army
12 x 12	11	6	\$ 34.02	\$ 40.10	\$ 46.17	\$ 36.45	\$ 43.13	\$ 49.82	\$ 49.81	\$ 55.89	\$ 67.43
12 x 14	11	6	37.80	44.55	51.30	40.50	47.93	55.35	54.90	62.10	74.93
12 x 16½	11	6	42.00	49.50	57.00	45.00	53.25	61.50	61.00	69.00	83.25
12 x 18½	11	6	46.20	54.45	62.70	49.50	58.58	67.65	67.10	75.90	91.58
12 x 21	11	6	50.40	59.40	68.40	54.00	63.90	73.80	73.20	82.80	99.90
12 x 24	11	6	54.60	64.35	74.10	58.50	69.23	79.95	79.30	89.70	108.23
12 x 28	11	6	61.74	72.77	83.79	66.15	78.28	90.41	89.67	101.43	122.38
12 x 30	11	6	65.94	77.72	89.49	70.65	83.60	96.56	95.77	108.33	130.70
14 x 14	12	6	43.68	51.48	59.28	46.80	55.38	63.96	63.44	71.76	86.58
14 x 16½	12	6	48.30	56.93	65.55	51.75	61.24	70.73	70.15	79.35	95.74
14 x 18½	12	6	52.92	62.37	71.82	56.70	67.10	77.49	76.86	86.94	104.90
14 x 21½	12	6	57.54	67.82	78.09	61.65	72.95	84.26	83.57	94.53	114.05
14 x 23½	12	6	62.16	73.26	84.36	66.60	78.81	91.02	90.28	102.12	123.21
14 x 28	12	6	70.98	83.66	96.33	76.05	89.99	103.94	103.09	116.61	140.69
14 x 30	12	6	75.60	89.10	102.60	81.00	95.85	110.70	109.80	124.20	149.85
16½ x 16½	13	6	54.18	63.86	73.53	58.05	68.60	79.34	78.69	89.01	107.99
16½ x 18½	13	6	58.80	69.30	79.80	63.00	74.55	86.10	85.40	96.60	116.55
16½ x 21½	13	6	63.84	75.24	86.64	68.40	80.90	93.40	92.72	104.88	126.54
16½ x 23½	13	6	68.67	80.93	93.19	73.57	87.06	100.55	99.73	112.82	136.12
16½ x 28	13	6	78.96	93.06	107.16	84.60	100.11	115.62	114.68	129.72	156.61
16½ x 30	13	6	84.00	99.00	114.00	90.00	106.50	123.00	122.00	138.00	166.50
18½ x 18½	14	6	66.36	78.21	90.06	71.10	84.14	97.17	96.38	109.02	131.54
18½ x 21½	14	6	71.82	84.65	97.47	76.95	91.06	105.17	104.31	118.00	142.36
18½ x 23½	14	6	76.86	90.59	104.32	82.35	97.45	112.55	111.63	126.27	152.35
18½ x 28	14	6	87.36	102.96	118.56	93.60	110.76	127.92	126.88	143.52	173.16
18½ x 30	14	6	92.82	109.40	125.97	99.45	117.68	135.92	135.81	152.49	183.98
18½ x 35	14	6	103.32	121.77	140.22	110.70	131.00	151.29	150.06	169.74	204.80

Stable Tents



These tents must be practical in every way and as good as any permanent stable for ordinary purposes. They are used mostly in building and construction camps where horses are used and where it is necessary to move frequently. There must be the greatest possible strength in all parts to withstand rough weather and it is on this account and their large size that we put more hand labor into Stable Tents than any other style.

Most tent makers do not reinforce the ridges and eaves, thus making a great saving in the cost of manufacturing such tents. We could do the same and offer them at lower prices, but our long experience has shown us that the greatest strain on these large tents is where the canvas comes in contact with the poles and to give longer life to the tent we know it is necessary to sew on wide heavy bands along the ridge and eaves. In addition to doing this, we rope each tent fully on the ridge, eaves, gables and every nine feet on the top.

Size	Height of Pole	Height of Wall	8-oz. D. F.	10-oz. D. F.	12-oz. D. F.	8-oz. Army	10-oz. Army	12-oz. Army	15-oz. Army	17-oz. Army
28 x 21	14	6	\$170.82	\$190.13	\$209.44	\$187.20	\$208.26	\$226.98	\$260.33	\$283.72
28 x 28	14	6	205.86	229.13	252.39	225.60	250.98	273.54	313.73	341.93
28 x 35	14	6	241.63	268.94	296.25	264.80	294.59	321.07	368.24	401.34
28 x 42	14	6	276.67	307.93	339.20	303.20	337.31	367.63	421.64	459.54
28 x 49	14	6	311.71	346.94	382.17	341.60	380.03	414.19	475.04	517.74
28 x 56	14	6	347.48	386.75	426.02	380.80	423.64	461.72	529.55	577.15
28 x 63	14	6	382.52	425.75	468.98	419.20	466.36	508.28	582.95	635.35
28 x 70	14	6	417.56	464.75	511.94	457.60	509.08	554.84	636.35	693.55
28 x 77	14	6	453.33	504.56	555.80	496.80	552.69	602.37	690.86	752.96
28 x 84	14	6	488.37	543.56	598.75	535.20	595.41	648.93	744.26	811.16
30 x 21	14	6	180.31	200.69	221.07	197.60	219.83	239.59	274.79	299.50
30 x 28	14	6	216.81	241.31	265.81	237.60	264.33	288.09	330.41	360.11
30 x 35	14	6	254.04	282.75	311.46	278.40	309.72	337.56	387.15	421.95
30 x 42	14	6	290.54	323.38	356.21	318.40	354.22	386.06	442.77	482.57
30 x 49	14	6	327.04	364.00	400.96	358.40	398.72	434.56	498.31	543.20
30 x 56	14	6	364.27	405.44	446.61	399.20	444.11	484.03	555.12	605.04
30 x 63	14	6	400.77	446.06	491.35	439.20	488.61	532.53	610.74	665.68
30 x 70	14	6	437.27	486.69	536.11	479.20	533.11	581.03	666.76	726.28
30 x 77	14	6	474.50	528.13	581.75	520.00	578.58	630.50	723.49	788.13
30 x 84	14	6	511.00	568.75	626.50	560.00	623.00	679.00	779.11	848.75

Our Prices Include Poles, Stakes, Guy Ropes and Tackle Block. Tents Are Complete, Ready to Set Up.

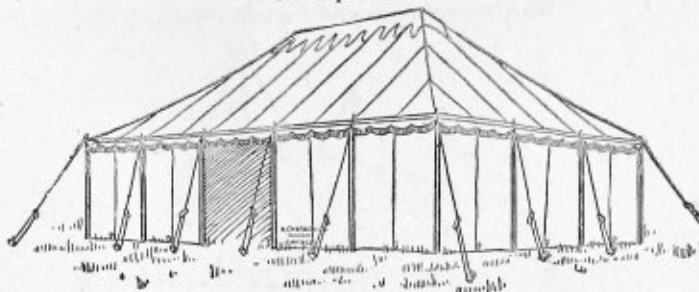
Kamp Komfort Tent Heater

This is a practical and effective wood burning heating stove. Just the thing for tent use as it can be used with safety. Can be used as a regular cook stove also, fitted with pipe which packs inside the heater when not in use. Size, 15 1/2 x 12 x 15. 9 ft. of telescoping pipe. Weight 24 lbs.

Price, each.....\$7.00



Oblong Tents With Square Ends



Oblong Square End Tents, Pole Ridge, Complete with Poles, Stakes and Guy Ropes

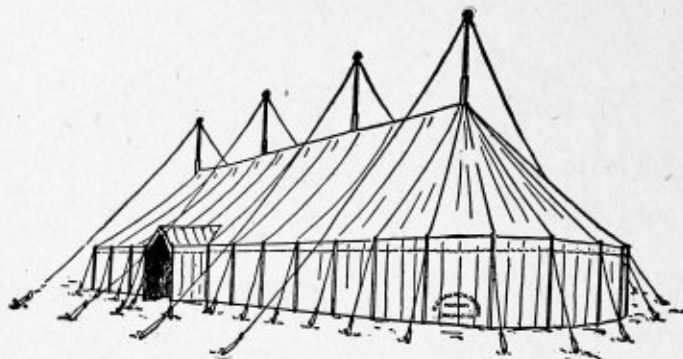
Size	Height of Pole	Height of Wall	10-oz. S. F.	12-oz. S. F.	10-oz. D. F.	12-oz. D. F.	8-oz. Army	10-oz. Army	12-oz. Army	15-oz. Army
7 x 12	9 1/2	6	\$31.67	\$36.00	\$33.78	\$38.65	\$33.04	\$38.35	\$43.07	\$51.48
7 x 14	9 1/2	6	35.84	40.87	38.36	43.89	37.52	43.55	48.91	58.46
9 x 14	10	6	40.13	45.75	42.94	49.13	42.00	48.75	54.75	66.44
9 x 16	10	6	45.48	51.85	48.66	55.57	47.51	55.25	62.05	74.15
9 x 19	10	6	50.29	57.34	53.82	61.57	52.64	61.10	68.62	82.02
12 x 16	12	7	62.33	71.07	66.70	76.30	65.24	75.72	85.04	101.65
12 x 19	12	7	66.34	75.64	70.99	81.22	69.44	80.60	90.52	108.19
12 x 21	12	7	73.30	83.57	78.43	89.74	76.72	89.05	100.01	119.53
12 x 23	12	7	81.32	92.72	87.02	99.56	85.12	98.80	110.96	132.62
14 x 21	13	7	80.79	92.11	86.45	98.31	84.56	98.15	110.23	131.75
14 x 23	13	7	87.74	100.04	93.89	107.42	91.84	106.60	119.72	143.09

Oblong Square End Tents, Complete with Poles, Stakes and Guy Ropes

Size	Height of Pole	Height of Wall	6 1/2-oz. Drill	10-oz. S. F.	12-oz. S. F.	8-oz. D. F.	10-oz. D. F. or 8-oz. Army	12-oz. D. F.	10-oz. Army	12-oz. Army	15-oz. Army
16 x 23	14	7	\$ 99.44	\$118.80	\$132.00	\$110.88	\$125.40	\$139.92	\$139.04	\$153.12	\$178.20
16 x 26	14	7	109.05	130.28	144.75	121.59	137.51	153.44	152.47	167.91	195.41
16 x 28	14	7	116.39	139.05	154.50	129.78	146.78	163.77	162.74	179.22	208.58
19 x 28	15	7	128.82	153.90	171.00	143.64	162.45	181.26	180.12	198.36	230.85
19 x 33	15	7	142.95	170.78	189.75	159.39	180.26	201.14	199.87	220.11	256.16
19 x 40	15	7	168.37	201.15	223.50	187.74	212.33	236.91	235.42	259.26	301.73
23 x 30	16	7	152.00	181.58	201.75	169.47	191.66	213.86	212.51	234.03	272.36
23 x 33	16	7	161.59	193.05	214.50	180.18	203.78	227.37	225.94	248.82	289.68
23 x 38	16	7	180.80	216.00	240.00	201.60	226.00	254.40	252.80	278.40	324.00
23 x 42	16	7	200.01	238.95	265.50	223.02	249.38	281.43	279.66	307.98	358.43
23 x 47	16	7	219.22	261.90	291.00	244.44	276.45	308.72	306.52	337.56	392.85
23 x 51	16	7	238.43	284.85	316.50	265.66	300.68	333.50	331.38	367.14	427.28
23 x 60	16	7	276.85	330.70	367.50	308.70	345.13	389.55	387.10	426.30	496.13
28 x 42	16	7	222.05	265.28	294.75	247.59	280.01	312.44	310.47	341.91	397.91
28 x 47	16	7	242.95	290.25	322.50	270.90	306.38	341.85	339.70	374.10	435.38
28 x 51	16	7	263.85	315.23	350.26	294.21	332.74	371.27	368.93	406.29	472.84
28 x 56	16	7	285.33	340.88	378.75	318.15	359.81	401.48	398.95	439.35	511.31
28 x 60	16	7	307.36	367.70	408.00	342.72	387.60	432.48	429.75	473.28	550.80
28 x 70	16	7	350.87	410.18	465.75	391.23	442.46	493.70	490.59	540.27	628.76
30 x 50	16	7	269.50	321.98	357.75	300.51	339.86	379.21	376.83	414.99	482.96
30 x 60	16	7	311.88	376.00	411.00	347.76	393.30	438.84	436.08	480.24	558.90
30 x 70	16	7	354.26	423.23	470.25	393.01	446.74	498.47	495.33	545.49	634.80
30 x 80	16	7	396.07	473.18	525.75	441.63	499.46	557.30	553.79	609.87	709.76
33 x 38	17	7	230.91	263.9	293.25	246.33	278.59	310.85	308.88	340.17	395.99
33 x 42	17	7	243.52	290.93	323.25	271.83	307.79	342.65	340.49	374.97	436.39
33 x 47	17	7	266.12	311.93	353.25	296.73	335.59	374.45	372.05	409.77	476.89
33 x 52	17	7	280.72	344.9	383.25	321.93	364.09	406.25	403.69	444.57	517.39
33 x 56	17	7	311.32	371.93	413.25	347.13	392.59	438.05	435.29	479.35	557.89
33 x 60	17	7	333.91	398.93	443.25	372.33	421.09	469.85	466.89	514.17	598.39
33 x 70	17	7	379.12	452.93	503.25	422.73	478.09	533.45	530.09	583.77	679.39
33 x 80	17	7	424.32	506.93	563.25	473.13	535.09	597.05	593.29	653.37	760.39
37 x 47	18	7	286.46	342.23	380.25	319.41	361.24	403.07	400.53	441.09	513.34
37 x 52	18	7	310.75	371.25	412.50	346.50	391.88	437.25	434.50	478.50	556.88
37 x 56	18	7	335.05	400.28	444.75	373.59	422.51	471.44	468.47	515.91	600.41
37 x 60	18	7	359.34	429.30	477.00	400.68	453.15	505.62	502.44	553.32	643.95
37 x 65	18	7	383.63	458.32	509.25	427.76	483.79	539.81	536.41	590.73	687.49
37 x 70	18	7	407.93	487.35	541.50	454.86	514.43	574.00	570.38	629.14	751.03
37 x 80	18	7	456.32	545.40	606.00	509.04	576.70	642.36	638.32	702.95	818.10
40 x 60	20	8	398.23	475.88	528.75	444.15	502.31	560.48	555.95	613.25	716.81
40 x 100	20	8	518.98	617.63	686.25	576.45	651.94	727.43	722.85	796.05	926.44
42 x 51	20	8	335.63	403.90	453.75	373.59	422.51	471.44	468.47	515.91	600.41
42 x 56	20	8	363.82	432.90	471.00	395.64	447.45	499.26	496.12	546.36	635.65
42 x 60	20	8	382.51	456.98	507.75	426.51	482.36	538.22	534.83	588.99	685.46
42 x 65	20	8	410.19	490.05	544.50	457.58	517.28	577.17	573.54	631.62	735.08
42 x 70	20	8	437.89	523.13	581.25	488.25	552.19	616.13	612.25	674.25	784.69
42 x 80	20	8	465.56	556.20	618.00	519.12	587.10	655.08	650.96	716.88	834.30
42 x 90	20	8	520.93	622.35	691.50	580.86	656.93	733.00	728.38	802.14	933.63

Oblong Tents

With Round Ends and Portable Walls



Push Pole Type

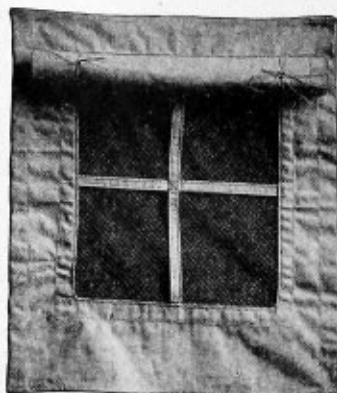
Push Pole. Complete with Poles, Banded Stakes and Guy Ropes

Size	Height of Pole	Height of Wall	250 Drill or 6½-oz.	8-oz. D. F.	10-oz. D. F.	8-oz. Army	10-oz. Army	12-oz. Army
12x21	11-6	6	\$52.51	\$60.18	\$69.92	\$68.44	\$79.06	\$88.50
18x24	13	6	71.20	81.60	94.60	92.80	107.20	120.00
18x31	13	6	88.56	101.49	117.91	115.42	133.33	149.25
18x36	13	6	100.13	114.75	133.31	130.50	150.75	168.75
23x30	15	7	104.13	119.34	138.65	135.72	156.78	176.60
23x37	15	7	125.49	143.82	167.09	163.56	188.94	211.50
23x44	15	7	146.85	168.30	195.53	191.40	221.10	247.80
26x33	16	7	152.69	169.65	191.18	187.92	211.41	232.32
26x40	16	7	183.69	204.10	230.01	226.08	254.34	279.46
26x47	16	7	214.70	238.55	268.83	264.24	297.27	326.63
26x54	16	7	245.70	273.00	307.65	302.40	340.20	373.80
30x44	16	7	212.94	236.60	266.63	262.08	294.84	323.96
30x51	16	7	245.70	273.00	307.65	302.40	340.20	373.80
30x58	16	7	277.88	308.75	347.94	342.00	384.75	422.75
30x65	16	7	310.64	345.15	388.96	382.32	430.11	472.59
30x72	16	7	342.81	380.90	429.25	421.92	474.66	521.54
35x49	17	7	263.89	282.10	317.91	312.48	351.54	386.26
35x56	17	7	289.56	321.75	362.59	356.40	400.95	440.55
35x63	17	7	325.25	361.40	407.27	400.32	450.36	494.84
35x70	17	7	360.95	401.05	451.95	444.24	499.77	549.13
40x54	19	7	304.79	338.65	381.63	375.12	422.01	463.69
40x61	19	7	345.15	383.50	432.18	424.80	477.90	525.10
40x68	19	7	385.52	428.35	482.72	474.48	533.79	586.61
40x75	19	7	425.88	473.20	533.26	524.16	589.68	647.92
40x82	19	7	466.25	518.05	583.80	573.84	645.57	709.33

Oblong Round End Tents, Complete With Poles, Banded Stakes, Block and Tackle Hoist

Size	Height of Pole	Height of Wall	250 Drill or 6½-oz.	8-oz. D. F.	10-oz. D. F.	8-oz. Army	10-oz. Army	12-oz. Army
40x 54	19	7	\$353.78	\$385.36	\$432.25	\$425.60	\$473.48	\$516.04
40x 61	19	7	400.33	439.46	489.13	481.60	536.78	583.94
40x 68	19	7	446.22	489.83	545.19	536.80	597.19	650.87
40x 75	19	7	492.10	540.20	601.25	592.00	658.60	717.80
40x 82	19	7	537.98	590.57	657.31	647.20	720.01	784.73
52x 66	23	8	533.33	585.46	651.64	641.60	713.78	777.94
52x 73	23	8	589.86	647.51	720.69	709.60	789.43	860.39
52x 80	23	8	646.38	709.56	789.75	777.60	865.08	942.34
52x108	23	8	875.14	960.68	1,068.85	1,052.80	1,171.24	1,276.62
60x 90	24	8	807.98	886.19	987.19	972.00	1,081.35	1,178.55
60x120	24	8	1,067.99	1,172.38	1,304.88	1,284.80	1,429.34	1,557.82
63x 90	24	8	849.87	932.94	1,038.38	1,022.40	1,137.42	1,239.66
63x120	24	8	1,115.21	1,224.22	1,362.66	1,341.60	1,492.53	1,625.69
70x100	25	8	954.92	1,069.23	1,178.94	1,160.80	1,291.39	1,407.47
70x130	25	8	1,258.52	1,378.24	1,534.00	1,510.40	1,680.32	1,831.36
80x120	26	8	1,286.11	1,411.82	1,571.38	1,547.20	1,721.26	1,875.98
80x160	26	8	1,749.62	1,920.64	2,137.69	2,104.80	2,341.53	2,562.07
95x145	30	9	1,776.88	1,950.56	2,171.00	2,137.60	2,378.08	2,591.84
95x190	30	9	2,405.97	2,641.14	2,939.63	2,894.40	3,220.02	3,509.46

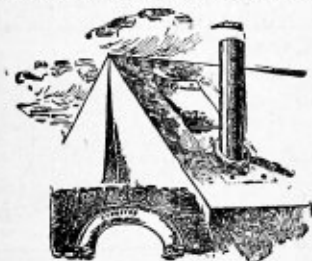
Tent Windows



Desirable in large tents for light and ventilation. The opening is filled with fine bobbinet heavily re-enforced and the flap on the outside is made extra large to exclude the wind or rain. The flap can be rolled up and tied as shown or it can be raised or lowered by a cord operated from the inside of the tent.

Net price, complete, put in tent..... **\$1.50**

Asbestos Stove Pipe Shield for Tents



We place stove pipe holes in any tent when wanted. It thoroughly protects the tent from fire or scorching. It is flexible and will roll up snugly. At the opening is placed a wide flap, of the same material as the tent which is rolled up and tied with tapes when pipe is in use. When pipe is not used the flap is lowered and tied in place with tapes, effectually closing the opening and making it water tight.

Price, placed in tent, complete with flap..... **\$2.00**

Ridge Poles



Finished with $\frac{5}{8}$ -inch holes and bands of galvanized iron.

Price per foot

$1\frac{3}{4} \times 2\frac{3}{4}$ in. 6 to 14 ft. long.....	\$0.07
$1\frac{3}{4} \times 2\frac{3}{4}$ in. 14 to 18 ft. long.....	.08
$1\frac{3}{4} \times 3\frac{3}{4}$ in. 18 to 30 ft. long, spliced.....	.10

Preservo

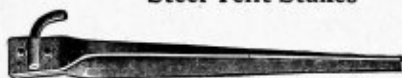


A liquid for waterproofing and making a tent mildew proof. Makes the canvas softer than rubber. It is not affected by heat or cold, acid or alkali. It fills the canvas with a composition that prevents it wearing by friction. Can be applied with a brush, sponge or cloth. One gallon covers 90 square feet. Will not color or stiffen the cloth. Full directions on each can.

Endorsed by all departments of the U. S. Government and used by Barnum & Bailey and Ringling Bros. on all their tents.

1 gallon cans, per gallon.....	\$1.50
5 gallon cans, per gallon.....	1.40
13-in barrels, containing 52 gallons, per gal.	1.25

Steel Tent Stakes



Practically indestructible, made of fine steel and furnished with rings as shown in cut.

9-inch steel stakes, per dozen.....	\$1.15
13-inch steel stakes, per dozen.....	1.40

Wood Tent Stakes



12-inch, per dozen.....	\$0.15
14-inch, per dozen.....	.18
16-inch, per dozen.....	.20
18-inch, per dozen.....	.22
20-inch, per dozen.....	.25
22-inch, 1 x 2-inch, per dozen.....	.30
24-inch, 1 x 2-inch, per dozen.....	.35

Round Tent Stakes with Iron Bands



Made of hardwood with tapered point.

2 x 24-inch, with ferule, per dozen.....	\$1.60
2 x 30-inch, with ferule, per dozen.....	1.60
2 x 36-inch, with ferule, per dozen.....	2.70

Tent Slides



$\frac{1}{4}$ -inch holes, per dozen.....	\$0.40
$\frac{3}{8}$ -inch holes, per dozen.....	.50

Tent Poles Upright Poles



Finished with galvanized iron bands and half-inch iron.

$1\frac{1}{2}$ -inch diameter, 6 to 14 ft. long, per foot.....	\$0.07
$1\frac{1}{2}$ -inch diameter, 8 to 14 ft. long, per foot.....	.09
$1\frac{1}{2}$ -inch diameter, 12 to 24 ft. long, per foot.....	.16

Improved Canvas Wheels



No. 50



No. 60



No. 70



No. 80

No. 50 Solid Canvas Wheels are used for polishing plows, stove trimmings, steel tools, and all metals having substantially even or flat surfaces, where fast cutting wheels are required. Used with No. 20 to No. 60 Emery. Made of best grade heavy canvas duck put together with a waterproof cement, making a slightly flexible and resilient surface. Face may be shaped as desired to conform to any special class of work as plowshares, cultivator blades, harrow disks, etc.

No. 60 Loose Canvas Wheels are especially suitable where extraordinary resiliency or pliability is wanted. The wheel is made solid to within one to three inches (or more) from periphery, so that after coating with glue and emery, a yielding cushion is formed easily adapting itself to any shape metal surface to be polished.

No. 70 Stitched Canvas Wheels are made of extra quality canvas duck, lock stitched in circles to periphery. Used for same purposes as solid canvas wheels where more flexibility on yielding face is required.

No. 80 Special Canvas Wheels are particularly recommended for raised stove work, but will be found equally suitable for all polishing work where canvas wheel of extra resiliency of face is required.

Made of heavy cotton duck or canvas belting. The combination of this extra heavy material and our pliable cement makes a wheel with yielding surface, yet one which will hold square face.

Diam. in Inches	Thickness in Inches							
	1	1½	2	2½	3	3½	4	These wheels may be furnished hard or soft
8	\$1.50	\$2.00	\$2.75	\$3.25	\$3.75	\$4.00	\$4.50	
10	1.60	2.20	2.85	3.35	3.85	4.20	4.75	
12	2.00	2.75	3.75	4.25	5.25	5.75	6.25	
14	2.50	3.50	4.75	5.50	6.50	7.25	8.00	
15	3.00	4.10	5.25	6.50	7.25	8.25	9.40	
16	3.50	5.00	6.00	7.50	8.75	10.00	11.25	
18	4.50	6.40	8.25	10.00	12.00	13.50	15.25	
20	5.75	8.50	11.00	13.50	15.50	17.50	19.50	

Cloth Wheels



These wheels are made of disks of muslin cloth, stitched spirally and cemented to within three inches of periphery. The surface of the wheel being extremely soft and yielding permits the face of the wheel to assume any shape desired and conforms to varying surfaces to be polished. Extensively used by manufacturers of plows, shovels and farm implements for producing finishing polish.

Diam in Ins.	Thickness in Inches						
	1	1½	2	2½	3	3½	4
8	\$1.00	\$1.50	\$2.00	\$2.40	\$2.80	\$3.20	\$3.50
10	1.10	1.60	2.10	2.50	3.10	3.60	4.00
12	1.50	2.25	3.00	3.60	4.50	5.00	5.50
14	2.00	3.00	3.90	4.80	5.70	6.50	7.25
15	2.30	3.40	4.50	5.60	6.60	7.50	8.40
16	2.75	4.10	5.40	6.70	8.00	9.25	10.25
18	3.75	5.60	7.40	9.20	11.00	12.50	14.00
20	5.00	7.50	10.00	12.50	14.50	16.50	18.50

No. 100 Special Buffs

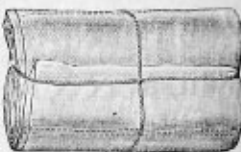
Furnished cut to size, with or without holes, but not glued, made from extra heavy felt canvas; also from old sail canvas, which gives most satisfaction to plow manufacturers, shovel factories and the like.

Price per pound, cut to size, with hole:
Extra heavy new canvas.....\$0.50
Heavy old canvas......40

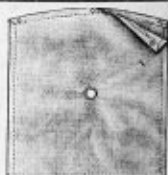
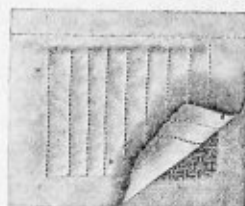
Old Canvas

Used for Brattice in Mines, Etc.

Usually cut 36, 54, 60 or 72 inches, but we can furnish any width desired. The weight is usually equal to a No. 2 duck. It is clean and odorless and much preferable to the imported brattice cloth, which reeks of fish oil, etc. Per square foot, \$0.05



Filter Cloths



For Potteries, Packing Houses and Paint Manufacturers.

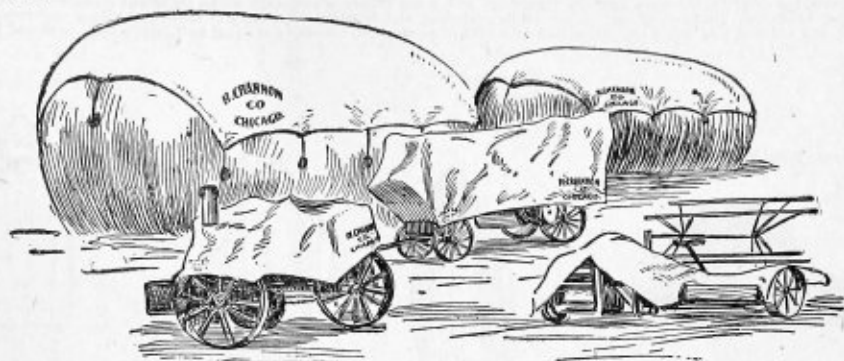
For Gold and Silver Mines.

Any size, style or shape. Usually made of No. 4, 5 or 6 duck with cocoa matting interlining (illustrated), or of plain duck securely stitched with heavy linen thread in transverse seams 1½ to 2 inches apart according to requirements.

Made of light-weight duck, 10 oz. double filling duck being generally used. Made as shown in illustration, or according to your specifications.

Plain White Canvas Paulins

For covering harvesters, binders, threshing machines, stacks, hay, cars, wagons and all kinds of merchandise.



We make paulins for any article and in any size and weight as desired. Below we give a list of the sizes which are most generally asked for.

Plain White Paulins or Stack Covers

Actual Size	Single Filling			Double Filling			U. S. Army Duck		
	8-oz.	10-oz.	12-oz.	8-oz.	10-oz.	12-oz.	12-oz.	15-oz.	17-oz.
7 x 15	\$ 5.30	\$ 6.45	\$ 7.60	\$ 5.75	\$ 7.00	\$ 8.30	\$ 9.45	\$11.80	\$13.35
7 x 16	5.65	6.85	8.10	6.10	7.45	8.85	10.10	12.55	14.20
7 x 17	5.95	7.30	8.60	6.50	7.90	9.40	10.70	13.30	15.05
7 x 18	6.30	7.70	9.10	6.85	8.35	9.90	11.30	14.10	15.95
9-4 x 12	5.70	6.95	8.20	6.30	7.50	8.95	10.20	12.70	14.35
9-4 x 13	6.15	7.50	8.85	6.70	8.10	9.65	11.00	13.70	15.50
9-4 x 14	6.60	8.05	9.50	7.15	8.70	10.35	11.80	14.70	16.65
9-4 x 16	7.05	8.60	10.15	7.65	9.30	11.05	12.65	15.70	17.80
9-4 x 18	7.50	9.15	10.80	8.15	9.90	11.80	13.45	16.75	18.95
9-4 x 20	8.40	10.25	12.10	9.15	11.10	13.20	15.05	18.75	21.25
10-6 x 13	9.30	11.35	13.40	10.15	12.30	14.65	16.70	20.80	23.50
10-6 x 14	6.90	8.40	9.95	7.50	9.15	10.85	12.35	15.40	17.45
10-6 x 15	7.40	9.05	10.65	8.05	9.80	11.65	13.30	16.55	18.75
10-6 x 16	7.90	9.65	11.40	8.60	10.50	12.45	14.20	17.70	20.00
10-6 x 17	8.45	10.30	12.15	9.15	11.15	13.25	15.10	18.85	21.30
10-6 x 18	8.95	10.90	12.90	9.75	11.85	14.05	16.05	19.95	22.60
10-6 x 20	9.45	11.55	13.60	10.30	12.50	14.85	16.95	21.10	23.90
10-8 x 12	7.15	8.75	10.30	7.80	9.45	11.25	12.85	16.00	18.10
11-8 x 14	8.25	10.10	11.90	9.00	10.95	13.00	14.90	18.45	20.85
11-8 x 16	9.35	11.45	13.50	10.20	12.40	14.75	16.80	20.90	23.65
11-8 x 18	10.50	12.90	15.20	11.60	13.95	16.60	18.95	23.60	26.70
11-8 x 20	11.65	14.25	16.80	12.70	15.45	18.35	20.90	26.05	29.50
11-8 x 22	12.75	15.60	18.40	13.90	16.90	20.10	22.90	28.50	32.25
11-8 x 24	13.95	17.05	20.10	15.20	18.45	21.95	25.05	31.20	35.30
14 x 14	9.90	12.05	14.25	10.75	13.05	15.65	17.70	22.05	24.95
14 x 16	11.25	13.70	16.20	12.25	14.85	17.65	20.15	25.10	28.40
14 x 17-10	12.60	15.35	18.15	13.70	16.65	19.80	22.60	28.15	31.85
14 x 20	13.95	17.05	20.10	15.20	18.45	21.95	25.05	31.20	35.30
14 x 23-9	16.70	20.35	24.05	18.15	22.05	26.25	29.90	37.25	42.15
14 x 30-9	21.45	26.15	30.90	23.35	28.35	33.70	39.45	47.90	54.20
16 x 16	13.10	16.00	18.90	14.25	17.35	20.60	23.60	29.30	33.15
16 x 17-10	14.70	17.95	21.20	16.00	19.50	23.15	26.40	32.90	37.20
16 x 20	16.35	19.95	23.55	17.80	21.60	25.70	29.30	36.50	41.30
16 x 23-9	19.50	23.60	28.05	21.20	25.80	30.65	34.95	43.55	49.25
16 x 28	22.80	27.80	32.85	24.80	30.35	35.84	40.85	50.45	57.65
16 x 30	24.85	30.30	35.80	27.00	33.05	39.05	44.55	54.95	62.80
18 x 20	18.60	22.70	26.80	20.25	24.60	29.25	33.35	41.55	47.05
18 x 23-9	22.25	27.15	32.05	24.20	29.40	34.95	39.85	49.65	56.20
19 x 28	26.55	32.40	38.25	28.90	35.10	41.75	47.60	59.30	67.10
19 x 30-4	28.90	35.30	41.65	31.45	38.25	45.60	51.85	64.60	73.10
19 x 35	33.70	41.10	48.55	36.65	44.55	53.00	60.40	75.25	85.15
19 x 39-8	37.75	46.10	54.40	41.10	49.95	59.40	67.75	84.40	95.50
21 x 22	22.95	28.05	33.10	25.00	30.40	36.15	41.20	51.30	58.05
24 x 23-8	27.80	33.90	40.05	30.25	36.75	43.70	49.55	62.10	70.25
24 x 30-4	36.40	44.40	52.45	39.60	48.15	57.25	65.30	81.35	92.05
24 x 35	42.20	51.50	60.80	45.90	55.80	66.35	75.65	94.25	106.65
24 x 39-8	47.60	58.10	68.60	51.80	63.00	74.90	85.40	106.40	120.40
24 x 49	58.85	71.80	84.80	64.05	77.85	92.55	105.55	131.50	148.80
24 x 59-2	72.80	88.85	104.90	79.20	96.30	114.60	130.55	162.65	184.05
24 x 70	83.65	102.10	120.55	91.05	110.70	131.65	150.10	187.00	211.60

Oiled Clothing

Fish and Shield Brand

In every town, big or little, there are farmers, teamsters, and many others whose work keeps them out doors every wet day; and there are those who enjoy hunting, fishing, automobiling, camping and boating. For each of these pursuits a waterproof garment is a necessity, and nothing you can secure will give an amount of service and satisfaction equal to Tower's Fish or Shield Brand.

Souwesters or Waterproof Hats



Tarp



Slicker



Frock or Half Coat



Jacket and Pants

Fish Brand slickers and oiled clothing have been sold to a steadily increasing market since 1836, and have not only met the test of time, but of world-wide service. The sales of the Fish Brand slicker exceed the combined sales of all other waterproof coats. We guarantee every garment bearing the "Sign of the Fish" to give satisfactory wear. Made double throughout, in black and yellow. They are the most durable goods made.

Shield Brand: Goods bearing this trade mark are warranted equal to any in the market, our Fish Brand alone excepted, and are comparable to the best quality only of other manufacturers. Made double throughout, in black and yellow.

Prices per Dozen, Black or Yellow

	Slickers	Medium Coats	Frocks	Jackets	Overalls	Strong Pants	Tarp Hats	Poncho, 45x72 Inches	Poncho, 66x90 Inches	Camp Blankets	Aprons, Duck	Aprons, Drill
Fish Brand	\$37.50	\$31.50	\$29.00	\$20.00	\$20.00	\$19.00	\$3.75	\$18.50	\$30.00	\$14.00	\$13.50	\$11.25
Shield Br'd	34.00	28.25	26.00	18.00	18.00	17.00						

Rubber Boots



Storm King



Knee



Hip



Sporting

Hip and Sporting Boots

Rubber

Price List of Boots

Men's knee boots, plain. Price per pair.....	\$5.35	Men's hip boots, Nanga sole. Price per pair.....	\$9.65
Men's knee boots, Nanga sole. Price per pair.....	7.00	Men's sporting boots, plain. Price per pair.....	7.85
Men's hip boots, plain. Price per pair.....	8.65	Men's Storm King boots, plain. Price per pair.....	6.60

Donavin Stoves or Cooking Ranges

For Contractors and
Camping Purposes

Everything Inside Ready
for Use

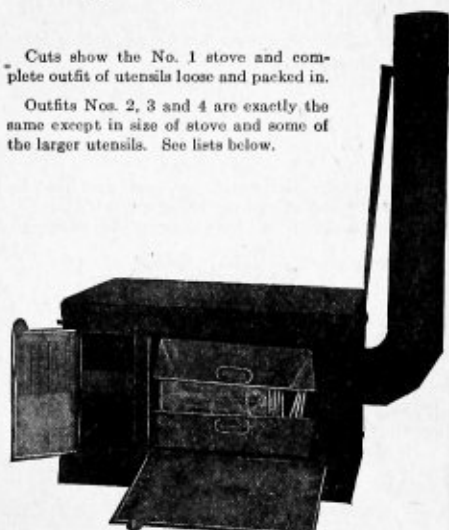
Shipped from Factory,
Columbus, Ohio



Open—Showing Utensils

Cuts show the No. 1 stove and complete outfit of utensils loose and packed in.

Outfits Nos. 2, 3 and 4 are exactly the same except in size of stove and some of the larger utensils. See lists below.



Showing Utensils Packed



No. 1 Outfit

No. 4. Capacity 6 to 18 men. Outside measure 12x13x22 inches. Oven 8x12x12 inches. Weight with utensils, 26 pieces, 72 pounds. Price \$30.00
Price, range, pipe and elbows, only 26.00

No. 3. Capacity 18 to 36 men. Outside measure 15x16x28 inches. Oven 9x15x16 inches. Weight with utensils, 35 pieces, 165 pounds. Price \$60.00
Price, range, pipe and elbows, only 44.00

No. 2. Capacity 36 to 75 men. Outside measure 18x19x33 inches. Oven 11x18x20 inches. Weight with utensils, 35 pieces, 380 pounds. Price \$70.00
Price, range, pipe and elbows, only 61.00

No. 1. Capacity 75 to 125 men. Outside measure 22x23x36 inches. Oven 14x21x23 inches. Weight with utensils, 38 pieces, 380 pounds. Price \$90.00
Price, range, pipe and elbows, only 78.00

All the above are made of malleable iron and steel and are practically unbreakable. These are the most practical ranges for camping parties or contractors' camps. They are carefully made, will cook or bake as well as any stove and the assortments of utensils included in the different sized outfits are the best obtainable.

List of Utensils Included in the Above Outfits

Sized to fit the range, and to nest and pack practically.

- 2 Boilers 11x7x5½ ins. deep.
- 4 Joints pipe. 1 Elbow.
- 1 Basting Spoon.

- 1 Boiler 13½x7½x7½ ins. dp.
- 1 Boiler 13½x7½x7½ ins. dp.
- 3 Covers for boilers.
- 4 Joints pipe. 1 Elbow.
- 1 Shovel. 1 Pipe Guard.

- 1 Boiler 16½x10½x12 ins. dp.
- 1 Boiler 16x10x12 ins. deep.
- 1 Forged spoon.
- 3 Covers for boilers.
- 1 Elbow. 4 Joints pipe.

- 1 Boiler 20x13½x12 ins. dp.
- 1 Boiler 19½x12½x12 ins. dp.
- 1 Saw knife. 1 Wire broiler.
- 1 Shovel. 1 Large fork.
- 1 Vegetable masher.

- 1 Locking bar, flue cleaner, lid
- 1 Dipper. 1 Cake turner.
- 2 Pans 11½x11½x2½ ins. dp.

- 1 Forged Spoon. 1 Steel.
- 3 Dredges, flour, salt and pepper.
- 1 Flesh fork.
- 1 Cake turner. 1 Cleaver.
- 1 Pot chain. 1 Pint dipper.

- 1 Pipe guard. 1 Shovel.
- 1 Dipper. 1 Cake turner.
- 1 Coffee mill. 1 Saw knife.
- 1 Steel. 1 Skimmer.
- 1 Pot chain. 1 Cleaver.

- 1 Coffee mill.
- 4 Lids for boilers.
- 1 Forged spoon.
- 1 Paring knife. 1 Cleaver.
- 1 Cake turner. 1 Steel.
- 1 Pot chain.

No. 4 Outfit

- 3 Dredges, flour, salt and pepper.
- 1 Butcher knife.
- 1 Cleaver. 1 Paring Knife.

No. 3 Outfit

- 1 Boiler 12½x6½x6½ ins. dp.
- 2 Pans 15½x14½x3 ins. deep.
- 1 Paring knife.
- 1 Wire broiler.
- 1 Coffee Strainer.

No. 2 Outfit

- 3 Dredges, flour, salt and pepper.
- 1 Boiler 15½x9½x12 ins. dp.
- 2 Pans 19x16½x3½ ins. deep.
- 1 Large Fork.
- 1 Biscuit cutter.

No. 1 Outfit

- 1 Dipper—2 qts.
- 1 Biscuit cutter.
- 1 Pipe guard.
- 1 Boiler 18½x11½x12 ins. dp.
- 2 Pans 22x20½x4 ins. deep.

- 1 Pint dipper.
- 2 Covers for boilers.
- 1 Flesh Fork. 1 Shovel.
- 1 Pot chain.

- 1 Skimmer.
- 1 Vegetable Masher.
- 1 Biscuit cutter.
- 1 Locking bar, flue cleaner, lid
- 1 lifter and poker combined.

- 1 Vegetable masher.
- 1 Wire broiler.
- 1 Paring knife.
- 1 Coffee strainer.
- 1 Locking bar, flue cleaner, lid
- 1 lifter and poker combined.

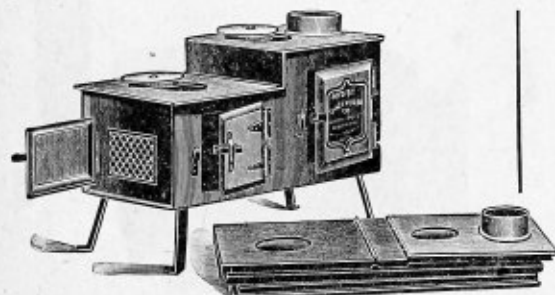
- 3 Dredges, flour, salt and pepper.
- 1 Elbow.
- 4 Joints pipe. 1 Skimmer.
- 1 Coffee strainer.
- 1 Locking bar, flue cleaner, lid
- 1 lifter and poker combined.

Folding Camp Stoves

Made from No. 20 gauge sheet steel, painted with best black graphite, which does not burn or peel off when in use. Every cooking hole on top of stove is protected with a cast iron ring riveted firmly on inside of each hole. The legs are detachable and can be packed inside of stove.

Cooking, Baking and Heating

You can cook, bake, roast, fry, broil and heat no matter what condition of weather. Biscuits can be baked in 15 minutes. They burn anything except coal. Can be used in open air, or in the summer cottage or kitchen, greatly lessen the work of cooking in the camp, and do away with so much annoying smoke and ashes.



Cut showing stove ready for use and folded for traveling

The Little Pet—Folding

The "Little Pet," Folding, size of stove 23 inches long, 12 inches high, 12 inches wide. Size of oven 8x8x12 inches; 48 inches high when standing on its legs. Weight 34 pounds. Has two 5-inch cooking holes and a pipe hole for a 5-inch standard pipe.

Packed in a neat pine box, 4 inches high, 14 inches wide, 27 inches long. Same box can be used for a table in camp.

Price.....\$16.00

The "Little Pet," non-folding, otherwise same as above.

Price.....\$12.00



Cut showing stove ready for use and folded ready for traveling

The Sportsman's Friend

The Sportsman's Friend, folding, size of stove 29 inches long, 17 inches wide, 16 inches high back of oven, and 10 inches high at fire place. When standing on legs, total height 23 inches. Weight 58 pounds. Size of oven 10x10x17 inches. Has four 5-inch cooking holes and a pipe hole for 5-inch standard pipe. The stove is large enough to supply all the cooking necessary for a party of fifteen people.

Packed in a neat pine box, 4 inches high, 17 inches wide, 32 inches long.

Price.....\$20.00

The Sportsman's Delight, non-folding, otherwise same as above.

Price.....\$16.00

Kamp Kook Kit

These kits are well-known for their great strength and utility and will stand the hard knocks of transportation under all conditions, that would put a less well-made outfit out of business.

This complete outfit, consisting of 54 pieces, is a sportsman's size of the Standard U. S. Army "Field Oven" and is the size used by Company Officers' messes. The whole kit nests and packs inside the fire jack. A padlock makes it secure for shipment and the handle on the large boiler furnishes a means of carrying the kit when packed.

The cooking kit weighs 15 pounds, and consists of a wrought iron fire jack, 8-quart heavy steel combined boiler and dish pan, 5-quart heavy steel camp boiler with lifting clips, heavy tin cover; combined frying and baking pan, adjustable wrought handle for pans, 3-quart coffee pot, folding wire broiler and toaster, two heavy wrought retinned ladles, cake turner, basting spoon, flesh fork, can opener, wire ring pot cleaner, dish towel, match box, flour dredge, salt and pepper boxes, and Eldnae candle lantern frame for fluted chimney. The tableware equipment consists of 33 pieces, made up of six steel knives, six forks, six teaspoons, two tablespoons, six open-handle cups, six tin plates, butcher knife in leather case. Whole outfit is thoroughly made and rivets used wherever they will add strength.

No. 3325	Kit of 54 pieces.	Price complete.....	\$9.00
No. 3324	Kit of 21 pieces.	Price complete.....	7.00
No. 3327	Tableware only.	Price complete.....	2.50



Oars, Oar Locks and Boat Cleats



Selected White Ash Oars

Length, feet.....	6	6½	7	7½	8	9
Plain, per pair.....	\$1.60	\$1.75	\$1.90	\$2.05	\$2.20	\$2.55
Copper Tipped, plain.....	1.75	1.90	2.05	2.20	2.35	2.75

Extra for leathering, per pair, 50c; varnishing 25c.

Spruce Oars

Length, feet.....	6	6½	7	7½	8	9
Plain, per pair.....	\$1.75	\$1.90	\$2.05	\$2.20	\$2.35	\$2.70
Copper Tipped, per pair.....	1.90	2.05	2.20	2.35	2.55	3.00

Extra for leathering, per pair, 50c; varnishing 25c.

Canoe Paddles



Straight blade, hand-made from Spruce, nicely varnished, 4, 4½ or 5 feet long..... Each \$1.50

Push Paddles

Made from selected Hardwood, properly shaped, length about 10 feet..... Each \$2.00

Oar Locks



Socket



Round Pocket



North River



Side Plate

No.	Distance Between Horns, Inches	Galvanized Malleable Iron, Price per Pair
0	1½	\$0.30
1	2	.35

No.	Diameter of Ring in the Clear, Inches	Galvanized Malleable Iron, Price per Pair
0	2	\$0.35

No.	Distance Between Horns, Inches	Galvanized Malleable Iron, Price per Pair
2		\$0.40

No.	Distance Between Horns, Inches	Galvanized Malleable Iron, Price per Pair
0	1½	\$0.60



Life Preservers

No. 1. Made of solid blocks of cork, securely fastened together and covered. To be worn around the body.

Price each..... \$1.50

Camp Furniture

Substantially Built and Well Finished. By Far the Best Camp Furniture Made.

Camp Bed No. 1

6 FT. 6 IN. LONG

2 FT. 4 IN. WIDE

GUARANTEED TO SUPPORT OVER HALF A TON

15 LBS. WEIGHT

4 IN. X 6 IN. X 3 FT. 6 IN. LONG

In its construction this bed is a marvel of skill. Opened it is a full length, easy, elastic and comfortable bed; and folded it is a snug package.

This bed is covered with extra good quality of 12-ounce double-filled brown duck. It is easily and quickly opened and folded and stands firmly on the floor. This bed is furnished with a duck fold easily convertible into a comfortable pillow.

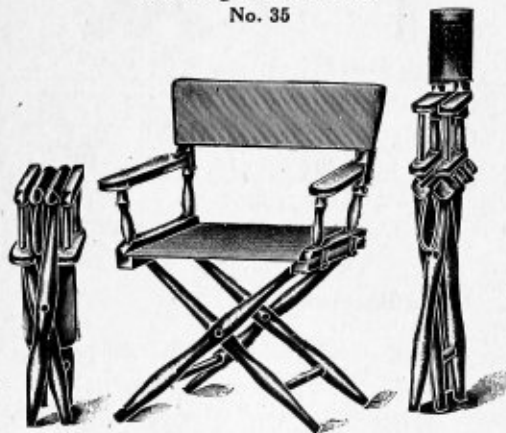
Size Open	Size Folded	Weight Lbs.	Price Each
6 ft. 6 ins. x 2 ft. 3 ins.	3 ft. 2 ins. long 4x5 ins. square	17	\$3.33

No. 50. Camp Bed

Same as No. 1. only wider, measuring 36 inches wide. Price each.....\$5.00

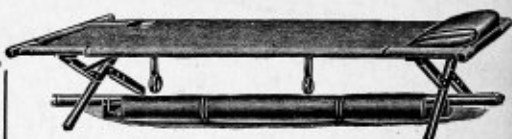
Folding Porch Chair

No. 35



This is the only chair made on this order that folds. It can be folded in two ways as illustrated. Seat and back are of very heavy drab duck. Oil finished frame. Weight 15 pounds. Price each.....\$2.75

House Cot No. 2

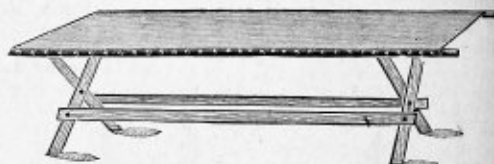


The house cot has been re-designed and is unequalled for use as an extra bed because it can be opened or folded so easily. Covered with heavy brown duck.

Size Open	Size Folded	Weight Lbs.	Net Price Each
6 ft. 6 ins. x 2 ft. 3 ins.	6 ft. 4 ins. long 4 ins. square	12	\$2.33

Folding Canvas Cots

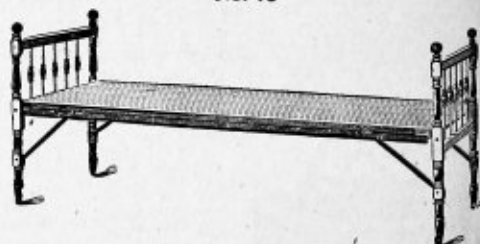
No. 74



A strong well made comfortable folding cot standard cross legs hard maple frame 10-oz. duck covering; size 2 ft. 4 ins. width 6 ft. long; weight 20 pounds. Price each.....\$2.00

Folding Wire Cots

No. 78

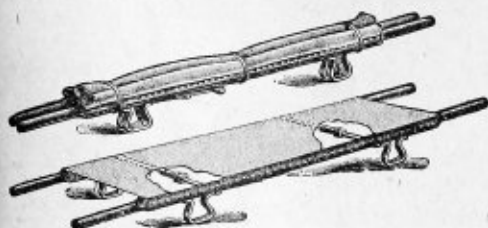


Hard maple frame. Turned posts and ornamental spindles; bright varnish finish; strong weave fabric. Folds flat.

	Each
Size 2 ft. 6 in. x 6 ft. 2 in. Weight 29 lbs.	\$3.00
Size 3 ft. x 6 ft. 2 in. Weight 33 lbs.	3.66

The American Litter

Used by the United States Army



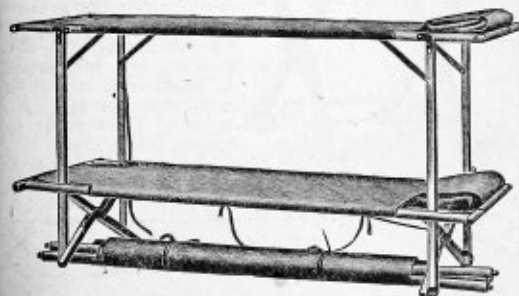
A regulation United States Army litter made of heavy No. 10 duck, tan or brown color; 6 feet in length, tacked on handles every inch apart. Size open, 7½ feet long, 21½ inches wide. Folds easily into a space 4 inches by 7½ feet.

The handles are made 2x1½-inch ash, with rounded ends, filled and varnished. Special galvanized steel feet, 1½x¾-inch.

The braces are made of ¾x¼-inch steel galvanized, with painted lugs. Each litter is provided with three leather straps, for folding up, also two blue webbing shoulder straps. Weight 21 pounds.

Price each \$7.00

Double Deck Cot No. 65

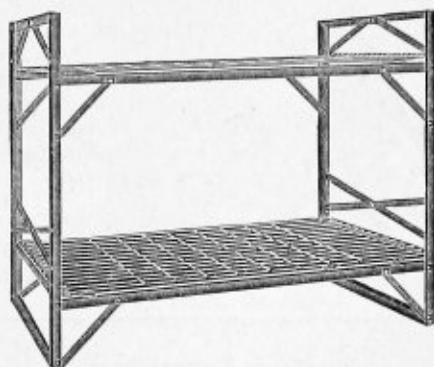


This is designed especially for portable houses or for tents, where space will not admit of two cots along side. The combination is made up of one of our house cots and another similar cot about 28 inches above, thoroughly braced and attached to the lower cot. When the lower cot is occupied there is no danger of tipping, and the upper cot, which is only about 40 inches above the floor, is perfectly rigid.

Each cot is 6 feet 6 inches long and 27 inches wide, covered with 12-ounce double filled brown duck, and has a duck fold for a pillow. Both folded together are 6 feet 6 inches long by about 8 inches in diameter, and weigh about 25 pounds.

Price of combination \$4.67

Steel Bunks for Contractors and Campers



The framework is exclusively angle and band steel. In the main frame the fabric is made of heavy wire links with oil-tempered helical springs at each end. The entire construction is such that by removing a few bolts it is knocked down into four parts for shipping. Every logging camp and railroad construction camp should have them.

No. 185. Double-deck bunk. Size 4 ft. 6 in. x 6 ft. 5 in. Weight 190 pounds. Price each \$13.33

No. 185. Double-deck bunk. Size 3 ft. x 6 ft. 5 in. Weight 145 pounds. Price each \$12.00

No. 186. Single-deck bunk. Size 4 ft. 6 in. x 6 ft. 5 in. Weight 105 pounds. Price each \$7.00

No. 186. Single-deck bunk. Size 3 ft. x 6 ft. 5 in. Weight 78 pounds. Price each \$6.33

Cot Mattress

Superior quality cotton felt, covered with an excellent grade of ticking, with slab edges. Made expressly for our folding cots.

No. 1. 2 ft. 6 in. wide, 6 ft. long. Price each \$3.00

No. 2. 3 ft. wide, 6 ft. long. Price each 3.75

Stretcher Bed



We manufacture a special stretcher bed of heavy canvas, either brown or tan color. Size when opened is 3 feet wide and 6 feet long. There are pockets along the sides in which poles are to be inserted and the entire stretcher is supported by stakes driven in the ground at the four corners. In the woods suitable poles and stakes can always be found.

Price of canvas alone, each \$2.25

Folding Camp Chair



No. 3. This chair can be folded and carried as easily as an umbrella. It is extra strong and guaranteed to hold a weight of 300 pounds. It adjusts itself to the body, and is comfortable. Take one of these along with you. Weight 6 pounds.

Each.....\$1.66

No. 4. Same chair as above, with back 6 inches higher. Weight 6½ pounds. Each.\$2.08

Reclining Camp Chair



No. 11

A very comfortable chair, strong and substantially built. Seat covering is of fancy striped duck, double and movable. Frame is of best hardwood and finished in oil. Weight 10 pounds. Each.....\$1.12

No. 11A. Same as No. 11, but with arms and arm rests. Price each.....\$1.40

Folding Lawn Settee



These settees are made of hardwood, spring seat, and are used largely at summer resorts and on lawns. The bodies are finished in vermilion or green and the seats in oil, and the entire settee is covered

with a good coat of varnish. Made in two sizes, viz.:

No. 14. Length 3 feet 6 inches. Weight 16 pounds. Each.....\$2.00

No. 16. Length 6 feet. Weight 26 pounds. Each.....\$2.59

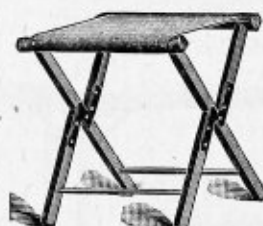
Folding Camp Chairs and Stools



No. 10 Chair

Made of hardwood, birch or rock-elm, nicely finished with filler and varnish, and is a very handsome and good chair in every way. Brussels or velvet carpet seats. An excellent folder, a dozen of them when packed making a very small bundle about 15x26x36 inches, which weighs about 60 pounds. For extras at churches, clubs, opera houses, etc., it has no equal. It is a favorite with undertakers and furniture dealers who rent chairs. Each.....\$1.15

No. 5 Stool



This is the strongest and neatest camp stool manufactured. It folds so compactly that a large number can be packed in a small space. On this account, and because of its small cost, it will be found useful on many occasions. Guaranteed to support 500 pounds.

The seat is 10-ounce brown duck. Weight 3½ pounds. Price each...\$0.50

Folding Slat Seat Chair

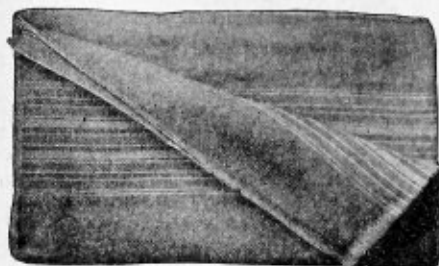


The Regulation Folding Chair

No. 2222

Strong and comfortable, adapted for outdoor use. Exposure to weather will not injure it. Made of hard maple, varnished. Weight 7 pounds. Price, each....\$1.00

Blankets



Camp Blankets

No. 1. Gray shoddy mixture, a good double blanket for lumber and contractors' camps. Just suited for hard wear as a bottom blanket.

Size 60x76 inches.....\$2.50

No. 2. "Outdoor" single light gray all wool blanket, handsome even stripe black border, a very popular medium price blanket. Size 66x80 inches. Weight 4 pounds.

Price each.....\$5.00

No. 3. "Outdoor" single seal brown all wool blanket, alternate narrow and wide stripe black border. A very desirable and handsome blanket, size 66x80 inches. Weight 4 pounds.

Price each.....\$5.00

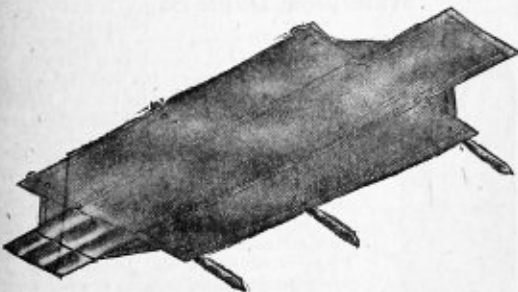
No. 4. "Delux" pearl gray all wool single blanket, alternate narrow and wide black striped border, has no equal at the price. Size 66x80 inches. Weight 5 pounds.

Price each.....\$6.75

No. 5. "Delux" seal brown all wool single blanket, even stripe black border, a very handsome blanket and warranted to give satisfaction. Size 66x80 inches. Weight 5 pounds.

Price each.....\$6.75

Bed Rolls



A Combination Bed and Pack Sack

Construction: Made of heavy brown duck, strongly sewed and reinforced. It measures six by eight inches wide and nine feet four inches long and has flaps at each end—one two feet nine inches long, the other two feet six inches long—both three feet wide. The long flap has six large pockets suitable for packing shoes, moccasins, etc.

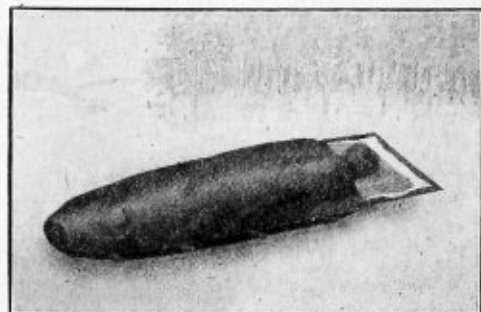
There are also three heavy straps and buckles, as shown in cut.
Price each.....\$12.00

Kapok Special Life Preserver Cushion



Price per dozen.....\$12.00

Sleeping Bags



For Cold and Damp Climates

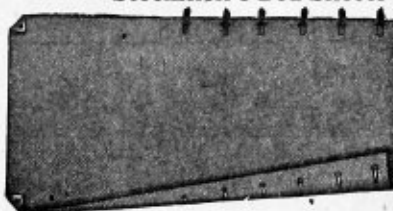
Made in three parts: (1) Outside bag of our special brown gullwing, which is water-repellant, extra heavy and closely woven; (2) lining of either sheepskin or wool; (3) inside bag of white drill, which can be removed and cleaned. A sensible and sanitary sleeping bag, waterproof, and the warmest thing next to fur obtainable.

Size: Body of bag is 6 feet long, and a 2-foot flap to give additional protection to the head. The bag is 3 feet wide at top, and shaped toward the bottom, as shown in cut.

Sheepskin lining, weight 20 lbs. Price each.....\$26.66

Wool lining, weight 15 lbs. Price each.....16.66

Stockmen's Bed Sheets



Made from one width of white duck. Finished with snaps and rings. Edges turned and stitched.

Size, Feet	Price Each 13-oz. or No. 10 Duck	Price Each 15-oz. or No. 8 Duck	Price Each 18-oz. or No. 6 Duck	Price Each 20-oz. or No. 4 Duck
6 x 12	\$ 6.48	\$ 7.20	\$ 8.28	\$ 9.36
6 x 14	7.56	8.40	9.66	10.92
6 x 15	8.10	9.00	10.35	11.70
6 x 18	9.72	10.80	12.42	14.04
7 x 12	7.56	8.40	9.66	10.92
7 x 14	8.82	9.80	11.27	12.74
7 x 16	10.08	11.20	12.88	14.56
7 x 18	11.34	12.60	14.49	16.38
8 x 12	8.64	9.60	10.92	12.48
8 x 14	10.08	11.20	12.88	14.56
8 x 16	11.16	12.40	14.26	16.12
8 x 18	12.96	14.40	16.56	18.72

Pack Sacks



An extremely serviceable pack sack, made of heavy brown Gullwing, a closely woven and waterproof material, especially made for us. Fitted with adjustable shoulder straps and an inside pocket for packing small articles. All parts are heavily sewed and reinforced.

This is the best pack made for medium and heavy carrying.

No.	Size, Ins.	Each
1.	18x16x4	\$3.00
2.	20x16x5	3.50
3.	22x18x6	4.00

With adjustable head strap, 50 cents extra.

Lightweight Pack Sacks

A special light weight sack for carrying small loads. Used on walking trips or in mountain climbing and by women on canoe trips. Made of a fine grade of brown duck, heavily sewed and fitted with adjustable shoulder straps. Made flat, 22x22 inches in size, and will readily conform to the shape of contents. Full capacity about 55 pounds.



Price, complete with head strap.....\$2.75

Heavy Pack Harness



Showing heavy pack harness loaded with a 14x16-foot wall tent packed in an 18x36-inch duffel bag. The straps are of the finest leather, securely riveted and sewed to the shoulder yoke. Made throughout of heavy brown canvas, double thickness. It is readily adapted to all sizes and shapes of packs.

Price of harness only, complete with shoulder and breast straps.....\$3.50

Food Bags



The most convenient method of carrying sugar, coffee, salt, rice, beans, oatmeal, etc., in pack sacks, as they are of no particular shape and can be packed in anywhere.

Eight to ten of the 5-pound size can be packed in one of our light weight pack sacks.

Made in any size to order, of the best canvas, with string lacing at top. When closely tied up, the contents are proof against moisture and insects.

We have three sizes in stock:

5-lb. size or less, per doz.	\$2.75
10-lb. size or less, per doz.	3.50
10-lb. size, extra heavy, doz.	4.00

Dunnage Bags

These bags are very handy where there is a large equipment. Made 45 inches long, of light or heavy duck.

8-oz. duck, dozen	\$ 9.75
12-oz. duck, dozen	13.35



Waterproof Duffel Bag



Made of a special brown waterproofed canvas with heavy seams and a double top. Both the inside and outside tops can be closed tightly with cords. The smaller bags are just the thing for provisions and general camp supplies and the larger sizes are suitable for packing tents.

We fit each duffel bag with handles at the side and bottom to add to their portability. With these handles on the bag no special harness is necessary for carrying them on the shoulders. An additional advantage of a duffel bag such as we make is that any goods packed therein are accepted anywhere as baggage.

Diam., Inches	Length, Inches	Weight, Ounces	Price per Dozen
9	24	11	\$12.00
12	36	21	15.25
15	36	29	17.50
18	36	35	24.00

Special locks, each.....\$0.50



OFFICE MAIL BAGS

Nos. 1 to 6, inclusive, are made entirely of leather as shown in illustration.

Nos. 7 to 12, inclusive, have canvas bodies with leather bottom and leather welt on each side.

Locks furnished on any of the above bags at an additional cost of 25c per bag.

All Leather

Size, Inches		No.	Price Each	Canvas and Leather	
10 x 13		1	\$4.00	7	\$3.25
12 x 15		2	4.50	8	3.75
14 x 17		3	5.25	9	4.00
15 x 20		4	6.00	10	4.75
16 x 24		5	7.00	11	5.50
18 x 26		6	7.50	12	6.00

PARCEL POST MAIL SACKS

Same as used by U. S. Government in mail service. Extra heavy white duck with patent metal fastener.

No. 1—30x40 inches, each\$2.00

No. 2—36x48 inches, each 2.50



REGULATION MAIL POUCHES

Made the same as those of the U. S. Government Postal Service. Very durable.



No.	Size Inches	Price Each	
		All Leather	Canvas with Leather Bottom
20	16 x 26	\$ 8.50	\$6.50
21	18 x 30	10.00	7.50
22	20 x 36	11.25	8.50
23	24 x 42	12.50	9.75
24	30 x 48	15.50	10.75

OFFICE MAIL BAGS

A compact bag of rugged construction, designed for rapid handling of small quantities of mail. No lock.

No. 13—10x10 inches, each\$2.50



INTER-DEPARTMENT BAG

A new type of bag that has proven of unusual service where current papers must be kept sorted.

The messenger going from one place of business to another or from department to department keeps incoming and outgoing matter always in order.

Slow search through the entire lot of mail to find the desired papers is eliminated—the separately consigned papers go in their respective divisions.

Bags are made of strong canvas with edges bound. Each bag equipped with shoulder and lock straps.



No.	Pockets	Price Each
501	10	\$5.00
502	15	6.00
503	20	7.00

MESSANGER SATCHELS WITH LOCK

For carrying money, jewelry, valuable papers or parcels. Hand made steel frame, heavy white cotton duck upper, with lower sides and base of grain leather. Heavy leather handles and strong lock.

No.	Size Frame Inches	Price Each Including Lock
62	14	\$3.00
63	16	3.25
64	18	3.50
65	20	4.00
66	22	4.50
67	24	4.75



BOND BAGS

Sturdy of construction and adapted to many uses.

Heavy steel frame, leather covered. Sides are of canvas, with leather base and bottom. Pocket on inside.

No. 53—14 inches long, each.....	\$4.50
No. 54—16 inches long, each.....	4.75
No. 55—18 inches long, each.....	5.00
No. 56—20 inches long, each.....	5.75
No. 57—22 inches long, each.....	6.00
No. 58—24 inches long, each.....	6.50

HAVERSACKS

Roomy, Serviceable

Bags for carrying parcel post packages, samples, etc.

Made of white or colored cotton duck, well sewed and leather bound.

No. 70—14 in. long, each\$1.75

No. 71—16 in. long, each 2.00

No. 72—18 in. long, each 2.25



H. Channon Company Chicago

CARRY-ALL BAGS

Made of brown cotton duck and leather bound with leather handles.

Nos. 16 and 17 have leather flap with strap to lock.

No.	Material	Size Inches	Price Each
15	10 oz. Duck	20 x 27	\$3.50
16	24 oz. Duck	22 x 31	5.50
17	24 oz. Duck	24 x 26	6.75



SHELL BAGS

Regulation style with shoulder strap and piece.

No.	Material	Capacity Shells	Price Each
130	8 oz. Duck	50 to 100	\$0.60
131	10 oz. Duck	50 to 100	.85
132	10 oz. Duck	100 to 200	1.15
133	15 oz. Army Duck	50 to 100	1.00
134	Russet Grain Leather	50 to 100	2.50

MASONS' TOOL BAGS

Made of heavy duck and lock-stitched with strong twine. Cannot rip unless every thread is cut. Has steel frame, leather handles and lock with key.



Without Pocket			With Pocket		
No.	Size Inches	Each	No.	Size Inches	Each
80	14	\$1.50	101	14	\$1.60
81	16	1.65	102	16	1.75
82	18	1.80	103	18	1.95
83	20	2.00	104	20	2.20
84	22	2.25	105	22	2.50
85	24	2.50	106	24	2.75

LINEMEN'S TOOL BAGS

Will Stand Rough Handling

Made of heavy canvas, sewed to a steel frame with leather base—heavy straps over top.

No.	Size Inches	Each	No.	Size Inches	Each
86	14	\$3.00	89	20	\$4.00
87	16	3.30	90	22	4.50
88	18	3.50	91	24	5.00



PARCEL POST MAILING BAGS



Approved By Postal Service

The handiest and most practical parcel post carrier made. Closely woven sheeting with strong draw string at top and address tag at bottom of bag.

Your name and address printed on tag for \$1.00 per thousand extra. They will not only prove serviceable carriers but furnish unique advertising.

Size	Price per 100 With Plain Tags	Price per 1000 With Plain Tags
3 x 4	\$1.50	\$13.35
3 1/2 x 5	1.65	14.65
4 x 6	2.00	18.00
5 x 7	2.10	19.35
5 x 8 1/2	2.30	21.30
5 1/2 x 10	2.60	23.50

Tags printed with your name and address, \$4.00 per thousand extra. For less than 1,000 printed tags, \$4.00. Special sizes to order.

LEATHER PORTFOLIOS

For carrying Mail, Documents or other valuables. Carefully made of Fine Tan Grained Calfskin.

No. 260. 12x12 in., per dozen, \$38.75



LETTER CARRIERS' SATCHELS

Made of leather or colored canvas.

Size, 15x16 inches

No.	Material	Price Each
40	Leather	\$6.50
41	Canvas	4.25



Tool Bags



Channon's Plumbers Tool Bags

Made of brussels carpet,
lined with duck and leather
bound.

No.	Style	Size, Inches	Price, Each
100	Plain Bottom.....	18 x 26	\$3.50
102	Leather Bottom.....	18 x 26	4.50
103	Leather Bottom and Sides.....	18 x 26	5.75

Channon's Gasfitters Bag—No. 50

Extra heavy
brown duck with
stiff leather bot-
tom.



Lined with brown canvas. Five metal studs on bottom.
Strong leather shoulder strap fastened to frame with nickel-
plated rings. Leather handles and center strap passing around
bag to keep it in shape when loaded. 18 in. long, 12 in. high,
8 in. wide.
Each..... \$3.50

Channon's New Tool Bag

For Electricians, Linemen, Gasfitters and Plumbers

Selected grain leather. Heavy
water-proof binder's board reinforces
the bottom, which is protected by
eight metal studs.

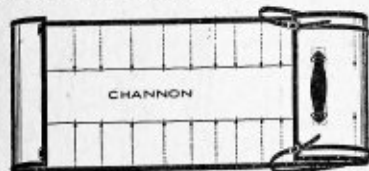
The flap or cover is a continuation
of one side of the bag and fastens in
front with three one-inch leather
straps and buckles. Shoulder strap is
connected to bag by plated snaps and
rings.

All edges and bottom are piped and
sewed on a lock stitch machine. The
bag cannot rip open unless every
thread is cut.

19 in. long, 8½ in. wide, 10 in. deep.
Each..... \$6.50



Channon Plumbers' Tool Roll—No. 60



Used by plumbers and steamfitters. Extra heavy white duck
entirely bound with leather. Pockets are of same material,
riveted at the top by double-headed japanned rivets and sewed
with heavy carpet thread. Has thirty assorted size pockets.
Two russet leather straps 1 inch wide passing through leather
stays. Extra heavy reinforced leather handle. Size, 56 in.
long, 24 in. wide.
Per dozen..... \$37.00

Coal Bags



Channon's Coal Bag No. 217

One of the
most durable
bags we manu-
facture.

The handles are reinforced and extend clear around the bag.
Bag has handles set low on the sides to make it easy to empty.
This is a feature worth considering. The bag is made of No. 4
duck, double bottom of 12-oz. double filled duck. Strongly
sewn and reinforced at the corners.

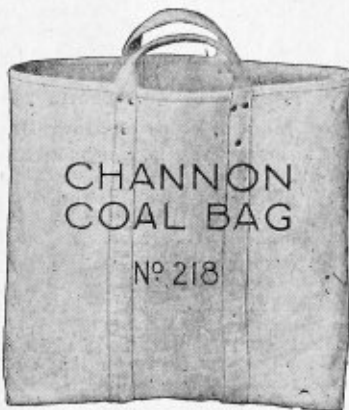
No. 217. Price per dozen..... \$13.33

Channon's Coal Bag No. 216

Made of No. 4 duck,
finished with canvas
handles extending
about six inches down
the side.

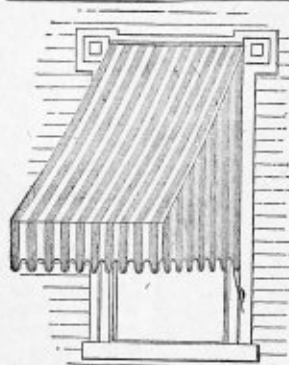


No. 216. Price per dozen..... \$10.00



Channon's Coal Bag No. 218

An unusually
durable bag.
Made of No. 4
duck with rein-
forced handles,
extending com-
pletely around
the bag to re-
sist strain from
rough handling.
Price per
dozen, \$11.50



Carroll Adjustable Awnings

Any awning will fit a window two inches wider or two inches narrower than the size it is made by spreading or contracting the arms where they fasten to the building, so that by making three sizes we can fit all ordinary windows.

Carroll Adjustable Window Awnings are made in three sizes, each size fitting three different widths of windows, and are made exactly like all high priced awnings.

Made in three sizes, 8-oz. Duplex duck, blue and white, or brown and white, complete with pulleys, ropes, cleat, galvanized fixtures, screws, staples, etc., and full directions for hanging.

Height, 42 inches; projection, 30 inches. Price per dozen \$24.00

No. 1 fits windows 2 feet 4 inches, 2 feet 6 inches and 2 feet 8 inches wide.

No. 2 fits windows 2 feet 10 inches, 3 feet and 3 feet 2 inches wide.

No. 3 fits windows 3 feet 4 inches, 3 feet 6 inches and 3 feet 8 inches wide.

Unless otherwise ordered, we pack six No. 1, four No. 2 and two No. 3 in each bale.

Each awning wrapped separately. Shipping weight, 80 pounds per dozen.

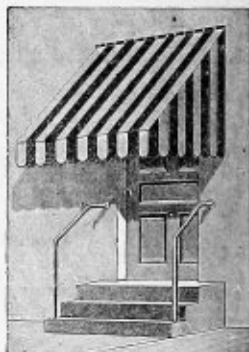
Bieder Adjustable Door Awnings

Are made adjustable the same as Bieder Adjustable Window Awnings, and fit all size doors from 4 feet to 6 feet wide. They are made of the same duck as the window awnings, and adjust in the same manner.

To not interfere with screen doors (which swing out) they are made large enough to fasten about two feet above top of door, and with enough extension to allow door to open out without touching them and wide enough to fasten outside of the door frame.

No. 4 Bieder Adjustable Door Awning, 8-oz. Duplex duck, blue and white, or brown and white, adjustable frame, galvanized fittings, widths adjustable from 4 feet to 6 feet, length 60 inches, projection 50 inches, complete with pulleys, rope, cleat, staples, screws, etc., and full directions for hanging. Each awning wrapped in cloth. Price per dozen \$72.00

Packed one-half dozen in bale. Shipping weight, 50 pounds per bale (½ doz.).



Bieder Adjustable Porch Curtains

Are made adjustable in the same manner as the Bieder Adjustable Window Awnings, and of the same material.

They are made in three sizes, are easily adjusted, easy to hang and will fit any porch.

They add much to the comfort and seclusion of the home.

Eight-oz. Duplex, blue and white, or brown and white, adjustable frame, complete with pulleys, ropes, cleat, screws, galvanized fixtures, and full directions for hanging.

No. 5 Adjustable, 4 ft. to 6 ft. wide, 76 in. high..... \$48.00

No. 6 Adjustable, 6 ft. to 8 ft. wide, 76 in. high..... 60.00

No. 7 Adjustable, 8 ft. to 10 ft. wide, 76 in. high..... 72.00

Shipping weights: No. 5, 60 pounds per dozen. No. 6, 90 pounds per dozen. No. 7, 120 pounds per dozen.

Each curtain wrapped separately.

Canvas Aprons

Made of White or Brown Duck

Made of heavy white or brown duck. Long pattern, to reach below the knees. Large pocket on front, adjustable neck supporters. Mechanics' are divided so as not to interfere with walking.

	Carpenter	Per Doz.
No. 3. 8-oz. brown duck.....		\$3.60
No. 5. 8-oz. white duck.....		3.40

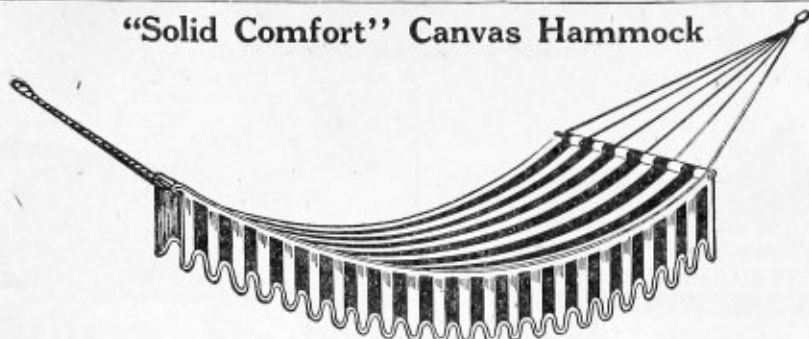
	Mechanics	
No. 4. 8-oz. brown duck.....		4.10
No. 6. 8-oz. white duck.....		3.90

No. 20. Special carpenters aprons, made of 10-oz. brown duck, with two large pockets extending across entire bottom and two small individual pockets near top. Corners of all pockets are reinforced with leather.

Price per dozen \$4.00



"Solid Comfort" Canvas Hammock



List Prices

			Per dozen
No. 1.	Made of fancy duplex striped canvas, with full valance.....		\$25.00
No. 1A.	Made of fancy duplex striped canvas, no valance.....		19.50
No. 2.	Made of fancy champion striped canvas, blue or brown, full valance.....		22.00
No. 2A.	Made of fancy champion striped canvas, blue or brown, no valance.....		17.30
No. 3.	Made of plain white canvas, no valance.....		14.40

United States Flags



All our flags are made of genuine wool bunting as made for by U. S. Government specifications. They are properly sewed and finished throughout in a first-class manner. We guarantee the workmanship to be unexcelled. The small sizes have canvas headings and brass grommets, but the larger sizes, from 15x10 feet upwards, have strong canvas headings with manila ropes inserted. We sew a full complement of stars on each union, except on the 3 and 4-foot sizes, which have but thirteen stars.

Our flag manufacturing department is the largest in the country, and we take special pride in the quality of work turned out. Channon flags can be found on all the school houses and public buildings in the country.

2 x 3.....	\$ 1.81	8 x 12.....	\$14.40	12½ x 25.....	\$43.47
2½ x 4.....	2.40	8 x 15.....	17.73	15 x 24.....	47.27
3 x 5.....	3.06	8 x 16.....	18.80	15 x 25.....	52.00
3 x 6.....	3.60	9 x 14.....	18.40	15 x 30.....	63.07
4 x 6.....	4.27	9 x 15.....	19.50	18 x 27.....	64.00
4 x 7.....	4.93	9 x 16.....	20.80	20 x 30.....	81.60
4 x 8.....	5.33	9 x 18.....	23.20	20 x 36.....	96.93
5 x 8.....	6.77	10 x 15.....	21.87	20 x 40.....	107.47
5 x 9.....	7.47	10 x 16.....	23.20	24 x 36.....	113.33
5 x 10.....	8.13	10 x 18.....	25.87	24 x 40.....	128.00
6 x 9.....	8.53	10 x 20.....	28.53	25 x 40.....	136.00
6 x 10.....	9.33	11 x 22.....	34.06	25 x 45.....	149.33
6 x 12.....	11.47	12 x 18.....	30.35	25 x 50.....	160.00
7 x 11.....	11.60	12 x 20.....	33.47	30 x 50.....	197.33
7 x 12.....	12.97	12 x 22.....	36.67	40 x 60.....	333.33
7 x 14.....	14.80	12 x 24.....	40.40	50 x 75.....	533.33

Steel Flag Poles

Re-Mov-Able

The poles that are 20 feet and 25 feet above ground are made in two sections and the 30-foot, 35-foot and 40-foot in three sections, besides the sockets. The sections fit into each other, making a gradual taper.

The lower half of the pole is filled with concrete which adds very materially to the strength.

These steel poles are superior to wooden poles for the following reasons: They will not rot and will last indefinitely—they can be taken to pieces and housed—no holes have to be dug, as the sockets are driven into the ground—they are also ornamental.

The prices which include all the fittings and halyards are much lower than wooden poles and are as follows:

20-foot.....	\$12.50	35-foot.....	\$31.50
25-foot.....	16.00	40-foot.....	24.50
30-foot.....	18.50		



Flag Poles

Nicely stained, mahogany finish. Complete with wooden ball and truck.

Length, Feet	Diam., Inches	Price Each	Length, Feet	Diam., Inches	Price Each
8.....	1½	\$1.00	14.....	1½	\$1.67
10.....	1½	1.23	16.....	1½	2.00
12.....	1½	1.47	18.....	1½	2.67

Flag Poles—Heavy One Price

Length, Feet	Diameter		Price Each	Length, Feet	Diameter		Price Each
	Base, Ins.	Top, Ins.			Base, Ins.	Top, Ins.	
12.....	3	1½	\$ 6.25	52.....	10	3¼	\$ 96.25
16.....	4	1¾	9.69	54.....	10	3¼	100.00
20.....	4	1¾	12.50	56.....	10	3¼	103.75
20.....	6	2½	14.38	58.....	10	3¼	107.50
24.....	6	2½	17.50	60.....	10	3¼	115.00
30.....	6	2½	27.50	60.....	12	4½	136.25
36.....	6	2½	33.13	62.....	12	4½	142.50
36.....	8	3¼	35.00	64.....	12	4½	150.00
40.....	8	3¼	49.38	68.....	12	4½	158.75
40.....	10	3¼	66.25	70.....	12	4½	172.50
46.....	8	3¼	60.00	72.....	12	4½	187.50
46.....	10	3¼	80.00	74.....	12	4½	193.75
50.....	8	3¼	65.00	76.....	12	4½	200.00
50.....	10	3¼	91.25				206.25

Fittings furnished with each flag pole consist of ball, truck cord and cleat.

Flag Staff Brackets



Galvanized Iron for Window Display
No. 768. For 1¼-inch pole. Price.....\$0.45
No. 768. For 1½-inch pole. Price.....\$0.50

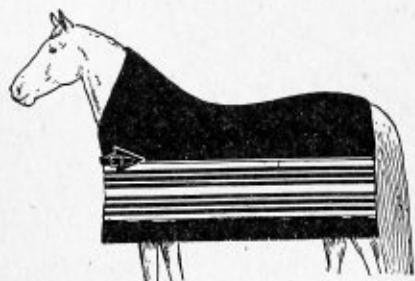
Flag Pole Holders

Malleable Iron, Galvanized



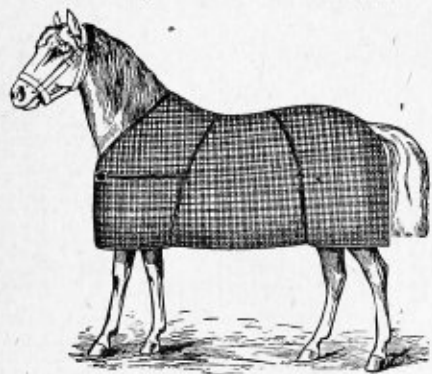
Number	Bore, Inches	To Fit Poles Length in Feet	Price Dozen
0.....	2	18	\$18.00
1.....	1¾	16	13.00
2.....	1½	12	11.00
3.....	1¼	10	9.50
4.....	1½	9	8.50

Channon Horse Blankets



Channon Wool Horse Blankets

- D105.**—5-lb., 76x80, dark natural gray body, striped border. Price each.....**\$3.33**
D106.—6-lb., 80x85, dark natural gray body, striped border. Price each.....**\$3.55**
D107.—6-lb., 80x84, high grade wool blanket, with cotton warp, golden fawn, fast color, wide fancy border of scarlet stripes. Price each.....**\$8.00**
D109.—7-lb., 84x90, same as D-107. Price each.....**\$9.33**
D112.—7-lb., 84x90, fine all-wool blanket, fast color, reversible fancy plaids on blue, brown or green blankets. Full weight and size. Heavy double weave. Price each.....**\$11.00**
D113.—Dark blue wool horse blankets, first quality throughout, fast color, wide scarlet fancy border. Best blue on the market. 7-lb., 84x90, price each, **\$8.00**; 8-lb., 90x90, price each, **\$8.66**; 9-lb., 90x96, price each.....**\$9.33**



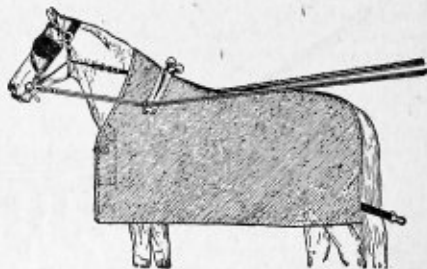
Channon Stable Blankets

D1120.—"Brigadier" stable blanket. 10-oz. satin finish bur-lap, with full sized good lining. Edges turned up and hemmed all around. Fitted with two 1 1/4-inch web sureingles and stays. Reinforced on top of neck and breast.

- | | Price Each |
|-----------------------------------------------------------|---------------|
| No. 1. For horses of 900 lbs. to 1,150 lbs. weight..... | \$3.75 |
| No. 2. For horses of 1,200 to 1,450 lbs. weight..... | 3.50 |
| No. 3. For horses of 1,500 lbs. to 1,700 lbs. weight..... | 3.75 |
- D1121.**—"Survivor" stable blanket, made of fancy blue and brown check, salmon plaid or Baker duck fully lined, with two 2-inch blue web sureingles and 2-inch web binding around entire blanket, two snaps in front.
- | | Price Each |
|-----------------------------------------------------|---------------|
| No. 1. For horse 900 lbs. to 1,150 lbs. weight..... | \$4.90 |
| No. 2. For horses 1,200 to 1,450 lbs. weight..... | 5.20 |
| No. 3. For horses 1,500 to 1,700 lbs. weight..... | 5.50 |

Channon Rain Covers

Full-sized—water repellent. Made of 12-oz. D. F. gullswing duck, with hame leathers, trace carriers and adjustable front straps. Price each.....**\$3.75**
 Made of oiled brown duck. Price each.....**3.75**



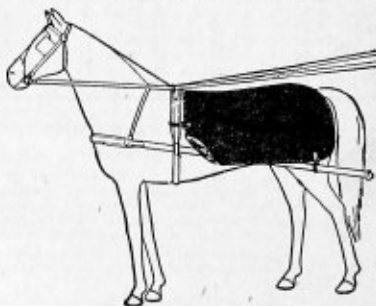
Channon Storm Blankets, Lined

- No. 1132. "Bernays". Size 84x90. Price each.....**\$5.00**
 No. 1133. "Salvator". Size 84x80. Price each.....**\$7.25**
 No. 1134. "Tenny". Size 84x80. Price each.....**\$6.25**

Our Special No. 1135



Square shaped, size 84x90 inches. Cover of dark brown water repellent 12-oz. D. F. gullswing duck with a full sized 6-lb. colored horse blanket for a lining. Edges are carefully finished and hemmed. Fitted with hame leathers, trace carriers and adjustable front straps. Sure protection against cold, wind, rain or blizzard. Price each,.....**\$9.00**



Channon Kidney Covers

- No. 10. 12-oz., brown Gullswing duck, unlined, with front straps and trace carriers. Price each.....**\$2.00**
 No. 20. Same as No. 10, but lined with good grade blanket. Price each.....**\$2.66**
 No. 50. Heavy black oiled duck, unlined. Best grade leather in straps. Price each.....**\$2.50**
 No. 60. Same as No. 50, but lined. Complete in every detail. Price each.....**\$3.33**

Channon Feed Bags

We are the largest manufacturers of feed bags in the country, and show herewith the styles we have found from our long experience to be the strongest and most satisfactory bags for all around use. These are the popular bags with the dealers because most easily saleable.



No. 1

A first-class cheap bag. Made of heavy 12-oz. duck wired onto a carefully selected hardwood bottom. Rope head strap. Price per dozen.....\$4.00



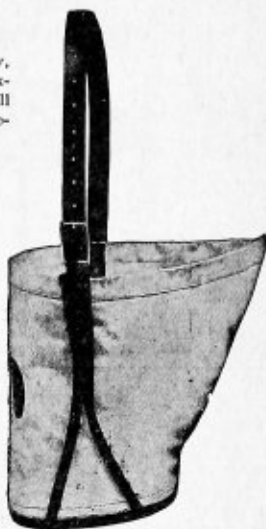
No. 2

Our most popular seller. Heavy 12-oz. duck top. Large leather bottom and ventilator. Four-foot head strap. Price per dozen.....\$8.40



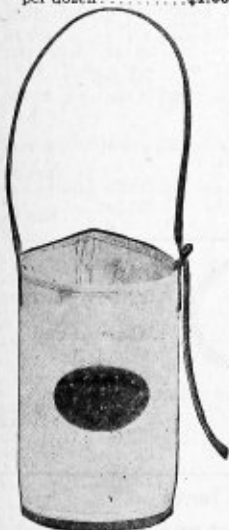
No. 5

Harness leather throughout. The strongest feed bag made. Special No. 8 duck top. Extra large leather bottom and half leather body as shown in cut. Four-foot leather head-strap. Heavily sewed and riveted. For those who want the best. Price per dozen.....\$18.25



No. 6

Heavy No. 6 duck top, 16 in. deep and 18 in. across opening when laid out flat. 4 1/2-foot head-strap made of 1-in. leather. Oval bottom 8x10 inches. Made of best leather. Large leather ventilator. Price per dozen.....\$15.25



No. 7

While this bag is similar to our No. 2 style, it is better and stronger in every way. The top, which is cut larger to make it suitable for large horses, is made of genuine 12-oz. double-filling duck. Leather bottom, ventilator and 4-foot head-strap. The most serviceable all-around feed bag on the market today. Price per dozen.....\$8.75



Coal Bag, Style 18

Coal bag style, 18 inches wide by 17 inches deep. Made of 12-oz. double-filling duck, with double bottom, adjustable canvas head-strap, heavily sewed and riveted throughout. A light bag, strong and durable. Price per dozen.....\$14.00



No. 8

Harness leather throughout. Special quarter leather body, adding greatly to the strength and durability of the top, which is made of No. 8 duck. This 4-inch strip of leather, heavily sewed onto the canvas top and riveted to the leather bottom, reinforces the bag where it is necessary and prolongs the life of the bag 100 per cent. Large leather ventilator and head-strap. Price per dozen.....\$14.50

Six Rib Umbrella



Covered with heavy duck in blue, brown, white or green.
Price, including wagon fixtures, each.....\$2.50

Wagon Sunshades
Three Bow Tops

With all irons ready to attach to seat.
Covered with striped duck.
Price each.....\$5.00



Extra Irons

Hand wheels. Price each.....\$0.25
Bolts. Price each......20
Complete sets. Price each..... 1.00

Window Washers'
Belt

The strongest belt made.
One that will give excellent
service combined with perfect
safety.
Price each.....\$5.00

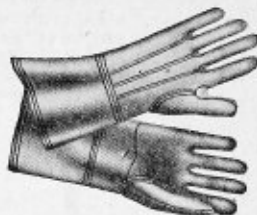
Rubber Aprons



Suitable for packing
houses, automobile
washers, tanners, fish-
ermen, etc.

Black, double-coat-
ed. No. 4, 32½x45
inches. Each.....\$2.50
Light. Each..... 3.00
Heavy. Each..... 3.00

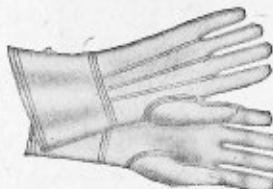
Half Long Rubber Gauntlet



No. 35-872. Men's half long black 5-inch gauntlet. Sizes
13, 14, 15. Price per dozen pairs.....\$72.00
No. 35-873. Men's half long black 5-inch gauntlet. Size 16.
Price per dozen pairs.....\$78.00
No. 35-874. Men's half long black 5-inch gauntlet. Size 17.
Price per dozen pairs.....\$84.00

Long Gauntlet

No. 35½-873. Men's long black 9-inch gauntlet. Sizes 13,
14, 15. Price per dozen pairs.....\$84.00
No. 35½-874. Men's long black 9-inch gauntlet. Size 16.
Price per dozen pairs.....\$90.00
No. 35½-875. Men's long black 9-inch gauntlet. Size 17.
Price per dozen pairs.....\$96.00

Half Long Rubber Gauntlet
Acid White

These gloves have a 5-
inch gauntlet.

No. 32-842. Men's half
long, heavy acid white
only. Sizes 13, 14, 15.
Price per doz. prs. \$72.00
No. 32-843. Men's half
long, heavy acid white
only. Sizes 16, 17.
Price per doz. prs. \$84.00

No. 32-852. Men's half long, heavy acid white, with fingers
and thumbs reinforced. Sizes 13, 14, 15.
Price per dozen pairs.....\$81.00
No. 32-853. Men's half long, heavy acid white, with fingers
and thumbs reinforced. Sizes 16, 17.
Price per dozen pairs.....\$93.00

Awning Rings
Galvanized

Inside diameter, ¼, ¾, 1½, 2 and 3-inch.
¼ to ¾. Price per pound.....\$0.50
¾ to 1½. Price per pound......55
1½ to 2. Price per pound......60
2 to 3. Price per pound......65
1-inch and larger. Price per pound......50

Awning Cleats

Galvanized Malleable Iron and Brass Curved
Horns

No. 1. 4½ inches galvanized. Price per dozen.....\$0.20
No. 2. 6 inches galvanized. Price per dozen......35
No. 3. 8 inches galvanized. Price per dozen......50
No. 4. 10 inches galvanized. Price per dozen..... 1.50

No. 602

Boy Scouts' Pocket Knife and Tool Kit

Pocket book, knife, reamer, file, saw, chisel, screwdriver, cork puller. All 8 in 1, each tool firmly attached or detached to knife in a second.

Always at hand for immediate use, whether camping, boating, teaming, driving, in the shop, factory, office, store, warehouse, automobile, on the farm, bicycle or around the home.

Price \$2.25



Scout's Axe



The New Official Axe of the Boy Scouts

Larger size officially adopted. Weight, with handle, 1 pound 5 ounces.

Solid steel of special analysis, from head to cutting edge. Double tempered, making a good keen edge. Hard, yet tough.

Highest grade hickory handles, with special forest finish.

Sheath of heavy russet leather.

The handiest tool in a woodsman's kit.

Without sheath. Price each \$1.50

With new heavier sheath. Price each 2.00

Hunters' Hatchets or Axes



A good axe is one of the main requisites of a good camp, and care should be exercised in its selection. We have given a great deal of attention to our axes, and those we offer cannot be improved on for quality.

No. 1. Bright, polished bit, 12-inch handle, natural finish, weight 1 1/4 pounds. Price each \$1.50

No. 2. Bright, polished bit, 14-inch handle, natural finish, weight 1 3/4 pounds. Price each \$1.75

The Channon Collapsible Pail



Open, with Spout

These pails are carefully constructed in our own canvas factory of an especially prepared duck.

The pail is firmly shaped, by heavy wire rings, making it very strong and serviceable. A wire bail is securely fastened to the top ring and finished with a wooden handle. Furnished with or without spouts.

Just the thing for the practical automobilists or launch owner.

Size 6 quarts, without spout. Price per dozen \$ 7.00

Size 10 quarts, without spout. Price per dozen 8.00

Size 6 quarts, with spout. Price per dozen 9.00

Size 10 quarts, with spout. Price per dozen 10.00

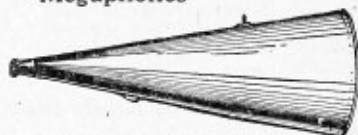


Open, without Spout

For Auto-
mobilists
and
Launch
Owners

Megaphones

Few people are fully acquainted with the many uses of the megaphone. The U. S. Navy, the large steamships and tug boats; all classes of yachts and sailing vessels, as well as many railroads, race tracks, golf clubs, etc., are using them in large numbers. The small megaphone or "Hurrah Phone" is a favorite among college and school boys for cheering on their men in athletic meets or foot ball and base ball teams. They increase the volume of sound to such an extent that a small body of students armed with them can drown the shouts of four times their number without.



Plain Strap Handles

Plain mouth piece—no hoops.

No.	Length, Inches	Price Each
1	12	\$0.25
2	15	.40
3	20	.50

Nickeled Trimmings—With Handles and Hoop

No.	Length, Inches	Price Each
1A	12	\$1.00
2A	15	1.50
3A	20	1.75
4	24	2.25
5	30	2.50
6	36	3.00
7	42	3.50
8	48	5.00
9	60	8.00

Galvanized Awning Blocks

Malleable Iron Swivel Eye
Single Sheave

No.	Lgt. of Shell, Ins.	Dia. of Rope, Ins.	Dia. of Sh'Ve, Ins.	Per Doz.
0	1	3/8	3/8	\$0.55
1	1 1/8	3/4	3/4	.65
3	1 3/4	3/4	1	.90
5	2	3/4	1 1/8	1.40
7	2 1/2	3/4	1 3/8	2.00

Double Sheave

No.	Lgt. of Shell, Ins.	Dia. of Rope, Ins.	Dia. of Sh'Ve, Ins.	Per Doz.
00	1 1/8	3/8	3/8	\$0.70
2	1 3/8	3/4	3/4	1.10
4	1 3/4	3/4	1	1.60
6	2	3/4	1 1/8	2.25
8	2 1/4	3/4	1 3/8	2.80



H. Channon Company Chicago

Ounce Duck

Single Filling

29-inch, 7-ounce.	Price per yard	\$0.26 ³ / ₄
29-inch, 8-ounce.	Price per yard	.30
29-inch, 9-ounce.	Price per yard	.34 ¹ / ₄
29-inch, 10-ounce.	Price per yard	.37 ¹ / ₂
29-inch, 12-ounce.	Price per yard	.45
36-inch, 8-ounce.	Price per yard	.31 ¹ / ₂
36-inch, 10-ounce.	Price per yard	.38 ¹ / ₄
36-inch, 12-ounce.	Price per yard	.45 ³ / ₄
40-inch, 10-ounce.	Price per yard	.38 ³ / ₄
40-inch, 11-ounce.	Price per yard	.42

Magnolia

29-inch, 7-ounce.	Price per yard	\$0.29 ¹ / ₂
29-inch, 8-ounce.	Price per yard	.33
29-inch, 10-ounce.	Price per yard	.41 ¹ / ₄
29-inch, 12-ounce.	Price per yard	.49 ¹ / ₂
36-inch, 8-ounce.	Price per yard	.34 ¹ / ₂
36-inch, 10-ounce.	Price per yard	.42
36-inch, 12-ounce.	Price per yard	.50 ¹ / ₄
40-inch, 10-ounce.	Price per yard	.42 ¹ / ₂
40-inch, 11-ounce.	Price per yard	.46 ¹ / ₄

Double Filling

29-inch, 8-ounce.	Price per yard	\$0.38
29-inch, 10-ounce.	Price per yard	.47 ¹ / ₂
29-inch, 12-ounce.	Price per yard	.57
36-inch, 10-ounce.	Price per yard	.48 ¹ / ₄
36-inch, 12-ounce.	Price per yard	.59 ¹ / ₂

Army Khaki Duck

Prices

28-inch, 8-ounce.	Price per yard	\$0.50
28-inch, 10-ounce.	Price per yard	.61
28-inch, 12-ounce.	Price per yard	.72
28-inch, 8-ounce khaki drill.	Price per yard	.45
33-inch, 8-ounce shelter tent drill.	Price per yd	.60

Double Filling Khaki Duck

8-ounce, 28-inch.	Price per yard	\$0.45
10-ounce, 28-inch.	Price per yard	.55
12-ounce, 28-inch.	Price per yard	.65

Single Filling Khaki Duck

8-ounce, 28-inch.	Price per yard	\$0.40
10-ounce, 28-inch.	Price per yard	.50
12-ounce, 28-inch.	Price per yard	.60

Colored Duck

Heavy Weight Dyed Duck

Price per Yard

44-inch No. 10 slate, tan and brown	\$0.75
44-inch No. 8 slate, tan and brown	.85
44-inch No. 6 slate, tan and brown	.95

Dyed Ounce Ducks, Single Filling

Price per Yard

Weight, ounces	7	8	10	12	10	10	11
Width, inches	29	29	29	29	36	40	40
Tan and brown	\$0.36	\$0.40	\$0.47	\$0.55	\$0.48	\$0.49	\$0.52
Slate and mode	.36	.40	.47	.55	.48	.49	.52
Black		.42					
Turkey red		.45					
Canary yellow		.45					
Indigo blue		.45					
Green		.45					

Colored Duck

Dyed Ounce Ducks, Double Filling Price per Yard

Weight, ounces	8	10	12
Width, inches	29	29	29
Brown	\$0.48	\$0.57	\$0.67

Black Oiled Duck

List Price per Yard

Widths	36	40	44	48	50
No. 10	\$0.72	\$0.80	\$0.88	\$0.96	\$1.00
No. 12	.63	.70	.77	.84	.88
Widths	54	60	66	72	84
No. 10	\$1.08	\$1.20	\$1.32	\$1.44	\$1.68
No. 12	.95	1.05	1.16	1.26	1.47

Put up 25 yards in roll.

Enamel Duck

Widths	Per Yard
36-inch black enameled muslin	\$0.19 ¹ / ₄
45-inch black enameled muslin	.21
54-inch black enameled muslin	.26 ¹ / ₄
36-inch black enameled drill	.29
45-inch black enameled drill	.30
50-inch black enameled drill	.32
54-inch black enameled drill	.37
38-inch black enameled duck	.36
45-inch black enameled duck	.38
50-inch black enameled duck	.40
54-inch black enameled duck	.44
60-inch black enameled duck	.59

Drills

Prices

	Per Yard
30-inch 285	\$0.20
30-inch 250	.25
30-inch 8-ounce	.30



Cotton Sail Twine

In 3/4-pound balls, 4, 5, 6, 7 and 8-ply, per pound \$0.50

Cotton Seine Twine

Medium Laid

In 1/2-pound balls, Nos. 12, 18, 24, 30, 36 and 40. Price per pound \$0.55



Cotton Rope

Best Quality—
"A" Brand



For porch and store awnings use 3/8 and 1/2-inch. We sell our rope in patent coils or ordinary reels. Unless otherwise notified we make delivery in either form.

Size 1/4-inch diameter.	Price per pound	\$0.40
Size 3/8-inch diameter.	Price per pound	.39 ¹ / ₂
Size 1/2-inch diameter.	Price per pound	.38 ¹ / ₂
Size 3/4-inch diameter.	Price per pound	.38
Size 1-inch diameter.	Price per pound	.38
Size 1 1/8-inch diameter.	Price per pound	.38
Size 1 1/4-inch diameter.	Price per pound	.38
Size 1 1/2-inch diameter.	Price per pound	.38
Size 1 3/4-inch diameter.	Price per pound	.38
Size 2-inch diameter.	Price per pound	.38

Less than coils or reels 2 cents per pound extra.

November 15, 1916

Wide Cotton Duck

Nos.	2-0	0	1	2	3	4	5	6	7	8	9	10	11	12
26-inch	\$0.73	\$0.69	\$0.66	\$0.62	\$0.58	\$0.55	\$0.52	\$0.49	\$0.47	\$0.43	\$0.40	\$0.36	\$0.34	\$0.30
28-inch	.78	.75	.71	.67	.63	.60	.56	.52	.50	.46	.43	.39	.36	.32
30-inch	.84	.80	.76	.71	.67	.64	.60	.56	.54	.49	.46	.42	.39	.35
32-inch	.90	.85	.81	.76	.72	.68	.63	.60	.57	.52	.49	.45	.41	.37
34-inch	.95	.90	.86	.81	.76	.72	.67	.63	.61	.56	.52	.47	.44	.39
36-inch	1.01	.96	.91	.86	.81	.76	.71	.67	.64	.59	.55	.50	.46	.41
38-inch	1.06	1.01	.96	.90	.85	.81	.75	.71	.68	.62	.58	.53	.49	.44
40-inch	1.12	1.06	1.01	.95	.90	.85	.79	.74	.71	.65	.61	.56	.51	.46
42-inch	1.17	1.12	1.06	1.00	.94	.89	.83	.78	.75	.69	.64	.58	.54	.48
44-inch	1.23	1.17	1.11	1.05	.98	.93	.87	.82	.78	.72	.67	.61	.56	.50
46-inch	1.29	1.22	1.16	1.09	1.03	.97	.91	.85	.82	.75	.70	.64	.59	.53
48-inch	1.37	1.30	1.23	1.16	1.10	1.04	.97	.91	.87	.78	.74	.68	.63	.56
50-inch	1.43	1.35	1.28	1.21	1.14	1.08	1.01	.95	.91	.83	.77	.71	.65	.58
52-inch	1.48	1.41	1.33	1.26	1.19	1.12	1.05	.98	.94	.87	.80	.74	.68	.60
54-inch	1.54	1.46	1.39	1.31	1.24	1.17	1.09	1.02	.98	.90	.83	.76	.70	.63
56-inch	1.60	1.52	1.44	1.36	1.28	1.21	1.13	1.06	1.02	.93	.86	.79	.73	.65
58-inch	1.65	1.57	1.49	1.41	1.32	1.25	1.17	1.10	1.05	.97	.89	.82	.76	.67
60-inch	1.73	1.64	1.55	1.47	1.38	1.32	1.23	1.16	1.11	1.02	.94	.86	.80	.71
62-inch	1.78	1.69	1.61	1.52	1.43	1.37	1.27	1.20	1.15	1.05	.97	.89	.82	.73
64-inch	1.84	1.75	1.66	1.57	1.47	1.41	1.32	1.23	1.18	1.08	1.00	.92	.85	.76
66-inch	1.90	1.80	1.71	1.61	1.52	1.45	1.36	1.27	1.22	1.12	1.04	.95	.87	.78
68-inch	1.96	1.86	1.76	1.66	1.57	1.50	1.40	1.31	1.26	1.16	1.07	.98	.90	.80
70-inch	2.01	1.91	1.81	1.71	1.61	1.54	1.44	1.35	1.29	1.19	1.10	1.01	.93	.83
72-inch	2.13	2.03	1.92	1.81	1.71	1.61	1.51	1.41	1.35	1.25	1.15	1.05	.97	.86
74-inch	2.19	2.08	1.97	1.86	1.75	1.66	1.55	1.45	1.39	1.28	1.18	1.08	1.00	.89
76-inch	2.25	2.14	2.03	1.91	1.80	1.71	1.59	1.49	1.43	1.31	1.21	1.11	1.02	.91
78-inch	2.31	2.19	2.08	1.96	1.85	1.75	1.63	1.53	1.47	1.35	1.25	1.14	1.05	.94
80-inch	2.37	2.25	2.13	2.01	1.90	1.80	1.68	1.57	1.50	1.38	1.28	1.17	1.08	.96
82-inch	2.47	2.35	2.23	2.10	1.98	1.87	1.75	1.64	1.58	1.44	1.33	1.22	1.12	1.00
84-inch	2.53	2.41	2.28	2.16	2.03	1.92	1.79	1.68	1.61	1.47	1.37	1.25	1.15	1.02
86-inch	2.59	2.47	2.34	2.21	2.08	1.97	1.84	1.72	1.65	1.51	1.40	1.28	1.18	1.05
88-inch	2.65	2.52	2.39	2.26	2.12	2.01	1.88	1.76	1.68	1.54	1.43	1.31	1.20	1.07
90-inch	2.72	2.58	2.44	2.31	2.17	2.06	1.92	1.80	1.72	1.58	1.46	1.34	1.23	1.10
92-inch	2.83	2.69	2.55	2.40	2.26	2.14	1.99	1.87	1.79	1.64	1.52	1.39	1.27	1.14
94-inch	2.89	2.74	2.60	2.46	2.31	2.19	2.04	1.92	1.83	1.68	1.55	1.42	1.31	1.16
96-inch	2.95	2.80	2.66	2.51	2.36	2.23	2.09	1.95	1.87	1.71	1.59	1.45	1.34	1.19
98-inch	3.07	2.91	2.76	2.61	2.45	2.32	2.17	2.03	1.94	1.78	1.65	1.51	1.39	1.23
100-inch	3.13	2.97	2.82	2.66	2.50	2.37	2.21	2.07	1.98	1.82	1.68	1.54	1.41	1.26
102-inch	3.19	3.03	2.87	2.71	2.55	2.42	2.26	2.11	2.02	1.85	1.71	1.57	1.44	1.28
104-inch	3.25	3.09	2.93	2.77	2.60	2.47	2.30	2.16	2.06	1.89	1.75	1.60	1.47	1.31
106-inch	3.38	3.21	3.04	2.87	2.70	2.56	2.39	2.24	2.14	1.96	1.81	1.66	1.52	1.35
108-inch	3.44	3.27	3.10	2.93	2.75	2.60	2.43	2.28	2.18	2.00	1.85	1.69	1.55	1.38
110-inch	3.50	3.33	3.15	2.98	2.80	2.65	2.48	2.32	2.22	2.03	1.88	1.72	1.58	1.40
112-inch	3.57	3.39	3.21	3.03	2.86	2.70	2.52	2.36	2.26	2.07	1.91	1.75	1.61	1.43
114-inch	3.70	3.51	3.33	3.14	2.96	2.80	2.61	2.45	2.34	2.14	1.98	1.81	1.66	1.48
116-inch	3.76	3.57	3.39	3.20	3.01	2.85	2.66	2.49	2.38	2.18	2.01	1.84	1.69	1.50
120-inch	3.89	3.70	3.50	3.31	3.11	2.94	2.75	2.58	2.46	2.26	2.08	1.91	1.75	1.56

Cotton Sail Duck

No.	2-0	0	1	2	3	4	5	6	7	8	9	10	11	12
22-inch	\$0.64	\$0.61	\$0.58	\$0.54	\$0.51	\$0.49	\$0.46	\$0.44	\$0.42	\$0.40	\$0.38	\$0.35	\$0.33	\$0.31
24-inch	.70	.66	.63	.59	.56	.53	.50	.48	.46	.43	.41	.38	.36	.34

Army Ounce Duck

Ounces	7	8	9	10	12	15
28½-inch	\$0.23	\$0.25	\$0.28	\$0.30½	\$0.36	\$0.46

H. Channon Company Chicago

Washer Grommets

Sheet Brass



Number	Diameter of Hole When Inserted, Inches	Per Gross	Brass Nickel Plated per Gross
0	3/8	\$0.50	\$0.70
1	1/2	.80	1.00
2	5/8	1.10	1.20
3	3/4	1.50	1.85
4	7/8	2.50	
5	1 1/8	3.50	
6	1 1/4	5.00	

Teeth Grommets

Sheet Brass



Number	Diameter of Hole When Inserted, Inches	Per Gross
0	3/8	\$0.50
1	1/2	.90
2	5/8	1.25
3	3/4	1.75
4	7/8	2.75
5	1 1/8	4.00

Eyelet Grommets

Sheet Brass



Number	Diameter at Bottom, Inches	Per Gross
1	3/8	\$1.15
2	1/2	1.35
3	5/8	1.60
4	3/4	1.80
5	7/8	2.25
6	1	2.70
7	1 1/8	3.15
8	1 1/4	5.00
10	1 3/8	7.00
15	2 1/2	10.00

Three Part Grommets

Cast Brass

Sheet Brass

Cast Brass



Number	Diameter of Hole Inserted, Inches	Per Gross
1	1/8	\$1.80
2	1/4	2.00
3	3/8	2.70
4	1/2	3.60
5	5/8	4.75
6	3/4	6.25
7	7/8	8.50
8	1	10.00
9	1 1/8	12.00
10	1 1/4	14.00
15	1 1/2	30.00

Conical Pointed, Rolled Rim Grommets

Cast Brass

Sheet Brass



Number	Diameter of Hole Inserted, Inches	Per Gross
2	3/8	\$2.00
3	1/2	2.70
4	5/8	3.60
5	3/4	4.75
6	7/8	6.25
7	1	8.50
8	1 1/8	10.00

Spur Grommets

Sheet Brass



Number	Diameter of Hole Inserted, Inches	Per Gross
1	3/8	\$1.80
2	1/2	2.00
3	5/8	2.70
4	3/4	3.60
5	7/8	4.75
6	1	6.25
7	1 1/8	8.50
8	1 1/4	10.00

Regular

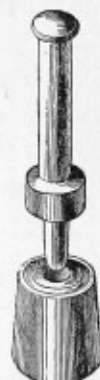
Side

Cutting Punches



Each	Regular, Each	Side, Each
0	\$1.00	\$0.50
1	1.00	.50
2	1.20	.60
3	1.30	.65
4	1.50	.75
5	1.75	1.00
6	2.00	1.30
7	2.25	1.60
8	2.50	
9	2.75	
10	3.00	

Setting Dies



Number	For Washer and Teeth Grommets Each	For C. P. R. R. and Spur Grommets Each	For Eyelet Grommets Each
0	\$2.00	\$2.00	
1	2.15	2.15	\$2.15
2	2.25	2.25	2.25
3	2.35	2.35	2.35
4	2.50	2.50	2.50
5	2.70	2.70	2.70
6	3.00	2.80	2.80
7		3.00	3.00
8		3.25	3.25
9			3.50
10			4.50
15			15.00

Sail Needles James Smith & Sons



Long Square

Number	Per Hundred	Number	Per Hundred
17	\$2.00	13	\$ 3.00
17½	2.00	12	4.00
16	2.00	11	5.00
16½	2.00	10	7.00
15	2.00	9	9.00
15½	2.00	8	11.00
14	2.50	7	13.00
14½	2.50	6	17.00

25 in a Package.

Reduced Edge Sail Needles, No. 17 to No. 12, list same as above.

SHORT SQUARE

Per Hundred	Per Hundred
Flat Seam.....\$2.00	Small Bolt Rope.....\$4.00
Tabline.....2.00	Middle Bolt Rope.....5.00
Old Work.....2.20	Large Bolt Rope.....6.60
Store.....2.50	Small Marline.....8.40
Head Rope.....3.00	Large Marline.....10.80

Packing or Sack Needles

25 in a Package.



No.	Length, Inches	Per Gross	Number	Length, Inches	Per Gross
14	3	\$2.00	9	5½	\$ 6.20
13	3½	2.40	8	6	8.00
12	4	3.00	7	6½	11.00
11	4½	3.80	6	7	13.20
10	5	4.60	5	8	14.00

3 dozen in a package.

Sailors' Palms



	Per Dozen
1 Half Hide Mounted, Seaming.....	\$2.00
2 Full Hide Mounted, Seaming.....	2.65
3 Brass Mounted, Seaming.....	2.65
4 Hide and Brass Mounted, Seaming.....	3.00
9 Common Roping for Sailors.....	3.00



Sailmakers' Palms

	Per Dozen
10 Read's Seaming.....	\$19.00
11 Read's Roping.....	25.00
12 Smith's Pattern, Seaming.....	25.00
13 Smith's Pattern, Roping.....	31.00



Metal Tent Slides

Size	Length, Inches	Diameter Hole, Inches	Price, per Dozen	
			Galvanized	Brass
No. 1	5	¾	\$0.75	\$1.50
No. 2	4	¾	.50	1.00
No. 3	3	¾	.30	.60



Sail Hooks With Brass Swivel

Per dozen.....\$2.00



Closed Thimbles

Galvanized Malleable Iron

Measure Extreme Diameter Outside, i. e. from Edge to Edge.

Size Inches	Price per Dozen		Size Inches	Price per Dozen	
	Light	Heavy		Light	Heavy
5/8	\$0.25		2½	\$0.80	\$1.25
¾	.25		2¾	.95	1.60
7/8	.30		3	1.10	1.70
1	.35		3¼	1.35	1.90
1¼	.38		3½	1.70	2.15
1½	.40		3¾		2.50
1¾	.42		4		3.25
1¾	.45		4¼		3.60
1¾	.50		4½		4.30
1¾	.55		4¾		5.40
2	.60	\$0.70	5		6.30
2¼	.70	.85			



Egg Shaped Thimbles

Galvanized Malleable Iron

Measure extreme length of Thimble outside.

Size	Per Dozen	Size	Per Doz.
1½-inch.....	\$0.50	2½-inch.....	\$0.90
1¾-inch.....	.50	2¾-inch.....	1.25
1¾-inch.....	.55	3-inch.....	1.75
1¾-inch.....	.60	3¼-inch.....	2.00
2-inch.....	.70	3½-inch.....	2.75
2¼-inch.....	.80		

Marline Spikes

Polished Steel

Length, inches.....	8	10	12	14	16
Price, per dozen.....	\$3.50	\$4.00	\$5.00	\$6.50	\$9.96



Wood Handles.

Sailmakers' Prickers

Steel Points.

	Each
No. 1. 10 inches.....	\$0.75
No. 2. 10½ inches.....	.90
No. 3. 8 inches.....	.50



Hand Fids

Numbers.....	1	2	3	4
Length, inches.....	14	16	18½	20½
Price each.....	\$0.50	\$0.60	\$0.75	\$1.00



Standing Fids

Numbers.....	1	2	3	4
Length, inches.....	30	32	36	40
Diameter of Butt, inches.....	4	5	6	6½
Price each.....	\$2.00	\$2.50	\$3.00	\$3.50

H. Channon Company Chicago

Freight Classifications (L. C. L.)

Copyrighted by H. Channon Company

On traffic originating in Chicago, the U. S. is divided into four general classification territories, viz.: Eastern or Official, Southern, Western and Illinois, designated below as E, S, W and I.

Eastern Territory includes all states east of Lake Michigan and Illinois and north of the Ohio River, including West Virginia and points on and north of the S. & W. Ry. in Virginia—embracing all the Central, North Atlantic and New England States and Eastern Canada. Also applies to Louisville, Henderson and Owensboro, Ky., Bristol, Tenn., points on the C. & O. in Kentucky and the eastern portion of the North Peninsula of Michigan and all Virginian Ry. stations.

Southern Territory includes all states south of the Ohio River and points south of the N. & W. Ry. in Virginia, except as provided in Eastern Classification. Also applies to points on west bank of Mississippi River from Helena, Ark., to New Orleans.

Western Territory includes Wisconsin, the Northern Peninsula of Michigan, Minnesota and all points west of the Mississippi River excepting as otherwise provided under the Southern and Illinois Classification.

Illinois Classification Territory includes the state of Illinois, and points on the west bank of the Mississippi River from St. Louis, Mo., to Dubuque, Iowa, inclusive.

Explanation of Characters used below:—

1 = First Class. 2 = Second Class. 3 = Third Class. 4 = Fourth Class. 5 = Fifth Class. 6 = Sixth Class.
 1½ = 1½ times 1st Class. D1 = Double 1st Class. 2½ = 2½ times 1st Class. 3-1 = 3 times 1st Class. L. C. L. = Less than carload.
 A = Class A, W and S. B = Class B, W. only. C = Class C, W. only. R25 = Rule 25, E. Classification only = 15% less than 2nd Class. K. D. = Knocked down. S. U. = Set up.
 N. O. S. = Not otherwise specified.

ITEMS	CLASSES				ITEMS	CLASSES				ITEMS	CLASSES			
	W	I	E	S		W	I	E	S		W	I	E	S
Adzes	2	3	3	2	Canvases, Cotton	1	3	1	1	Forges, K. D., crated	2	2	2	2
Anchor	4	4	4	5	Car Movers	2	4	R26	3	Forks	2	2	R25	3
Angles, Steel	4	4	4	6	Cars	1	1	1	1	Furniture, Camp	1½	2	1	1
Anvils	4	4	R26	5	Carts, Concrete	3	1	1	1	Generators, Electric	1	1	1	3
Asbestos Cement	3	4	R26	5	Carts, Hand, K. D.	1½	1½	D1	1	Globes, Lantern, boxed	2	2	1	2
" Cloth	1	1	1	1	Castings	4	4	4	4	Glue Heaters	1	1	1	1
" Paper	3	4	R26	5	Cements, Asbestos	3	4	R26	5	Gongs, Steel, boxed	3	3	2	3
" Mill Board	4	3	3	3	" Pipe	3	4	3	3	" Brass, boxed	2	2	1	2
Augers, Post Hole	2	3	R25	3	" Roofing	4	4	4	2	Governors, Steam	1	2	2	3
Awnings, in bundles	3	3	3	2	Channels, Steel	4	4	4	5	Grain Shovels	2	2	x	x
Awning Fixtures, boxed	3	3	3	2	Chain, Coll., Alloy	4	4	4	5	Graphites	2	3	3	4
Axes	2	3	3	3	" Iron	4	4	4	5	Greases, Fall	2	3	3	3
Babbitt Metal	3	4	3	4	Chucks	2	2	2	2	" Metal Cans	4	3	R26	3
Bags, Feed, boxed	1	1	1	2	Chutes, Coal	2	4	2	2	Grinders	1	1	1	2
" Mail	2	2	2	2	" nested	3	4	3	3	Grindstones, loose	4	4	R26	5
Balls, Steel, boxed	1	3	2	2	Clamps, Machinists	2	4	3	3	" with frames, K. D.	3	4	R26	4
Barrels, Steel	D1	1	D1	1	Clips, Wire Rope	4	4	4	4	Hammers, Hand	2	3	3	3
20 gauge or higher	1	3	3	3	Clutches	2	2	2	2	" Power	1	1	1	3
19 gauge or lower	1	3	3	3	Coal, Blacksmith	4	4	4	5	" Steam	2	1	1	3
Barrows, see Wheel Barrows					Collectors, Dust	D1	1	3-1	3-1	Hammocks	1	1	1	1
Bars, Crow, etc	4	4	4	4	Columns, Water	1	2	2	2	Handles, crated	4	4	3	3
" Grate	4	4	4	4	Compressors	1	2	2	2	Hangers, Barn Door	3	3	R26	4
" Steel	4	4	4	6	Conveyors, Screw	2	3	R26	3	" Joist	4	4	4	6
Batteries, Dry	3	2	R25	2	Copper Sheets, boxed	2	3	3	2	Hardware, boxed	2	3	3	2
" Blastings	1½	1	1	1	Cotters, boxed	4	4	4	4	Hatchets	2	3	3	3
" Storage	1	1	1	1	Cotton, Caulking	1	2	2	2	Headlights, Loco	D1	D1	1	D1
Beams, Steel	4	4	4	5	Cots, Wire	1	2	1	1½	Heaters, Asphalt	1	2	1	2
Bearings, Roller	1	3	2	4	" K. D., crated	3	2	2	1	" Feed Water	2	3	2	2
Benches, Work, S. U.	1½	1½	1½	2	Covers, Canvas	1	1	1	2	Hinges or Butts	3	4	R26	3
" K. D.	2	2	2	3	Cranes	1	2	2	3	Hods	2	2	2	3
Benders, Rail	3	3	3	3	Crayons, boxed	2	3	3	2	Hoes, Garden	2	2	R25	3
" Tire	3	3	1	2	Crushers, Rock	2	4	R26	4	" Grub	3	4	R26	4
Bellows	1	1	1	1	Cutters, Pipe	2	2	2	2	Holsts, Chain	2	3	2	3
Bells, Iron, boxed	3	3	2	3	Derricks	1	2	2	3	" Steam	1	2	2	3
" Loose	2	3	R25	3	Derrick Irons	4	4	4	3	Hooks, Cant.	3	3	2	2
" Brass, boxed	2	2	1	2	Dies and Stocks	2	2	2	3	" Lug	3	3	2	2
" loose	1	2	1	2	Dispers, Post Hole	2	3	R25	1	" Steel, bundles	2	3	2	2
Beltins	1	2	2	2	Diving Apparatus	D1	1	1	1	" boxed	4	3	3	4
" Link	4	4	4	2	Doors, Mill	4	2	2	4	Horsehoes, boxed	3	4	4	6
Bits, Auger	2	2	3	2	Dollies, Timber	2	2	R25	3	Hose, in bundles	1	1	2	2
Blankets	1	1	1	1	Dressing, Belt	2	2	3	3	" boxed	2	2	3	2
Blocks, Tackle	3	3	3	3	Drills, Post, B. S.	2	2	2	5	Hose Reels, S. U., crated	1	1	1½	1
" Swage	3	3	3	5	" Power	1	1	1	1	Hydrants	3	4	R26	3
Blowers, Blacksmith	2	2	2	5	" Rock	1	1	3	1	Injectors	1	2	2	2
Board, Wall	3	4	3	5	Dumb Waiters, K. D.	1	2	2	2	Iron and Steel Goods	4	4	4	6
Boilers					Electrical Appliances	1	1	1	1	Jacks, Wooden	1	1	3	3
10 feet and under	3	3	2	3	Elevator Buckets	3	4	R26	3	" Iron	3	4	3	3
10 to 30 feet	1	1	2	3	" Boots	D1	2	2	2	Kettles, Caldron	3	3	R25	3
Boilers, Heating, G. I.	1	1	2	1	Elevators, S. U., house	D1	1	1	3	Ladders, crated	3	3	2	2
Set up	4	3	4	3	" K. D., boxed	2	2	2	3	Lag Screws	4	4	4	5
K. D.	4	3	4	3	Engines	1	2	2	3	Lamps, Art.	1	1	1	1
Boiler Castings	4	4	4	6	" Semi-Portable	2	2	2	3	" Incandescent	1½	D1	1½	1
" Flues	4	4	4	5	" Hoisting	2	2	2	3	Lanterns, with Globes	1	1	1	2
" Covering	4	3	3	5	Emery Paper	3	4	3	3	Lath, Metal	3	4	4	4
Boils, Iron, boxed	4	4	4	5	Extinguishers, Fire	1	1	1	1	Lath Yarn	3	3	3	3
" In bags	3	4	4	5	Fans, Electric	D1	1	1	1	Lead, Bar, Sheet	4	2	2	4
" 12 in. long or over, bdls	4	4	4	5	Fencing, Wire	3	4	R26	6	" White	4	4	4	4
Boxes, steel, boxed	1	1	1	1	Files	2	3	3	2	Life Preservers	1	1	1	1
Brass, Sheet, boxed	2	3	3	2	Filter Cloths	1	2	1	4	Lights	1	1	1	1
Brattice Cloth	4	4	3	3	Fire Extinguishers	1	1	1	1	Lubricators	1	1	1	2
Brooms	1	1	1	1	Fish Plates	4	4	4	6	Machinery, S. U.	1	4	3	3
Brushes, bundles	1	1	1	1	Fittings, Pipe, Iron	2	3	3	2	Manifolds, K. D., boxed	2	2	2	3
" boxed	2	1	1	1	" Brass	2	3	3	2	Mandrels, Blacksmith	3	4	3	4
Buckets, Coal	3	2	2	3	Flag Poles, Wood, loose	1½	3	1	1	Mattocks	3	4	R26	4
" Dump	2	2	2	3	" Iron	2	2	1	3	Megaphones	D1	D1	1½	1
" Dredging	3	2	2	3	Flags, in bundles	D1	1½	1½	1	Mixers, Concrete	1	1	1	2
" Ore	2	2	2	3	" baled, boxed	1	1	1	1	Mops	2	1	1	1
" Steel	3	2	2	3	Flue Cleaners	2	3	2	2	Motors, Electric	1	1	1	3
Camp Furniture	1½	2	1	1	Forgings, Steel	4	4	4	5	Mowers, Lawn	2	1	1	2
Cans, boxed	1	1	1	1	Forges, S. U., crated	1	2	1	1	Nails	4	4	4	6

Minimum Charge—Usually 100 lbs. at First Class Rate.

Freight Classifications (L. C. L.) Continued

ITEMS	CLASSES				ITEMS	CLASSES				ITEMS	CLASSES			
	W	I	E	S		W	I	E	S		W	I	E	S
Nozzles, Brass	2	2	2	2	Rods, Iron	4	4	4	6	Tampers	3	3	3	3
Nuts, Iron	4	4	4	5	Rollers, Wood, loose	3	3	3	3	Tank Lugs	3	4	4	4
Oakum	2	2	2	2	Roofing, Paper	3	4	R26	5	Tanks, iron, nested	1	1 1/2	2	3
Oars, Boat	2	3	3	3	" Steel	4	4	4	4	" completely K. D.	4	4	4	4
Oils, Barrels	3	3	3	3	Rope Clamps	4	4	4	6	" 10 feet and under	3	1	2	3
" Cans, crated	2	3	2	3	Rope, Manila, burlapped	3	4	3	4	" 10 to 30 feet	1	1	2	3
Oil Cans	1	1	1	1	" Wire	4	4	R26	4	Tapes	1	1	1	1
" jacketed, crated	2	1	1	2	Rosin	4	4	4	5	Tar, Pipe, in barrels	3	4	4	3
Outfits, Camp Cook	1	1	1	1	Sand Driers	1	3	1	1	" in cans, crated	2	2	3	1
" Divers	D1	1	1	1	Sand Paper	3	4	3	3	Tarpaulins	1	1	1	2
" Sand Blast	1 1/2	1	1	D1	Saw Blades, on boards	1	1 1/2	1	1	Tents	1	1	1	1
Packing, Hemp	3	3	3	3	" in crates	2	2	2	1	Thimbles, Rope	4	4	4	4
" Rubber	1	3	3	3	" Mills, S. U.	1	1	1	3	Tiros, Auto.	1 1/2	1	1 1/2	1 1/2
Pails, Galvanized, nested	2	2	R25	2	" K. D., crated	2	2	2	3	Tools	2	2	3	2
" Wood, nested	2	2	2	2	Seals, crated	2	2	2	2	Tools, Anvil	3	3	4	5
Painting Machines	D1	1	1	3	Scoops	3	3	R25	4	" Carpenters	1	2	3	2
Paints	4	4	4	4	Scrapers, Drag	3	3	R25	4	" Mechanics	3	3	3	2
Paper, Building	2	4	R26	5	" Sidewalk	2	2	R25	3	" Logging	3	3	3	2
" Emery	3	4	3	3	" Wheeled	1 1/2	3	1 1/2	1 1/2	" Track	3	4	4	4
" Roofing	3	4	R26	5	" wheels off	3	3	1	4	Tongs, Skidding	3	3	3	3
" Sand	3	4	3	3	Screen Plates	4	4	3	6	Torches, Blow	1 1/2	1 1/2	1	1
Paulins, Canvas	1	1	1	2	Screens, Rev.	1	2	1	1 1/2	Truck, Portable	2	2	3	4
Peavies	3	3	2	2	" K. D.	2	2	2	2	Traps, Steam, crated	1	4	3	2
Picks, boxed	3	4	R26	4	" Sand and Coal	1	2	2	2	" over 100 lbs.	4	4	x	2
Pile Hammers	4	4	4	4	Screws, Brass	2	3	3	2	Trench Braces	4	3	4	3
" Steam	2	3	3	3	" Iron	4	4	4	5	Trolleys	2	3	3	3
Pipe, Alloy, bundles	1	3	3	2	" Wood, Hand	2	3	3	2	Trolley Systems	3	3	R26	2
" crated	2	4	4	6	Seythes	2	2	R25	2	Trucks, Hand	1	3	R25	3
" Iron or Steel	4	4	4	6	Separators, Steam	4	3	2	2	" House M.	3	3	R25	3
" Riveted, loose	D1	1	2	D1	Setters, Tire	4	4	4	5	Turnbuckles	4	4	4	3
" nested	1	1	2	2	Shafting, Steel	4	4	4	5	Turnbuckles	4	4	4	3
" nested and crated	2	3	2	2	" with Pulley'satch'd	1	3	2	3	Twine, Binder	3	3	3	3
" Fittings, Iron	4	4	4	6	Shears, loose	1	3	1	2	" baled	2	3	3	3
Pins, Drift	4	4	4	6	" K. D., crated	3	2	3	3	Upsettters, Tire	3	3	1	2
Pitch	4	4	4	6	Sheaves	3	3	3	3	Valves, Iron	4	4	R26	3
Planes	2	3	3	2	Sheets, Steel	4	4	4	6	" Brass	2	3	2	2
Plates, Steel	4	4	4	6	Shields, Expansion	2	4	4	6	Varnishes	2	2	2	2
Plows, S. U.	D1	1	1	1 1/2	Shingles, Asphalt	4	4	R26	5	Vises	2	4	R26	2
" K. D., boxed	3	3	R25	2	Shoes, Horse	4	4	4	6	Washers, Iron	4	4	4	4
Poles, Pike	3	3	3	2	Shovels	2	2	R25	3	Waste, Cotton	3	4	4	5
" Tent	3	3	3	3	" Snow	1	2	2	2	Wedges, Iron	4	4	4	4
Post Drills	2	3	3	3	Shrinkers, Tire	3	3	1	2	Welding Compound	3	3	4	4
Pullers, Stump, K. D.	3	3	R25	2	Sledges	3	3	R26	4	Weights, Sash	4	4	4	4
Pulleys, loose	1	3	3	3	Snaths, Scythe	1	1	1	1	Well Points	4	4	3	3
" over 100 lbs.	2	3	3	3	Spikes, Steel	4	4	4	6	Wheelbarrows, S. U.	1	1	1	1
" boxed	2	3	x	3	Sponges	D1	D1	D1	D1	" K. D.	2	2	2	3
Pump Jacks, crated	2	3	2	2	Sprayers, S. U.	1	2	1	1 1/2	Wheels, Buffing	1	1	1	3
Pumps, Hand	2	3	R25	3	" K. D., crated	3	3	2	1	" Car	4	4	4	6
" Iron, N. O. S.	1	3	2	3	Sprockets, less 50 lbs.	1	3	1	3	" Grinding	3	2	3	3
" Power	1	3	2	3	" over 50 lbs.	4	3	4	3	" Well	2	2	2	4
" Sand	3	3	2	3	Sockets, Rope	4	4	4	4	Whistles, Steam	1	2	1	1
" Windmill	3	3	R25	3	Solder	4	4	4	4	Wicking	1	2	2	5
Radiators	3	3	3	3	Spades	2	2	R25	3	Winches	1	3	R25	3
Rakes	2	2	1	1	Stacks, Smoke, 24-in. diam.	2	1	2	1	Wire Cloth, Steel	3	4	3	2
Reels, Hose, S. U., loose	D1	1 1/2	D1	1 1/2	" or less, 16 gauge and up.	2	1	2	1	" Fence	4	4	R26	6
" crated	1 1/2	1	1	1	Stakes, Tent	3	4	3	3	" Mesh Reinforcement	3	4	3	5
" wheels off cr'd	1	1	1	2	Staples	3	4	4	6	" Netting	3	4	R26	2
Replacers, Car	4	4	R26	6	Stocks and Dies	2	2	2	2	Wrenches	2	3	3	2
Rivets	4	4	4	6	Stoves	3	3	R25	3					

L. C. L. Freight Rates (per 100 lbs.)

On goods shipped from Chicago to a number of towns in each state. Other towns located in same part of the state take practically the same rate or only a few cents per 100 pounds more or less.

First, refer to Classification Tables to arrive at the proper class to which the goods belong, then locate the proper rate per 100 pounds in the table of rates following. Shipments of less than 100 pounds usually charged as 100 pounds at 1st Class rate. Rates given subject to changes.

From CHICAGO To	CLASSES				From CHICAGO To	CLASSES				From CHICAGO To	CLASSES			
	1st	2nd	3rd	4th		1st	2nd	3rd	4th		1st	2nd	3rd	4th
ALABAMA					ARIZONA					ARKANSAS—				
Anniston	142	122	103	83	Bisbee	290	251	209	175	Continued				
Bessemer	132	112	93	75	Clifton	321	276	240	212	Fort Smith	130	111	87	69
Birmingham	132	112	93	75	Douglas	290	251	209	175	Helena	110	90	75	58
Dothan	146	144	123	99	Globe	345	310	258	219	Hot Springs	155	132	105	81
Ensley	132	112	93	75	Morehead	327	281	245	216	Jonesboro	101	84	66	53
Flomenville	114	99	80	62	Nogales	290	251	209	175	Little Rock	120	101	77	59
Gadsden	142	122	103	83	Phoenix	290	251	209	175	Newport	111	91	70	58
Huntsville	114	99	80	62	Prescott	290	251	209	175	Paragould	101	84	66	53
Mobile	110	90	75	58	Tucson	290	251	209	175	Pine Bluff	120	101	77	59
Montgomery	133	117	100	77						Texarkana	147	127	108	92
Opelika	141	123	103	83	ARKANSAS					CALIFORNIA				
Selma	133	117	100	77	Argenta (Pub. Co.)	120	101	77	59	Alameda	340	295	245	207
Talladega	143	122	103	83	Arkansas City	120	101	77	59	Bakersfield	340	295	245	207
Tuscaloosa	143	124	101	79	Eldorado	147	127	105	81					

Commodity and Carload rates quoted upon request.

H. Channon Company Chicago

L. C. L. Freight Rates (per 100 lbs.)

From CHICAGO To	CLASSES				From CHICAGO To	CLASSES				From CHICAGO To	CLASSES			
	1st	2nd	3rd	4th		1st	2nd	3rd	4th		1st	2nd	3rd	4th
CALIFORNIA—Continued					ILLINOIS—Continued					INDIANA—Continued				
Fresno	340	295	245	207	Batavia	21.1	17.3	14.3	10.5	South Bend	23.1	21	17.9	12.6
Los Angeles	340	295	245	207	Beardsdown	39.6	32	24.8	19.9	Terre Haute	33.1	28.4	22.6	14.7
Modesto	340	295	245	207	Bellevue	45.1	36.9	29	23	Valparaiso	15.2	13.7	12.6	10.5
Redlands	340	295	245	207	Belvidere	27.8	23.3	17.3	13	Vincennes	38.9	33.6	24.7	16.8
Sacramento	340	295	245	207	Bloomington	34.6	27.1	21.3	16.8	Wabash	29.9	26.3	21	14.2
San Diego	340	295	245	207	Cairo	46.6	38.4	30.5	23.9	Washington	38.9	33.6	24.7	16.8
San Francisco	340	295	245	207	Canion	38.4	30.7	23.8	19.1	Whiting	11	10.5	9.5	8.4
San Jose	340	295	245	207	Carbondale	45.1	36.9	29	23	IOWA				
Stockton	340	295	245	207	Carpentersville	23.3	18.8	15.8	11.3	Albia	57	46	34	26
COLORADO					Centralia	42.3	34.3	26.7	21.4	Ames	60	48	36	27
Aspen	285	241	191	161	Champaign	34.2	26.7	21.1	16.5	Arnold	75	60	45	32
Boiler	180	145	110	85	Charleston	37.7	30.1	23.3	18.8	Boone	65	52	39	29
Colorado Springs	180	145	110	85	Clinton	36.1	28.6	22.2	18.1	Burlington	41.6	33.6	26	20.9
Cripple Creek	245	206	168	140	Danville	34.2	26.7	21.1	16.5	Carroll	73	58	44	32
Denver	180	145	110	85	Dekalb	24.8	20.3	17.3	12	Cedar Rapids	52	42	31	23
Durango	320	270	215	160	Dixon	30.8	24.8	19.9	15	Centerville	65	52	39	29
Florence	207	169	130	101	DuQuoin	43.8	35.6	27.8	22.3	Charles City	60	50	40	25
Fort Collins	180	145	110	85	East St. Louis	42.8	34.7	27.1	21.7	Clinton	39.4	31	24.3	19.6
Grand Junction	265	223	185	149	Elgin	21.1	17.3	14.3	10.5	Council Bluffs	80	65	45	32
Greeley	180	145	110	85	Freeport	30.8	24.8	19.9	15	Creston	69	55	41	31
Idaho	174	144	107	80	Galesburg	37.1	29.5	22.9	18.5	Davenport	39.4	31.3	24.3	19.6
Leadville	180	145	110	85	Granite City	43.3	35.2	27.5	22	Decorah	60	50	40	25
Pueblo	265	223	185	142	Harrisburg	45.1	36.9	29	23	Des Moines	60	48	36	27
Salida	240	200	160	128	Harvey	10.5	10	9	8	Dubuque	40.3	32.2	25	20.1
Silverton	345	295	240	185	Havana	38.4	30.7	23.8	19.1	Fairfield	52	42	31	23
Trinidad	180	145	110	85	Hopkinton	39.6	32	24.8	19.9	Fort Dodge	65	50	39	29
CONNECTICUT					Jacksonville	39.6	32	24.8	19.9	Fort Madison	43.3	35.1	27.2	21.8
Ansonia	85.8	74.3	57.5	40.8	Joliet	21.1	17.3	14.3	10.5	Grinnell	57	46	34	26
Bridgeport	85.8	74.3	57.5	40.8	Kankakee	24.1	19.6	16.5	11.7	Iowa City	52	42	31	23
Hartford	85.8	74.3	57.5	40.8	Kewanee	37.5	29.8	23.1	18.7	Keosauqua	43.8	35.5	27.6	22.2
Meriden	85.8	74.3	57.5	40.8	LaSalle	30.8	24.8	19.9	15	Le Mars	80	65	45	32
New Britain	85.8	74.3	57.5	40.8	Lincoln	36.5	28.9	22.4	18.2	Maquoketa	44	35	26	20
Stamford	85.8	74.3	57.5	40.8	Macomb	39.6	32	24.8	19.9	Marshalltown	59	47	35	26
Waterbury	85.8	74.3	57.5	40.8	Marion	45.1	36.9	29	23	Mason City	63	50	40	26
DELAWARE					Mattoon	37.7	30.1	23.3	18.8	Muscatine	40.8	32.9	25.4	20.4
Dover	78.8	68.3	52.5	36.8	Metropolis	47.4	39.1	31.2	24.4	Newton	59	47	35	27
Wilmington	76.8	68.3	52.5	36.8	Moline	37.1	29.5	22.9	18.5	Oakdale	56	45	34	25
DIST. OF COLUMBIA					Monmouth	37.5	29.8	23.1	18.7	Oaklaca	57	46	34	26
Georgetown	75.8	65.3	49.5	33.8	Ms. Vernon	35.2	27.3	21.3	16.5	Ottumwa	80	65	45	32
Washington	75.8	65.3	49.5	33.8	Murphysboro	45.1	36.9	29	23	Red Oak	78	62	45	32
FLORIDA					Ottawa	28.6	23.7	19.2	13.9	Shenandoah	80	65	45	32
Apalachicola	197	167	143	118	Pana	39.6	32	24.8	19.9	Sioux City	80	65	45	32
Batavia	210	181	161	141	Parag	39.6	32	24.8	19.9	Waterloo	64	51	38	29
Bayton	192	168	147	126	Peoria	36.5	28.9	22.4	18.2	Webster City	64	51	38	29
Fernandina	130	110	97	85	Peru	30.8	24.8	19.9	15	KANSAS				
Gainesville	178	156	138	119	Pontiac	30	24.4	19.7	14.7	Abilene	125	105	80	69
Jacksonville	130	110	97	85	Princeton	31.6	25.2	20.2	15.3	Achene	80	65	45	32
Key West	196	171	153	126	Quincy	42.3	34.3	26.7	21.4	Chanute	105	86	65	45
Marianna	160	132	101	89	Rockford	29.3	24.1	19.5	14.3	Cherokee	110	90	68	48
Miami	227	197	176	155	Rock Island	37.5	29.8	23.1	18.7	Coffeyville	162	139	108	83
Pensacola	110	90	75	58	Savanna	35.3	27.8	21.7	17.4	Dodge City	116	94	71	54
Tallahassee	182	157	135	108	Springfield	38.4	30.7	23.8	19.1	Emporia	94	81	55	37
Tampa	180	153	131	117	Sterling	32.3	25.6	20.4	15.4	Fort Scott	94	81	55	37
GEORGIA					Streator	29.3	24.1	19.5	14.3	Galena	94	81	55	37
Albany	166	144	123	100	Taylorville	39.6	32	24.8	19.9	Grand Bend	145	122	95	77
Athens	147	125	106	85	Urbana	34.2	26.7	21.1	16.5	Hutchinson	130	111	86	65
Atlanta	142	122	103	83	East Chicago	39.6	32	24.8	19.9	Independence	110	90	68	48
Augusta	142	122	103	83	Waukegan	21.1	17.3	14.3	10.5	Iola	105	86	65	45
Brunswick	180	150	97	85	INDIANA					Kansas City	80	65	45	32
Columbus	142	122	103	83	Anderson	33.1	28.4	22.6	14.7	Lawrence	94	78	55	41
Gainesville	147	125	106	85	Bedford	38.9	33.6	24.7	16.8	Leavenworth	80	65	45	32
Griffin	153	132	112	90	Bloomington	38.9	33.6	24.7	16.8	Manhattan	110	93	70	51
Hawthorne	142	122	103	83	Bluffton	37.5	29.8	23.1	18.7	Newton	129	110	85	64
Marietta	142	122	103	83	Brazil	33.1	28.4	22.6	14.7	Ottawa	105	86	65	45
Savannah	130	110	97	85	Clinton	33.1	28.4	22.6	14.7	Peoria	105	86	65	45
Thomasville	180	156	134	107	Columbus	37.8	32.6	24.2	16.8	Pittsburg	94	81	55	37
Valdosta	180	156	134	107	Crawfordsville	39.6	32	24.8	19.9	Salina	127	108	82	60
Waycross	170	146	129	107	Decatur	29.9	26.3	21.1	16.2	Topeka	100	82	59	43
IDAHO					East Chicago	11	10.5	9.5	8.4	Union	110	93	70	51
Boise	281	241	200	165	Elkhart	25.7	23.1	20.5	13.1	KENTUCKY				
Coeur d'Alene	290	251	209	175	Elwood	33.1	28.4	22.6	14.7	Ashland	47.3	41	31.5	22.1
Idaho Falls	265	225	185	149	Evansville	29.9	26.3	21.1	16.5	Bellevue	42	35.7	26.3	17.9
Lewiston	290	251	209	175	Frankfort	31.5	26.3	21.1	16.5	Bowling Green	90	74.7	58.5	46.9
Moscow	290	251	209	175	Gary	11	11	10.5	8.4	Covington	42	35.7	26.3	17.9
Nampa	281	241	200	165	Greenburg	37.8	32.6	24.2	16.8	Dayton	42	35.7	26.3	17.9
Pocatello	265	223	185	149	Hammond	11	10.5	9.5	8.4	Elmore	63	53.7	42.3	31.9
Twin Falls	277	237	197	162	Huntington	29.9	26.3	21.1	16.2	Georgetown	78	67.7	53.3	39.9
Wallace	290	251	209	175	Indianapolis	33.1	28.4	22.6	14.7	Hopkinsville	80	65	45	32
ILLINOIS—					Jeffersville	42	35.7	26.3	17.9	Lexington	78	67.7	53.3	39.9
Abingdon	37.5	29.8	23.1	18.7	Kokomo	28.9	25.2	21	13.7	Louisville	43	36.7	27.3	18.9
Alton	42.3	34.3	26.7	21.4	Lafayette	31.5	26.3	21	13.7	Madisonville	78	66.7	54.3	42.9
Aurora	21.1	17.3	14.3	10.5	Lapeer	28.9	25.2	21	13.7	Marysville	42.2	35.7	26.3	17.9
ILLINOIS—Continued					Lebanon	27.3	24.2	20.5	13.7	Middleboro	96	83	69	57
Batavia	21.1	17.3	14.3	10.5	Marion	31.5	27.3	22.1	14.2	Newport	42	35.7	26.3	17.9
Beardsdown	39.6	32	24.8	19.9	Michigan City	15.2	13.7	11.6	10.8	Owensboro	49.5	42.2	31.3	22.9
Bellevue	41.1	36.9	29	23	Midland	24.2	21.1	18.6	14.7	Paducah	78	66.7	54.3	42.9
Belvidere	27.8	23.3	17.3	13	Muncie	33.1	28.4	22.6	14.7	Richmond	88	76.7	61.3	48.9
Bloomington	34.6	27.1	21.3	16.9	New Albany	42	35.7	26.3	17.9	LOUISIANA				
Cairo	46.6	38.4	30.5	23.8	New Castle	34.7	29.9	23.1	18.5	Alexandria	147	127	108	92
Canion	38.4	30.7	23.8	19.1	Normal	28.9	25.2	21	13.7	Baton Rouge	110	90	75	58
Carbondale	45.1	36.9	29	23	Peru	37.8	32.6	24.2	16.8	MISSISSIPPI				
Carpentersville	23.3	18.8	15.8	11.3	St. Louis	28.9	25.2	21	13.7	MISSISSIPPI—Continued				
Centralia	42.3	34.3	26.7	21.4	Union	110	93	70	51	Albany	166	144	123	100
Champaign	34.2	26.7	21.1	16.5						Athens	147	125	106	85
Charleston	37.7	30.1	23.3	18.8						Atlanta	142	122	103	83
Clinton	36.1	28.6	22.2	18.1						Augusta	142	122	103	83
Danville	34.2	26.7	21.1	16.5						Brunswick	180	150	97	85
Decatur	37.5	29.8	23.1	18.7						Columbus	142	122	10	

L. C. L. Freight Rates (per 100 lbs.)

From CHICAGO To	CLASSES				From CHICAGO To	CLASSES				From CHICAGO To	CLASSES			
	1st	2nd	3rd	4th		1st	2nd	3rd	4th		1st	2nd	3rd	4th
LOUISIANA—Continued														
Crowley	160	135	111	101	Owatonna	60	50	40	25	Bayonne	78.8	68.3	52.5	36.8
Donaldsonville	110	90	75	58	Red Wing	60	50	40	25	Hoboken	78.8	68.3	52.5	36.8
Lake Charles	160	135	111	101	Rochester	60	50	40	25	Jersey City	78.8	68.3	52.5	36.8
Moore	147	127	108	92	St. Cloud	83.8	69.8	55.8	36.9	Newark	78.8	68.3	52.5	36.8
New Orleans	110	90	75	58	St. Paul	60	50	40	25	Perth Amboy	78.8	68.3	52.5	36.8
Opelousas	160	135	111	101	Stillwater	60	50	40	25	Trenton	78.8	68.3	52.5	36.8
Shreveport	147	127	108	92	Two Harbors	81.9	69.1	55.3	36.4	NEW MEXICO				
Thibodaux	135	113	97	75	Virginia	90.7	76.4	61.1	40.9	Albuquerque	220	186	150	125
MAINE					Winona	50	42	33	23	Gallop	275	233	193	165
Augusta	85.8	74.3	57.5	40.8	MISSISSIPPI									
Bangor	85.8	74.3	57.5	40.8	Aberdeen	125	102	82	70	Las Vegas	220	186	150	125
Biddeford	85.8	74.3	57.5	40.8	Biloxi	135	115	100	100	Raton	220	186	150	125
Lewiston	85.8	74.3	57.5	40.8	Clarksdale	131	111	89	78	Rockwell	220	186	150	125
Portland	85.8	74.3	57.5	40.8	Columbus	125	102	82	70	Santa Fe	220	186	150	125
MARYLAND					Cumtubus	125	102	82	70	Silver City	260	221	182	156
Baltimore	75.8	65.3	49.5	33.8	Greenville	110	90	75	58	Tucuman	205	174	140	116
Cumtubus	75.8	65.3	49.5	33.8	Guilford	110	90	75	58	NEW YORK				
Frederick	75.8	65.3	49.5	33.8	Hattiesburg	129	109	93	78	Albany	75.6	65.6	50.4	35.3
Hagerstown	75.8	65.3	49.5	33.8	Jackson	126	106	90	76	Auburn	63	54.6	42	29.4
MASSACHUSETTS					Laurel	129	109	93	78	Binghamton	63	54.6	42	29.4
Attleboro	85.8	74.2	57.5	40.8	McComb	138	112	95	79	Brooklyn	78.8	68.3	52.5	36.8
Boston	85.8	74.2	57.5	40.8	Meriden	126	106	90	76	Buffalo	47.3	41	31.5	22.1
Cambridge	85.8	74.2	57.5	40.8	Natchez	110	90	75	58	Coboes	75.6	65.6	50.4	35.3
Fitchburg	85.8	74.2	57.5	40.8	Tupei	113	94	78	66	Dunkirk	47.3	41	31.5	22.1
Holyoke	85.8	74.2	57.5	40.8	Vicksburg	110	90	75	58	Jamestown	47.3	41	31.5	22.1
New Bedford	85.8	74.2	57.5	40.8	Yazoo City	129	99	82	65	Lockport	47.3	41	31.5	22.1
Springfield	85.8	74.2	57.5	40.8	MISSOURI									
Worcester	85.8	74.2	57.5	40.8	Cape Girardeau	65	56	46	34	Newburgh	78.8	68.3	52.5	36.8
MICHIGAN					Carthage	94	84	60	45	New York	78.8	68.3	52.5	36.8
Adrian	36.8	31.5	23.6	15.8	Chillicothe	80	65	45	32	Niagara Falls	47.3	41	31.5	22.1
Albion	34.7	29.9	23.1	15.8	Clinton	82	72	58	37	North Tonawanda	47.3	41	31.5	22.1
Ann Arbor	38.9	33.6	24.7	16.8	Columbia	82	72	58	37	Oneonta	63	54.6	42	29.4
Battle Creek	33.1	28.4	22.6	14.7	DeSoto	66.8	58.6	48.3	35.9	Port Chester	85.8	74.3	57.5	40.8
Bay City	38.9	33.6	24.7	16.8	Fall River	73	64	53	41	Rochester	58.3	50.5	38.9	27.2
Benton Harbor	25.2	23.1	20	13.1	Fulton	64	51	38	26	Schenectady	75.6	65.6	50.4	35.3
Bessemer	65	55	44	28	Hanibal	44.1	36.8	28.4	21	Syracuse	63	54.6	42	29.4
Bozoyne City	55.7	47.3	35.7	27.3	Independence	80	65	45	32	Tonawanda	47.3	41	31.5	22.1
Cadillac	49.4	43.1	32.6	24.2	Jefferson City	71	58	42	29	Utica	70.9	61.5	47.3	35.1
Calumet	74.3	64	48	32.6	Joplin	94	84	60	45	Watertown	78.8	68.3	52.5	36.8
Charlotte	34.7	29.9	23.1	15.8	Kansas City	80	65	45	32	Yonkers	78.8	68.3	52.5	36.8
Cheboygan	57.8	47.3	35.7	27.3	Kirksville	67	55	40	27	NORTH CAROLINA				
Coldwater	31.5	27.3	22.1	14.2	Lexington	80	65	45	32	Asheville	129	114	97	75
Crystal Falls	65	55	44	28	Louisiana	45.5	37	28.9	23.1	Burlington	129	114	97	75
Detroit	38.9	33.6	24.7	16.8	Mexico	92	81	57	37	Charlotte	124	108	84	62
Dowagiac	25.2	21	16.8	13.1	Moberly	65	49	37	26	Concord	124	108	84	62
Escanaba	60	50	40	25	Nevada	92	81	55	37	Durham	112	93	78	55
Flint	38.9	33.6	24.7	16.8	Poplar Bluff	80	65	45	32	Ellabeth City	112	93	78	55
Gladstone	60	50	40	25	Sedalia	80	65	45	32	Fayetteville	124	108	84	62
Grand Rapids	34.7	29.9	23.1	15.8	Springfield	82.5	72	58	37	Gastonia	138	120	99	75
Hancock	74.3	64	48	32.6	St. Joseph	80	65	45	32	Goldboro	117	101	78	56
Holland	34.7	29	23.1	15.8	St. Louis	45.5	37	28.9	23.1	Greensboro	117	101	78	56
Ironwood	65	55	44	28	Webb City	84	60	45	32	Henderson	117	101	78	56
Ishtabena	62.3	52	38.5	29.1	MONTANA									
Jackson	34.7	29.9	23.1	15.8	Anacanda	265	226	185	149	High Point	122	106	82	60
Kalamazoo	31.5	27.3	22.1	14.2	Billings	250	209	169	136	Kinston	117	101	78	56
LaSalle	37.8	32.6	24.2	16.8	Butte	265	226	185	149	Monroe	124	108	84	62
Ludington	49.4	43.1	32.6	24.2	Calumet	260	222	182	143	Newbern	113	94	74	56
Manistee	49.4	43.1	32.6	24.2	Chadron	265	226	185	149	Oxford	117	101	78	56
Marquette	62.3	52	38.5	29.1	Crete	275	235	193	157	Railroad Mount	124	108	84	62
Memominee	43	36	29	23	Lewiston	260	222	182	143	Salisbury	124	108	84	62
Monroe	38.9	33.6	24.7	16.8	Livingston	265	226	185	149	Statesville	124	108	84	62
Mt. Clemens	38.9	33.6	24.7	16.8	Mission	275	235	193	157	Tarboro	112	93	78	55
Muskegon	34.7	29	23.1	15.8	Missoula	265	226	185	149	Washington	112	93	78	55
Negaunee	62.3	52	38.5	29.1	Red Lodge	260	222	182	143	Wilmington	117	98	75	56
Niles	38.9	33.6	24.7	16.8	Walker	265	226	185	149	NORTH DAKOTA				
Onondaga	25.2	21	16.8	13.1	NEBRASKA									
Pontiac	55.7	47.3	35.7	27.3	Allamore	178	147	110	81	Bismarck	160	135	107	76
Petoseky	55.7	47.3	35.7	27.3	Beatrice	92	77	53	40	Devils Lake	156	132	103	73
Pontiac	38.9	33.6	24.7	16.8	Benson	80	65	45	32	Grand Forks	124	104	83	58
Port Huron	38.9	33.6	24.7	16.8	Chadron	180	149	111	83	Jamestown	146	123	97	68
Saginaw	38.9	33.6	24.7	16.8	Clarksdale	115	95	71	52	Mandan	161	137	109	78
Sault Ste. Marie	62.3	52	38.5	29.1	Crete	95	80	57	42	Minot	139	117	92	65
South Haven	34.7	29	23.1	15.8	Fairbury	110	93	70	83	Valley City	139	117	92	65
St. Joseph	25.2	23.1	20	13.1	Falls City	80	65	45	32	Walton	109	91	73	50
Traverse City	51.5	44.1	33.6	24.2	Grand Island	131	110	81	59	Williston	199	166	136	99
Wyandotte	38.9	33.6	24.7	16.8	Hastings	131	110.5	82	60	OHIO				
Ypsilanti	38.9	33.6	24.7	16.8	Kearney	135	116	86	63	Akron	43.1	36.8	27.3	18.9
MINNESOTA					Lincoln	85	70	49	36	Alliance	43.1	36.8	27.3	18.9
Albert Lea	60	50	40	25	Norfolk	115	95	71	52	Ashtabula	46.2	39.4	29.9	20
Austin	60	50	40	25	Omaha	80	65	45	32	Barberton	43.1	36.8	27.3	18.9
Beemidji	111.3	93.6	74.9	51.1	Plattsmouth	109	91	68	52	Bucyrus	38.9	33.6	24.7	16.8
Brainerd	96.5	80.4	64.3	43.2	Superior	111	110.5	83	62	Canton	43.1	36.8	27.3	18.9
Cass Lake	108.4	91.1	72.9	49.7	Yorck	115	96	72	55	Chillicothe	46.2	39.4	29.9	20
Chisholm	91.7	77.2	61.8	41.3	NEVADA									
Cloquet	65	55	44	28	Carson City	315	276	234	200	Cincinnati	42	35.7	26.3	17.9
Crookston	119	99.2	79.4	54.5	Ely	372	328	282	240	Cleveland	43.1	36.8	27.3	18.9
Duluth	95.8	81	64.4	42.8	Goldfield	445	393	337	291	Coshocton	46.2	39.4	29.9	20
Ely	85.8	74.3	57.5	40.8	Reno	290	251	209	175	Dayton	42	35.7	26.3	17.9
Excelsior	89.7	75.6	56.4	38.4	Schuyler	290	251	209	175	East Liverpool	31	31.5	22.1	15.1
Fairbault	60	50	40	25	Tombig	485	393	337	291	Elyria	43.1	36.8	27.3	18.9
Fergus Falls	106.3	88.6	70.9	48.1	Virginia City	330	291	244	205	Findlay	38.9	33.6	24.7	16.8
Hibbing	91.7	77.2	61.8	41.3	NEW HAMPSHIRE									
Lake City	90.6	75.5	60.4	40.3	Concord	85.8	74.3	57.5	40.8	Hamilton	42	35.7	26.3	17.9
Little Falls	90.6	75.5	60.4	40.3	Dover	85.8	74.3	57.5	40.8	Lancaster	46.2	39.4	29.9	20
Mankato	65	55	44	28	Manchester	85.8	74.3	57.5	40.8	Lima	43.1	36.8	27.3	18.9
Minneapolis	60	50	40	25	Portsmouth	85.8	74.3	57.5	40.8	Lorain	43.1	36.8	27.3	18.9
Moorehead	114.1	95.1	76.1	52.1	Portsmouth	85.8	74.3	57.5	40.8	Mansfield	42	35.7	26.3	17.9
New York	67	55	43	29										
Northfield	60	50	40	25										

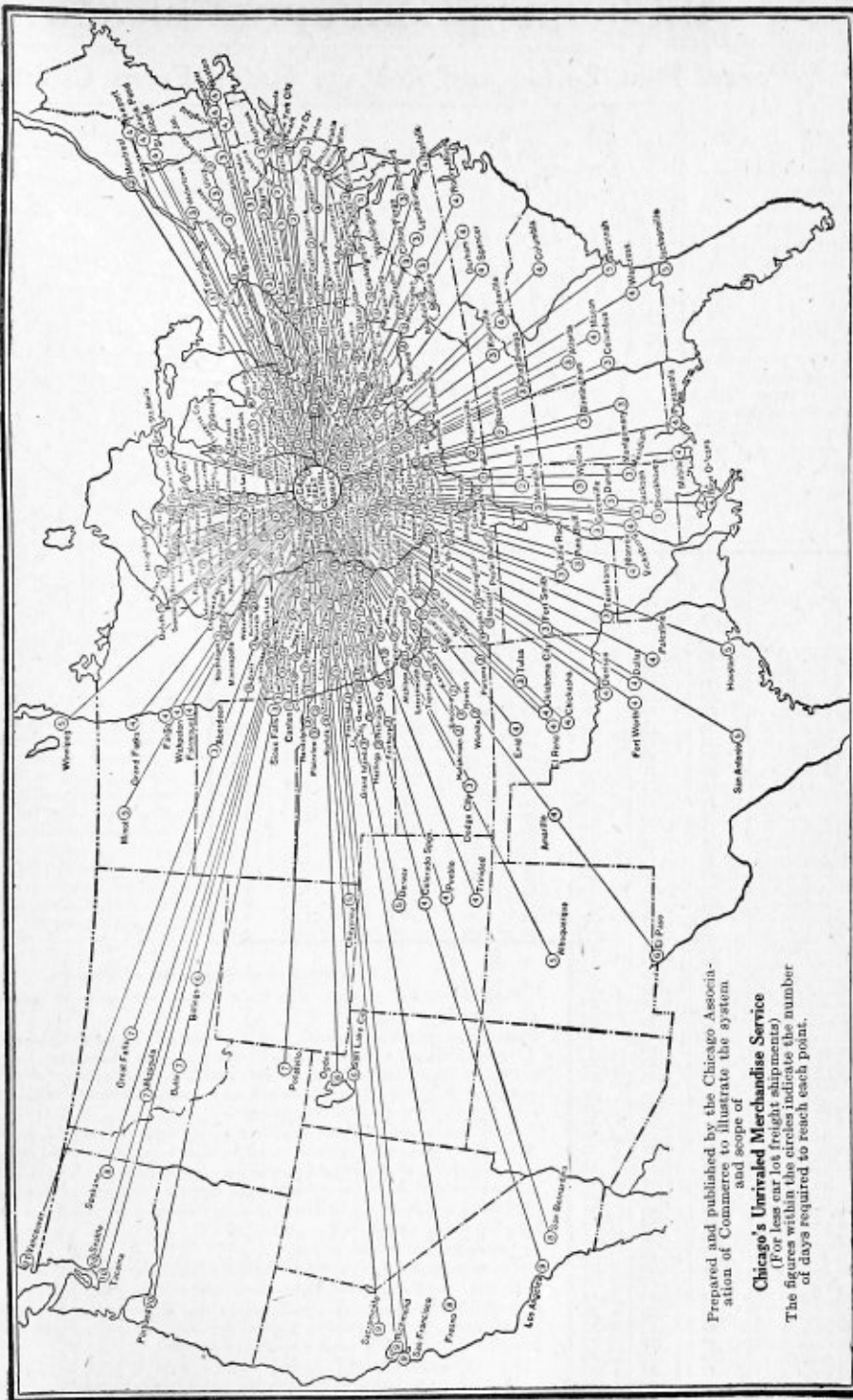
H. Channon Company Chicago

L. C. L. Freight Rates (per 100 lbs.)—Continued.

From CHICAGO To	CLASSES				From CHICAGO To	CLASSES				From CHICAGO To	CLASSES			
	1st	2nd	3rd	4th		1st	2nd	3rd	4th		1st	2nd	3rd	4th
OHIO—Continued					SOUTH DAKOTA					VIRGINIA—Continued				
Marion	38.9	33.6	24.7	16.8	Aberdeen	114	95	67	50	Roanoke	75.8	65.3	49.5	33.8
Newark	43.1	36.8	27.3	18.9	Brookings	88	75	58	40	Staunton	75.8	65.3	49.5	33.8
Piqua	38.9	33.6	24.7	16.8	Canton	83	67.5	47	33.5	Suffolk	75.8	65.3	49.5	33.8
Portsmouth	47.3	41	31.5	22.1	Deadwood	194	162	135	110	Winchester	75.8	65.3	49.5	33.8
Sandusky	42	35.7	26.3	17.9	Huron	185	157	130	106					
Springfield	42	35.7	26.3	17.9	Lend	194	162	135	110					
Stuebenville	47.3	41	31.5	22.1	Madison	162	85	55	42					
Tiffin	38.9	33.6	24.7	16.8	Mitchell	105	94	67	47					
Toledo	38.9	33.6	24.7	16.8	Pierre	122	104	80	60					
Warren	46.2	39.4	29.9	20	Rapid City	185	157	130	106					
Youngstown	46.2	39.4	29.9	20	Redfield	114	95	67	50					
Zanesville	46.2	39.4	29.9	20	Sioux Falls	83	67.5	47	33.5					
					Vermillion	89	73	51	37					
					Watertown	96	82	64	45					
					Yankton	91	73	51	37					
OKLAHOMA					TENNESSEE									
Ada	154	131	110	91	Athens	121	105	87	70					
Altus	160	137	114	101	Bristol	87.8	75.3	57.5	40					
Armore	160	137	114	101	Brownsville	126	100	86	71					
Barlesville	125	106	80	60	Chattanooga	111	95	79	62					
Blackwell	150	128	100	79	Clarksville	82	68	53	43					
Chandler	150	129	107	87	Cleveland	121	105	87	70					
Chickasha	150	129	107	87	Columbia	107	88	71	60					
Coalgate	154	131	110	91	Dyersburg	106	87	71	58					
Durant	160	137	114	101	Payetteville	123	108	90	73					
Enid	150	128	100	79	Gallatin	72	67	64	52					
Frederick	160	137	114	101	Harrison	111	95	79	62					
Guthrie	150	129	107	87	Humboldt	103	84	68	56					
Hobart	160	137	114	101	Jackson	106	87	71	58					
Hugo	147	135	114	95	Johnson City	136	117	91	69					
Lawton	160	137	114	101	Knoxville	111	95	79	62					
McAlester	140	123	95	74	Memphis	85	65	55	43					
Mangum	160	137	114	101	Merristown	129	114	97	75					
Miami	118	96	72	51	Nashville	82	68	53	43					
Muskogee	135	120	90	69	Paris	87	73	64	52					
Okmulgee	150	129	107	87	Pulaski	117	101	81	69					
Okpalma	137	120	92	72	Rockwood	111	95	79	62					
Shawnee	150	129	107	87	Shebilleville	111	95	78	63					
Tulsa	121	103	83	60	Trenton	101	83	68	56					
Vinita	121	103	83	60	Tulahoma	111	95	79	62					
Wagoner	135	120	90	69	Union City	92	75	60	48					
OREGON					TEXAS									
Astoria	340	295	245	207	Ahlens	167	141	116	106					
Baker City	290	251	209	175	Austin	167	141	116	106					
Corvallis	340	295	245	207	Beaumont	167	141	116	106					
Eugene	340	295	245	207	Brownsville	198	171	150	141					
Medford	340	295	245	207	Cleburne	167	141	116	106					
Portland	340	295	245	207	Dallas	167	141	116	106					
Salem	340	295	245	207	Denison	167	141	116	106					
The Dalles	340	294	244	205	El Paso	220	186	152	130					
PENNSYLVANIA					Fort Worth									
Allentown	76.8	66.3	50.5	34.8	Galveston	167	141	116	106					
Altoona	63	54.0	42	29.4	Houston	167	141	116	106					
Beaver Falls	47.3	41	31.5	22.1	Laredo	179	154	134	126					
Bethlehem	76.8	66.3	50.5	34.8	Marshall	167	141	116	106					
Butler	47.3	41	31.5	22.1	Paletine	167	141	116	106					
Carnegie	47.3	41	31.5	22.1	Paris	167	141	116	106					
Chester	76.8	66.3	50.5	34.8	San Angelo	167	141	116	106					
Coshocton	76.8	66.3	50.5	34.8	San Antonio	167	141	116	106					
Duquesne	47.3	41	31.5	22.1	Sherman	167	141	116	106					
Easton	76.8	66.3	50.5	34.8	Temple	167	141	116	106					
Erie	47.3	41	31.5	22.1	Tyler	167	141	116	106					
Harrisburg	75.8	65.3	49.5	33.8	Waco	167	141	116	106					
Hazleton	76.8	66.3	50.5	34.8	Wichita Falls	167	141	116	106					
Houtstont	47.3	41	31.5	22.1	UTAH									
Johnston	57.3	49	37.5	27.1	Brigham	265	223	185	149					
Lancaster	76.8	66.3	50.5	34.8	Ephraim	290	244	203	164					
Lebanon	76.8	66.3	50.5	34.8	Eureka	311	265	225	180					
McKeesport	47.3	41	31.5	22.1	Heber	265	223	185	149					
New Castle	46.2	39.4	29.9	20	Duvalville	265	223	185	149					
Norristown	76.8	66.3	50.5	34.8	Lozan	265	223	185	149					
Philadelphia	76.8	66.3	50.5	34.8	Manti	290	244	203	164					
Pittsburg	47.3	41	31.5	22.1	Murray	265	223	185	149					
Reading	76.8	66.3	50.5	34.8	Park City	265	223	185	149					
Scranton	76.8	66.3	50.5	34.8	Provo	265	223	189	149					
Wilkes-Barre	76.8	66.3	50.5	34.8	Salt Lake City	265	223	189	149					
York	75.8	65.3	49.5	33.8	VERMONT									
RHODE ISLAND					Barre	85.8	74.3	57.5	40.8					
Newport	85.8	74.3	57.5	40.8	Burlington	85.8	74.3	57.5	40.8					
Pawtucket	85.8	74.3	57.5	40.8	Montpelier	85.8	74.3	57.5	40.8					
Warwick	85.8	74.3	57.5	40.8	Rutland	85.8	74.3	57.5	40.8					
Woonsocket	85.8	74.3	57.5	40.8	VIRGINIA									
SO. CAROLINA					Alexandria	75.8	65.3	49.5	33.8					
Anderson	140	124	106	83	Charlottesville	75.8	65.3	49.5	33.8					
Camden	142	124	106	83	Covington	75.8	65.3	49.5	33.8					
Charleston	130	110	97	85	Daville	103	86	67	48					
Columbia	140	124	106	83	Fredericksburg	75.8	65.3	49.5	33.8					
Florence	142	124	106	83	Hampton	75.8	65.3	49.5	33.8					
Georgetown	142	123	100	78	Lynchburg	75.8	65.3	49.5	33.8					
Greenville	140	124	106	83	Newport News	75.8	65.3	49.5	33.8					
Greenwood	140	124	106	83	Norfolk	75.8	65.3	49.5	33.8					
Laurens	140	124	106	83	Petersburg	75.8	65.3	49.5	33.8					
Marion	142	124	106	83	Portsmouth	75.8	65.3	49.5	33.8					
Newberry	140	124	106	83	Richmond	75.8	65.3	49.5	33.8					
Newburg	145	128	109	85										
Rock Hill	142	124	106	83										
Spauldingburg	140	124	106	83										
Sumter	140	124	106	83										

Map of Chicago's Package Car Scheme

Showing the number of days it takes less than car lot shipments to reach various points throughout the country.



Prepared and published by the Chicago Association of Commerce to illustrate the system and scope of

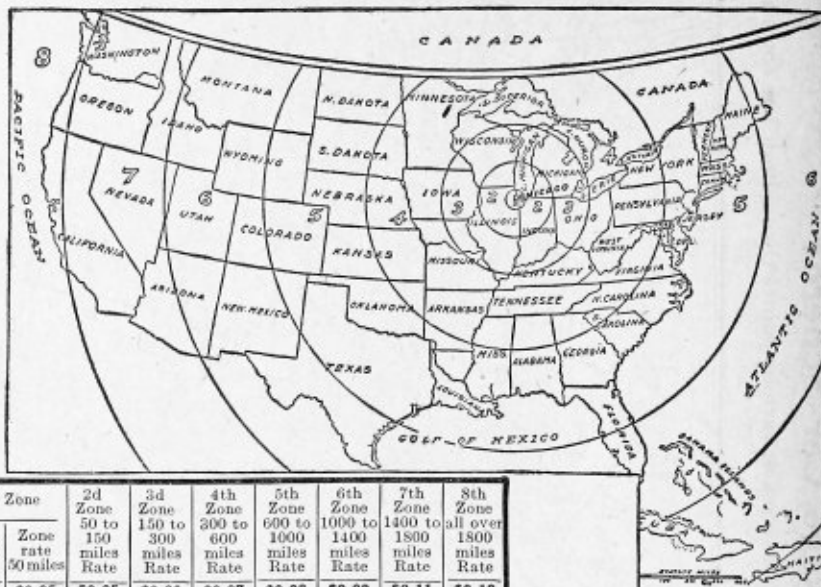
Chicago's Unrivalled Merchandise Service

(For less car lot freight shipments)
The figures within the circles indicate the number of days required to reach each point.

Parcel Post Zones and Postage Rates From Chicago

Parcels weighing four ounces or less are available at the rate of one cent for each ounce or fraction of an ounce, regardless of distance.

Parcels weighing more than four ounces are available at the pound rates shown in the following table, a fraction of a pound being considered a full pound:



WEIGHT	First Zone		2d Zone	3d Zone	4th Zone	5th Zone	6th Zone	7th Zone	8th Zone
	Local rate*	Zone rate 50 miles	50 to 150 miles Rate	150 to 300 miles Rate	300 to 600 miles Rate	600 to 1000 miles Rate	1000 to 1400 miles Rate	1400 to 1800 miles Rate	all over 1800 miles Rate
1 pound	\$0.05	\$0.05	\$0.05	\$0.06	\$0.07	\$0.08	\$0.09	\$0.11	\$0.12
2 pounds	.06	.06	.06	.08	.11	.14	.17	.21	.24
3 pounds	.06	.07	.07	.10	.15	.20	.25	.31	.36
4 pounds	.07	.08	.08	.12	.19	.26	.33	.41	.48
5 pounds	.07	.09	.09	.14	.23	.32	.41	.51	.60
6 pounds	.08	.10	.10	.16	.27	.38	.49	.61	.72
7 pounds	.08	.11	.11	.18	.31	.44	.57	.71	.84
8 pounds	.09	.12	.12	.20	.35	.50	.65	.81	.96
9 pounds	.09	.13	.13	.22	.39	.56	.73	.91	1.08
10 pounds	.10	.14	.14	.24	.43	.62	.81	1.01	1.20
11 pounds	.10	.15	.15	.26	.47	.68	.89	1.11	1.32
12 pounds	.11	.16	.16	.28	.51	.74	.97	1.21	1.44
13 pounds	.11	.17	.17	.30	.55	.80	1.05	1.31	1.56
14 pounds	.12	.18	.18	.32	.59	.86	1.13	1.41	1.68
15 pounds	.12	.19	.19	.34	.63	.92	1.21	1.51	1.80
16 pounds	.13	.20	.20	.36	.67	.98	1.29	1.61	1.92
17 pounds	.13	.21	.21	.38	.71	1.04	1.37	1.71	2.04
18 pounds	.14	.22	.22	.40	.75	1.10	1.45	1.81	2.16
19 pounds	.14	.23	.23	.42	.79	1.16	1.53	1.91	2.28
20 pounds	.15	.24	.24	.44	.83	1.22	1.61	2.01	2.40
21 pounds	.15	.25	.25						
22 pounds	.16	.26	.26						
23 pounds	.16	.27	.27						
24 pounds	.17	.28	.28						
25 pounds	.17	.29	.29						
26 pounds	.18	.30	.30						
27 pounds	.18	.31	.31						
28 pounds	.19	.32	.32						
29 pounds	.19	.33	.33						
30 pounds	.20	.34	.34						
31 pounds	.20	.35	.35						
32 pounds	.21	.36	.36						
33 pounds	.21	.37	.37						
34 pounds	.22	.38	.38						
35 pounds	.22	.39	.39						
36 pounds	.23	.40	.40						
37 pounds	.23	.41	.41						
38 pounds	.24	.42	.42						
39 pounds	.24	.43	.43						
40 pounds	.25	.44	.44						
41 pounds	.25	.45	.45						
42 pounds	.26	.46	.46						
43 pounds	.26	.47	.47						
44 pounds	.27	.48	.48						
45 pounds	.27	.49	.49						
46 pounds	.28	.50	.50						
47 pounds	.28	.51	.51						
48 pounds	.29	.52	.52						
49 pounds	.29	.53	.53						
50 pounds	.30	.54	.54						

*The rate for local delivery shall apply to all parcels mailed at a post office from which a rural route starts, for delivery on such route, or mailed at any point on such route for delivery at any other point thereon, or at the office from which the route starts, or on any rural route starting therefrom, and on all matter mailed at a city carrier office, or at a point within its delivery limits, for delivery by carriers from that office, or at any office for local delivery.

Domestic Parcel Post, Limit of Weight

Limit of weight of delivery within the first and second zones, 50 pounds; to all other zones, 20 pounds.

Dimensions Limit of Parcels and Restrictions as to Character of Contents

Parcels must not be greater in size than 84 inches in length and girth combined nor in form or kind likely to injure the person or any postal employee or damage the mail equipment or other mail matter and not of a character perishable within a period reasonably required for transportation and delivery.

Stove casings and pieces of machinery should be protected with excelsior or similar material and wrapped in cloth or strong paper or be properly boxed or crated.

Sharp-pointed or sharp-edged instruments or tools must have their points and edges protected so that they cannot cut through their covering, and be thoroughly wrapped.

Powders and all pulverized dry substances must be so wrapped that none of the contents of the package will sift out.

Books may now be sent by parcel post.

The following may not be sent: Intoxicating liquors, poisons, matches, explosives, fire-arms, benzine, caps, cartridges, gun-powder and inflammables.

To find the size limit: Take a piece of string 84 inches long and wind it once completely around the parcel and then across the top lengthways. If the ends of the string reach the sides of the parcel it comes under the limit.

Regular carriers will deliver parcels wherever possible.

Parcels must be mailed at the postoffice or branches and regular stamps may be used.

Express Rates

Express rates per 100 pounds on goods shipped from Chicago to cities in each State, these cities being used as a basis for figuring rates for all the towns in the immediate vicinity of each city. Express Agent will give you the exact rates from Chicago to your town and full information about their delivery service.

From Chicago to	Expr's per 100 Lbs.	From Chicago to	Expr's per 100 Lbs.	From Chicago to	Expr's per 100 Lbs.	From Chicago to	Expr's per 100 Lbs.	From Chicago to	Expr's per 100 Lbs.
ALABAMA—		GEORGIA—		MARYLAND—		NEW JERSEY—		SOUTH DAKOTA—	
Birmingham.....	\$2.40	Atlanta.....	\$2.60	Baltimore.....	\$2.25	Atlantic City.....	\$2.40	Aberdeen.....	\$3.15
Brewton.....	2.85	Macon.....	2.85	Boston.....	2.50	Trenton.....	2.40	Bellefourche.....	3.80
Mobile.....	2.95	Waycross.....	3.20	MASSACHUSETTS—		NEW MEXICO—		Santa Fe.....	2.45
Montgomery.....	2.60		3.15	MICHIGAN—		Gallup.....	6.25	Waterbury.....	2.75
ARIZONA—		IDAHO—		Bessemer.....	2.25	Silver City.....	6.50	TENNESSEE—	
Phoenix.....	8.00	Boise.....	7.85	Detroit.....	1.25	NEW YORK—		Jackson.....	1.95
Tucson.....	7.15	Pocatello.....	7.00	Grand Rapids.....	1.60	Albany.....	2.30	Knoxville.....	2.40
ARKANSAS—		ILLINOIS—		Traverse City.....	1.60	Buffalo.....	1.80	Memphis.....	2.10
Arkansas City.....	2.50	Cairo.....	1.50	MINNESOTA—		New York.....	2.30	Nashville.....	1.70
Fort Smith.....	2.90	Joliet.....	1.60	Atkins.....	2.65	Syracuse.....	2.55	TEXAS—	
Hot Springs.....	2.90	Rock Island.....	1.60	Duluth.....	2.40	NO. CAROLINA—		El Paso.....	5.95
Little Rock.....	2.65	Springfield.....	1.15	Grand Rapids.....	2.75	Raleigh.....	2.95	Fort Worth.....	3.85
Tuxarkana.....	3.15	INDIANA—		Minneapolis.....	2.00	Wilmington.....	3.20	Houston.....	4.10
CALIFORNIA—		Evansville.....	1.25	MISSISSIPPI—		NORTH DAKOTA—		UTAH—	
Bakersfield.....	8.90	Fort Wayne.....	1.00	Hattiesburg.....	2.75	Bismarck.....	3.65	Marysville.....	7.30
Los Angeles.....	8.90	Indianapolis.....	1.25	Jackson.....	2.65	Fargo.....	2.90	St. George City.....	6.60
San Francisco.....	9.30	South Bend.....	.75	Natchez.....	2.90	Grand Forks.....	3.50	VERMONT—	
COLORADO—		IOWA—		MISSOURI—		Minot.....	3.80	Montpelier.....	2.50
Denver.....	4.20	Des Moines.....	1.80	Kansas City.....	2.10	Williston.....	4.10	VIRGINIA—	
Durango.....	5.90	Fort Dodge.....	1.95	St. Louis.....	1.40	OHIO—		Marion.....	2.45
Grand Junction.....	5.50	Sioux City.....	2.45	Cincinnati.....	1.25	OKLAHOMA—		Rocky Mount.....	2.60
Julesburg.....	3.70	KANSAS—		Springfield.....	2.25	Okemah.....	3.45	WASHINGTON—	
Leadville.....	5.00	Dodge City.....	3.55	MONTANA—		Wheeler.....	3.55	Seattle.....	8.60
CONNECTICUT—		Great Bend.....	3.15	Billings.....	5.40	OREGON—		Spokane.....	7.75
Hartford.....	2.55	Kansas City.....	2.10	Glasgow.....	4.75	OKLAHOMA—		WEST VIRGINIA—	
DELAWARE—		Topoka.....	2.25	Hayward.....	5.55	Okemah.....	3.45	Charleston.....	1.85
Dover.....	2.30	Wellita.....	3.15	Kalamazoo.....	6.80	Portland.....	8.85	Elkins.....	2.20
DISTRICT OF COLUMBIA—		KENTUCKY—		Miles City.....	4.70	PENNSYLVANIA—		WISCONSIN—	
Washington.....	2.25	Frankfort.....	1.40	NEBRASKA—		Harrisburg.....	2.15	Ashland.....	2.25
FLORIDA—		Hopkinsville.....	1.60	Lincoln.....	2.45	Philadelphia.....	2.10	La Crosse.....	1.35
Jacksonville.....	3.45	Louisville.....	1.75	North Platte.....	3.40	Pittsburgh.....	1.70	Madison.....	1.35
Miami.....	4.58	Morgantown.....	1.60	Omaha.....	2.25	RHODE ISLAND—		Milwaukee.....	1.75
Pensacola.....	3.10	Lake Charles.....	3.45	NEVADA—		Providence.....	2.55	WYOMING—	
Tallahassee.....	3.10	New Orleans.....	3.10	Austin.....	8.15	SO. CAROLINA—		Cheyenne.....	4.50
Tampa.....	4.00	Shreveport.....	3.25	Carson City.....	8.65	Greenville.....	3.40	Green River.....	5.15
		MAINE—		Concord.....	2.55	Sumter.....	3.20	Lander.....	5.35
		Bangor.....	2.95					Sheridan.....	4.70

Express Charges Based on the Rate per 100 Pounds

Rate per 100 lbs.	\$0.60	0.75	\$0.90	\$1.00	\$1.15	\$1.25	\$1.35	\$1.40	\$1.50	\$1.60	\$1.70	\$1.75	\$1.80	\$1.85	\$1.95	\$2.00	\$2.10	\$2.25
Package of 1 lb.	.26	.26	.26	.26	.26	.26	.26	.26	.26	.26	.26	.26	.26	.27	.27	.27	.27	.27
Package of 2 lbs.	.26	.26	.26	.26	.26	.26	.26	.26	.26	.26	.26	.26	.26	.27	.27	.27	.27	.27
Package of 5 lbs.	.27	.27	.28	.28	.29	.29	.30	.30	.31	.31	.32	.32	.33	.33	.33	.34	.34	.34
Package of 10 lbs.	.28	.30	.31	.32	.33	.34	.35	.36	.36	.37	.38	.39	.40	.41	.42	.43	.44	.44
Package of 15 lbs.	.30	.32	.33	.35	.36	.38	.40	.41	.42	.44	.45	.47	.48	.49	.50	.51	.53	.53
Package of 20 lbs.	.32	.33	.35	.38	.40	.43	.45	.47	.48	.50	.52	.54	.55	.56	.57	.59	.60	.62
Package of 25 lbs.	.34	.37	.41	.44	.47	.50	.52	.54	.56	.59	.61	.62	.64	.65	.67	.69	.71	.72
Package of 30 lbs.	.35	.40	.44	.47	.52	.55	.58	.60	.63	.65	.68	.71	.73	.74	.76	.77	.80	.82
Package of 35 lbs.	.37	.42	.48	.51	.56	.60	.63	.65	.69	.72	.75	.77	.79	.81	.84	.86	.89	.91
Package of 40 lbs.	.39	.45	.51	.55	.61	.65	.69	.71	.75	.79	.83	.85	.87	.89	.93	.95	.99	.101
Package of 45 lbs.	.41	.47	.54	.59	.65	.70	.74	.77	.81	.86	.90	.92	.95	.97	1.01	1.04	1.08	1.10
Rate per 100 lbs.	\$2.20	\$2.25	\$2.30	\$2.40	\$2.45	\$2.50	\$2.55	\$2.60	\$2.65	\$2.75	\$2.85	\$2.90	\$2.95	\$3.05	\$3.10	\$3.15	\$3.20	\$3.25
Package of 1 lb.	.27	.27	.27	.27	.27	.27	.27	.27	.27	.27	.28	.28	.28	.28	.28	.28	.28	.28
Package of 2 lbs.	.29	.29	.29	.29	.29	.29	.29	.30	.30	.30	.30	.30	.30	.31	.31	.31	.31	.31
Package of 5 lbs.	.35	.35	.35	.36	.36	.36	.36	.37	.37	.37	.38	.38	.38	.39	.39	.39	.40	.40
Package of 10 lbs.	.44	.45	.45	.46	.47	.47	.48	.48	.49	.50	.51	.51	.52	.53	.53	.54	.54	.55
Package of 15 lbs.	.54	.55	.56	.57	.58	.59	.60	.60	.61	.62	.64	.65	.65	.67	.68	.68	.69	.70
Package of 20 lbs.	.64	.65	.66	.68	.69	.70	.71	.72	.73	.75	.77	.78	.79	.81	.82	.83	.84	.85
Package of 25 lbs.	.74	.75	.76	.79	.80	.81	.82	.84	.85	.87	.90	.91	.92	.95	.96	.97	.99	1.00
Package of 30 lbs.	.83	.85	.86	.89	.91	.92	.94	.96	.97	1.00	1.03	1.04	1.06	1.09	1.11	1.12	1.13	1.15
Package of 35 lbs.	.93	.95	.97	1.00	1.02	1.04	1.07	1.07	1.07	1.12	1.15	1.16	1.18	1.21	1.22	1.23	1.25	1.27
Package of 40 lbs.	1.03	1.05	1.07	1.11	1.13	1.15	1.17	1.19	1.21	1.25	1.29	1.31	1.33	1.37	1.39	1.41	1.43	1.45
Package of 45 lbs.	1.13	1.15	1.17	1.22	1.24	1.26	1.28	1.31	1.33	1.37	1.42	1.44	1.46	1.51	1.53	1.55	1.58	1.60
Rate per 100 lbs.	\$3.40	\$3.45	\$3.55	\$3.65	\$3.70	\$3.80	\$3.85	\$4.10	\$4.15	\$4.20	\$4.55	\$4.70	\$4.75	\$5.00	\$5.35	\$5.50	\$5.80	\$5.90
Package of 1 lb.	.28	.28	.28	.28	.28	.29	.29	.29	.29	.29	.29	.29	.29	.30	.30	.30	.31	.31
Package of 2 lbs.	.31	.31	.32	.32	.32	.32	.32	.33	.33	.33	.34	.34	.34	.34	.35	.35	.36	.36
Package of 5 lbs.	.41	.41	.41	.42	.42	.43	.43	.44	.44	.45	.46	.47	.47	.49	.50	.51	.53	.53
Package of 10 lbs.	.56	.57	.58	.59	.59	.60	.61	.63	.64	.64	.66	.68	.70	.72	.76	.77	.80	.81
Package of 15 lbs.	.72	.73	.74	.76	.77	.78	.79	.81	.83	.84	.89	.92	.92	.96	1.01	1.04	1.08	1.10
Package of 20 lbs.	.88	.89	.91	.93	.94	.96	.97	1.02	1.03	1.04	1.11	1.14	1.15	1.20	1.27	1.30	1.36	1.38
Package of 25 lbs.	1.04	1.05	1.07	1.10	1.11	1.14	1.15	1.21	1.22	1.24	1.32	1.36	1.37	1.44	1.52	1.56	1.64	1.66
Package of 30 lbs.	1.19	1.21	1.24	1.27	1.28	1.31	1.33	1.40	1.42	1.43	1.54	1.58	1.60	1.67	1.78	1.82	1.91	1.94
Package of 35 lbs.	1.35	1.37	1.40	1.44	1.45	1.49	1.51	1.60	1.62	1.65	1.81	1.84	1.87	1.95	2.09	2.15	2.28	2.31
Package of 40 lbs.	1.51	1.53	1.57	1.61	1.63	1.67	1.69	1.79	1.81	1.83	1.97	2.03	2.05	2.25	2.29	2.41	2.47	2.51
Package of 45 lbs.	1.67	1.69	1.73	1.78	1.80	1.85	1.87	1.98	2.00	2.03	2.18	2.25	2.27	2.39	2.54	2.61	2.75	2.79
Rate per 100 lbs.	\$5.95	\$6.25	\$6.50	\$6.55	\$6.60	\$6.80	\$7.00	\$7.15	\$7.30	\$7.75	\$8.55	\$8.60	\$8.75	\$8.80	\$8.65	\$8.85	\$8.90	\$9.30
Package of 1 lb.	.31	.31	.31	.31	.31	.32	.32	.32	.32	.32	.33	.33	.33	.33	.33	.34	.34	.34
Package of 2 lbs.	.36	.37	.37	.38	.38	.38	.38	.39	.39	.40	.40	.40	.41	.42	.42	.42	.42	.43
Package of 5 lbs.	.53	.55	.56	.56	.57	.58	.59	.59	.60	.62	.63	.64	.64	.67	.67	.68	.68	.70
Package of 10 lbs.	.82	.85	.87	.88	.88	.90	.92	.94	.95	1.00	1.01	1.02	1.04	1.08	1.09	1.11	1.11	1.15
Package of 15 lbs.	1.10	1.15	1.19	1.19	1.20	1.25	1.26	1.28	1.31	1.37	1.59	1.61	1.62	1.59	1.61	1.54	1.55	1.61
Package of 20 lbs.	1.39	1.45	1.50	1.51	1.52	1.56	1.60	1.63	1.66	1.75	1.77	1.80	1.83	1.92	1.93	1.97	1.98	2.06
Package of 25 lbs.	1.67	1.75	1.81	1.82	1.84	1.89	1.94	1.97	2.01	2.12	2.15	2.19	2.22	2.24	2.25	2.40	2.41	2.51
Package of 30 lbs.	1.96	2.05	2.12	2.14	2.15	2.21	2.27	2.32	2.36	2.50	2.53	2.57	2.62	2.75	2.77	2.83	2.84	2.96
Package of 35 lbs.	2.24	2.35	2.41	2.45	2.46	2.54	2.61	2.66	2.73	2.89	2.96	3.01	3.07	3.17	3.23	3.36	3.38	3.42
Package of 40 lbs.	2.53	2.65	2.75	2.77	2.79	2.87	2.95	3.01	3.07	3.25	3.29	3.35	3.41	3.59	3.61	3.69	3.71	3.87
Package of 45 lbs.	2.81	2.95	3.06	3.08	3.11	3.20	3.29	3.35	3.42	3.62	3.67	3.74	3.80	4.01	4.03	4.12	4.14	4.32

Useful Information

Steam

A cubic inch of water evaporated under atmospheric pressure is approximately converted into 1 cubic foot of steam.

The horse-power of boilers, as per standard adopted by the Am. S. M. E., is 30 pounds water evaporated per hour at a pressure of 70 pounds per square inch and from a temperature of 100 degrees Fahr.

Well designed boilers, under successful operation, will evaporate from 7 to 10 pounds of water per pound of first-class coal.

Each square foot of heating surface is considered sufficient to evaporate 2 pounds of water; therefore, for an engine using 30 pounds of water per horse-power per hour, each horse-power of the engine requires 15 square feet heating surface in the boiler.

On one square foot of fire grate can be burned on an average from 10 to 12 pounds hard coal, or 18 to 20 pounds soft coal, per hour, with natural draft.

Two and one-quarter pounds of dry wood is equal to 1 pound of average quality soft coal.

Steam engines consume from 12 to 50 pounds of feed water, and from $1\frac{1}{4}$ to 7 pounds of coal, per hour per indicated horse-power.

Condensing engines require from 20 to 30 times the amount of feed water for condensing purposes; approximately for most engines, 1 to $1\frac{1}{2}$ gallons condensing water per minute per indicated horse-power.

Water

One cubic inch weighs .0361 pounds.

One pound = 27.7 cubic inches.

One cubic foot = 62.4245 pounds at 39 degrees Fahr.; 7.48 gallons U. S.; 6.2321 gallons imperial.

One gallon U. S. = 8.33111 pounds; 231 cubic inches; .13368 cubic feet.

One imperial gallon = 10 pounds at 62 degrees Fahr.; 277.274 cubic inches; .16046 cubic feet.

One pound pressure = 2.31 feet in height.

One foot in height = .433 pounds pressure.

Petroleum weighs $6\frac{1}{2}$ pounds per U. S. gallon, 42 gallons to the barrel.

To convert imperial gallons into U. S. gallons, multiply by the factor 1.2. To convert U. S. gallons into imperial gallons, multiply by the factor .8333.

A *miner's inch* is a measure for flow of water, and is the quantity of water that will flow in one minute through an opening 1 inch square in a plank 2 inches thick under a head of $6\frac{1}{2}$ inches to the centre of the orifice. This is equivalent, approximately, to 1.53 cubic feet, or $11\frac{1}{2}$ gallons per minute.

To find the diameter of pump plungers to pump a given quantity of water at 100 feet piston speed per minute, divide the number of gallons by 4, then extract the square root, and the result will be the diameter in inches of the plungers.

To find the number of gallons delivered per minute by a single double-acting pump at 100 feet piston speed per minute, square the diameters of the plungers, then multiply by 4.

To find the horse-power necessary to elevate water to a given height, multiply the weight of the water elevated per minute by the height in feet and divide the product by 33,000 (an allowance should be made for water friction and a further allowance for losses in the steam cylinder, say from 20 to 30 per cent.).

The mean pressure of the atmosphere is usually estimated at 14.7 pounds per square inch, so that with a perfect vacuum it will sustain a column of mercury 29.9 inches, or a column of water 33.9 feet high at sea level.

To determine the proportion between the steam and pump cylinder, multiply the given area of the pump cylinder by the resistance on the pump in pounds per square inch, and divide the product by the available pressure of steam in pounds per square inch. The product equals the area of the steam cylinder. To this must be added an extra area to overcome the friction, which is usually taken at 25 per cent.

The resistance of friction in the flow of water through pipes of uniform diameter is independent of the pressure and increases directly as the length and the square of the velocity of the flow, and inversely as the diameter of the pipe. With wooden pipes the friction is 1.75 times greater than in metallic. Doubling the diameter increases the capacity four times.

To determine the velocity in feet per minute necessary to discharge a given volume of water in a given time, multiply the number of cubic feet of water by 144 and divide the product by the area of the pipe in inches.

To determine the area of a required pipe, the volume and velocity of water being given, multiply the number of cubic feet of water by 144 and divide the product by the velocity in feet per minute.

Pressure of Water

The pressure of water in pounds per square inch for every foot in height to 260 feet: and then, by intervals, to 3,000 feet head. By this table, from the pounds pressure per square inch, the feet head is readily obtained, and *vice versa*.

Feet Head	Pressure per Square Inch	Feet Head	Pressure per Square Inch	Feet Head	Pressure per Square Inch	Feet Head	Pressure per Square Inch	Feet Head	Pressure per Square Inch	Feet Head	Pressure per Square Inch
1	0.43	54	23.39	107	46.34	160	69.31	213	92.20	265	123.45
2	0.86	55	23.82	108	46.78	161	69.74	214	92.69	290	125.62
3	1.30	56	24.26	109	47.21	162	70.17	215	93.13	295	127.78
4	1.73	57	24.69	110	47.64	163	70.61	216	93.56	300	129.95
5	2.16	58	25.12	111	48.08	164	71.04	217	93.99	305	132.12
6	2.59	59	25.55	112	48.51	165	71.47	218	94.43	310	134.28
7	3.03	60	25.99	113	48.94	166	71.91	219	94.86	315	136.46
8	3.46	61	26.42	114	49.38	167	72.34	220	95.30	320	138.62
9	3.89	62	26.85	115	49.81	168	72.77	221	95.73	325	140.79
10	4.33	63	27.29	116	50.24	169	73.20	222	96.16	330	142.95
11	4.76	64	27.72	117	50.68	170	73.64	223	96.60	335	145.12
12	5.20	65	28.15	118	51.11	171	74.07	224	97.03	340	147.28
13	5.63	66	28.58	119	51.54	172	74.50	225	97.46	345	149.45
14	6.06	67	29.02	120	51.98	173	74.94	226	97.90	350	151.61
15	6.49	68	29.45	121	52.41	174	75.37	227	98.33	355	153.78
16	6.93	69	29.88	122	52.84	175	75.80	228	98.76	360	155.94
17	7.36	70	30.32	123	53.28	176	76.23	229	99.20	365	158.10
18	7.79	71	30.75	124	53.71	177	76.67	230	99.63	370	160.27
19	8.22	72	31.18	125	54.15	178	77.10	231	100.0	375	162.45
20	8.66	73	31.62	126	54.58	179	77.53	232	100.49	380	164.61
21	9.09	74	32.05	127	55.01	180	77.97	233	100.93	385	166.78
22	9.53	75	32.48	128	55.44	181	78.40	234	101.36	390	168.94
23	9.96	76	32.92	129	55.88	182	78.84	235	101.79	395	171.11
24	10.39	77	33.35	130	56.31	183	79.27	236	102.23	400	173.27
25	10.82	78	33.78	131	56.74	184	79.70	237	102.66	425	184.10
26	11.26	79	34.21	132	57.18	185	80.14	238	103.09	450	195.0
27	11.69	80	34.65	133	57.61	186	80.57	239	103.53	475	205.77
28	12.12	81	35.08	134	58.04	187	81.0	240	103.96	500	216.58
29	12.55	82	35.52	135	58.48	188	81.43	241	104.39	525	227.42
30	12.99	83	35.95	136	58.91	189	81.87	242	104.83	550	238.25
31	13.42	84	36.39	137	59.34	190	82.30	243	105.26	575	249.09
32	13.86	85	36.82	138	59.77	191	82.73	244	105.69	600	259.90
33	14.29	86	37.25	139	60.21	192	83.17	245	106.13	625	270.73
34	14.72	87	37.68	140	60.64	193	83.60	246	106.56	650	281.56
35	15.16	88	38.12	141	61.07	194	84.03	247	106.99	675	292.40
36	15.59	89	38.55	142	61.51	195	84.47	248	107.43	700	303.22
37	16.02	90	38.98	143	61.94	196	84.90	249	107.86	725	314.05
38	16.45	91	39.42	144	62.37	197	85.33	250	108.29	750	324.88
39	16.89	92	39.85	145	62.81	198	85.76	251	108.73	775	335.72
40	17.32	93	40.28	146	63.24	199	86.20	252	109.16	800	346.54
41	17.75	94	40.72	147	63.67	200	86.63	253	109.59	825	357.37
42	18.19	95	41.15	148	64.10	201	87.07	254	110.03	850	368.20
43	18.62	96	41.58	149	64.54	202	87.50	255	110.46	875	379.03
44	19.05	97	42.01	150	64.97	203	87.93	256	110.89	900	389.86
45	19.49	98	42.45	151	65.40	204	88.36	257	111.32	925	400.70
46	19.92	99	42.88	152	65.84	205	88.80	258	111.76	950	411.54
47	20.35	100	43.31	153	66.27	206	89.21	259	112.19	975	422.35
48	20.79	101	43.75	154	66.70	207	89.66	260	112.62	1000	433.18
49	21.22	102	44.18	155	67.14	208	90.10	261	113.06	1500	649.7
50	21.65	103	44.61	156	67.57	209	90.53	262	113.49	2000	866.3
51	22.09	104	45.05	157	68.0	210	90.96	270	116.96	3000	1,299.5
52	22.52	105	45.48	158	68.43	211	91.39	275	119.12	.....	.....
53	22.95	106	45.91	159	68.87	212	91.83	280	121.29	.....	.....

Heights in Feet to Which Pumps Will Elevate Water

Steam pressure, 50 pounds per square inch at the pump. No allowance made for friction in pipes, etc.

Diam. of Steam Cylinder	DIAMETER OF WATER CYLINDERS															
	2 Inch	2½ Inch	3 Inch	3½ Inch	4 Inch	5 Inch	6 Inch	7 Inch	8 Inch	9 Inch	10 Inch	10½ Inch	12 Inch	14 Inch	16 Inch	20 Inch
3½	230	147	102	75	58	37										
4	300	192	134	102	75	48	34									
5	469	300	209	153	117	75	52	38								
6	675	432	300	221	169	108	75	55	42	33						
7	920	588	408	300	230	147	102	75	57	45	37					
8	...	768	533	344	300	192	141	98	75	59	48					
9	...	972	675	466	380	243	169	124	95	75	61	55	42			
10	...	...	833	612	469	300	208	153	117	94	75	68	50	38		
12	...	...	...	881	675	432	300	220	169	133	108	97	75	55	42	
14	...	...	...	...	920	588	408	300	228	182	147	133	102	75	57	45
16	...	...	...	...	...	768	564	392	300	236	192	174	141	98	75	59
18	...	...	...	...	...	972	650	490	379	300	243	220	162	122	95	75
20	...	...	...	...	...	...	833	600	469	370	300	272	208	150	117	92
22	...	...	...	...	...	...	1008	741	567	448	364	329	252	185	142	112
24	...	...	...	...	...	...	...	882	675	533	432	392	300	220	169	133
26	...	...	...	...	...	...	...	1034	788	626	508	460	356	258	197	156
28	...	...	...	...	...	...	...	...	919	726	588	533	407	300	230	181
30	...	...	...	...	...	...	...	...	1054	834	676	612	468	345	263	208
32	...	...	...	...	...	...	...	...	...	948	798	697	533	391	300	237
34	...	...	...	...	...	...	...	...	...	1070	868	786	603	442	339	268
36	...	...	...	...	...	...	...	...	...	...	972	881	675	495	380	300

The maximum limit of piston speed depends upon the head pumped against.

Friction Loss in Pounds Pressure per Square Inch

For each 100 feet of length in different size clean iron pipes discharging given quantities of water per minute.

Gallons Discharged Per Minute	½ Inch	¾ Inch	1 Inch	1¼ Inch	1½ Inch	2 Inch	2½ Inch	3 Inch	3½ Inch	4 Inch	5 Inch	6 Inch	Gallons Discharged per Minute
	Friction Loss in Pounds	Friction Loss in Pounds	Friction Loss in Pounds	Friction Loss in Pounds	Friction Loss in Pounds	Friction Loss in Pounds	Friction Loss in Pounds	Friction Loss in Pounds	Friction Loss in Pounds	Friction Loss in Pounds	Friction Loss in Pounds	Friction Loss in Pounds	
5	24.6	3.3	.84	.31	.12								5
10	96.0	13.0	3.16	1.05	.47	.12							10
15		28.7	6.98	2.38	.97								15
20		50.4	12.3	4.07	1.66	.42							20
25		78.0	19.0	6.40	2.62		.21	.10					25
30			27.5	9.15	3.75	.91							30
35			37.0	12.04	5.05								35
40			48.0	16.1	6.52	1.60							40
45				20.2	8.15								45
50				24.9	10.0	2.44	.81	.35	.16	.09	.03		50
75				56.1	22.4	5.32	1.80	.74	.34				75
100					39.0	9.46	3.20	1.31	.60	.33	.12	.05	100
125						14.9	4.89	1.99	.90				125
150						21.2	7.0	2.85	1.32	.69	.25	.10	150
175						28.1	9.46	3.85	1.78				175
200						37.5	12.48	5.02	2.32	1.22	.42	.17	200
250							19.66	7.76	3.55	1.89	.65	.26	250
300							28.06	11.2	5.23	2.66	.93	.37	300
350								15.2	7.0	3.65	1.28	.50	350
400								19.5	9.0	4.73	1.68	.65	400
450								25.0	11.60	6.01	2.10	.81	450
500								30.8	14.26	7.43	2.70	.96	500

Table continued on next page

Friction Loss in Pounds Pressure per Square Inch

Continued

For each 100 feet of length in different size clean iron pipes discharging given quantities of water per minute.

Gallons Discharged per Minute	5 INCH	6 INCH	8 INCH	10 INCH	12 INCH	14 INCH	16 INCH	18 INCH	20 INCH	24 INCH	30 INCH	Gallons Discharged per Minute
	Friction Loss in Pounds	Friction Loss in Pounds	Friction Loss in Pounds	Friction Loss in Pounds	Friction Loss in Pounds	Friction Loss in Pounds	Friction Loss in Pounds	Friction Loss in Pounds	Friction Loss in Pounds	Friction Loss in Pounds	Friction Loss in Pounds	
250	.65	.26	.07	.03	.01	....	....	....	....	....	....	250
500	2.70	.96	.25	.09	.04	.017	.009	.005	....	....	....	500
750	5.40	2.21	.53	.18	.08	....	....	....	....	....	....	750
1,000	9.60	3.88	.94	.32	.13	.062	.036	.020	.012	.005	.002	1,000
1,250	1.46	.49	.20	....	....	....	....	....	....	1,250
1,500	2.09	.70	.29	.135	.071	.040	....	....	....	1,500
1,75095	.38	....	....	....	....	....	....	1,750
2,000	1.23	.49	.234	.123	.071	.042	.020	.006	2,000
2,25063	....	....	....	....	....	....	2,250
2,50077	.362	.188	.107	....	....	....	2,500
3,000	1.11	.515	.267	.150	.091	.047	.012	3,000
3,500697	.365	.204	....	....	....	3,500
4,000910	.472	.263	.158	.067	.022	4,000
4,500593	.333	....	....	....	4,500
5,000730	.408	.244	.102	.035	5,000
6,000585	.348	.146	.048	6,000
7,000472	.196	.065	7,000
8,000612	.255	.083	8,000
9,000323	.105	9,000
10,000396	.131	10,000

Pounds Pressure Lost by Friction

In each 100 feet of 2½-inch fire hose, for given discharges of water per minute.

Diameter of Nozzle, Inches	PRESSURE AT HOSE NOZZLE									
	Head in pounds per square inch.....	20	30	40	50	60	70	80	90	100
	Head in feet.....	46.2	69.3	92.4	115.5	138.6	161.7	184.8	207.9	231.0
1	{ Gallons discharged.....	110	134	155	173	189	205	219	232	245
	{ Rubber hose, pounds.....	4.35	6.40	8.40	10.20	12.80	14.80	17.0	19.20	20.50
	{ Leather hose, pounds.....	6.33	8.53	10.83	13.10	15.34	17.79	20.11	22.40	24.83
1½	{ Gallons discharged.....	139	170	196	219	240	259	277	294	310
	{ Rubber hose, pounds.....	6.79	10.16	13.60	17.05	20.50	24.0	27.0	30.0	33.0
	{ Leather hose, pounds.....	9.05	12.71	16.38	20.11	23.88	27.61	31.41	35.24	39.07
1¾	{ Gallons discharged.....	171	210	242	271	297	320	342	363	383
	{ Rubber hose, pounds.....	10.28	15.64	20.85	25.46	29.50	33.0	36.81	40.42	43.0
	{ Leather hose, pounds.....	12.84	19.0	24.07	30.11	35.94	41.57	47.36	53.25	59.20
1½	{ Gallons discharged.....	207	253	293	327	358	387	413	439	462
	{ Rubber hose, pounds.....	15.0	22.96	29.40	40.50	48.20	55.70	64.70	72.0	79.26
	{ Leather hose, pounds.....	18.81	26.39	35.01	43.38	52.0	60.40	68.59	76.73	84.87

Useful Information.

Table of Capacity of Pumps

The figures at the extreme left of the table are piston or plunger diameters; the line of figures across the top are piston or plunger strokes; the figures in the body of the table are the capacity or displacement in gallons, corresponding to a single stroke. To find the capacity for one revolution multiply the capacity for a single stroke by two.

Diameter of Cylinder, Inches	LENGTH OF STROKE IN INCHES															
	2	3	4	5	6	7	12	13	16	18	20	24	25	33	36	38
1 1/4	.0106	.0159	.0212	.0266	.0319	.0372	.0638	.0691	.085	.0956	.1062	.1274	.1328	.1753	.1912	.2021
1 1/2	.0129	.0193	.0257	.0321	.0386	.045	.0771	.0835	.1029	.1156	.1286	.1543	.1607	.2121	.2314	.2442
1 3/4	.0153	.0229	.0306	.0382	.0459	.0535	.0918	.0984	.1224	.1377	.1530	.1836	.1912	.2524	.2754	.2907
2	.0208	.0312	.0416	.0521	.0625	.0729	.1249	.1353	.1666	.1874	.2082	.2499	.2603	.3436	.3748	.3956
2 1/4	.0272	.0408	.0544	.068	.0816	.0952	.1632	.1768	.2176	.2448	.2720	.3264	.340	.4489	.4897	.5169
2 1/2	.0344	.0516	.0688	.086	.1033	.1205	.2065	.2238	.2754	.3008	.3442	.4131	.4303	.568	.6196	.6541
2 3/4	.0425	.0638	.0859	.1063	.1275	.1488	.2557	.2763	.340	.3825	.425	.51	.5313	.7013	.765	.8075
3	.0514	.0771	.1029	.1263	.1513	.1765	.3086	.3343	.4114	.4628	.5143	.6171	.6429	.8486	.9257	.9771
3 1/4	.0613	.0918	.1234	.1539	.1836	.2142	.3672	.3978	.4896	.5508	.612	.7344	.765	.101	.1102	.1163
3 1/2	.0718	.1077	.1437	.1796	.2154	.2514	.431	.4668	.5746	.6464	.7183	.8619	.8978	.1185	.1293	.1365
3 3/4	.0833	.1249	.1666	.2082	.2499	.2915	.4997	.5414	.6663	.7496	.833	.9995	.1041	.1374	.1499	.1583
3 1/2	.0957	.1435	.1913	.2392	.287	.3348	.574	.6214	.7653	.8610	.9561	1.148	.1196	.1579	.1722	.1818
4	.1088	.1632	.2176	.272	.3265	.3809	.653	.7074	.8706	.9795	1.088	1.306	.136	.1796	.1959	.2068
4 1/4	.1229	.1843	.2457	.3071	.3684	.4300	.7371	.7986	.9828	1.106	1.239	1.474	.1536	.2027	.2211	.2333
4 1/2	.1377	.2065	.2753	.3443	.413	.4818	.826	.8948	1.101	1.269	1.377	1.652	.1721	.2271	.2478	.2616
4 3/4	.1531	.2301	.3068	.3835	.4603	.537	.9205	.9972	1.227	1.378	1.534	1.841	.1918	.2531	.2762	.2915
5	.17	.2550	.34	.4250	.51	.5950	1.02	1.105	1.36	1.53	1.7	2.04	.2125	.2805	.3060	.323
5 1/4	.1874	.2812	.3749	.4686	.5623	.6561	1.135	1.218	1.5	1.687	1.874	2.249	.2343	.3063	.3374	.3561
5 1/2	.2057	.3086	.4114	.5143	.6171	.72	1.234	1.337	1.646	1.851	2.057	2.468	.2571	.3394	.3703	.3908
5 3/4	.2248	.3373	.4497	.5621	.6745	.787	1.349	1.461	1.799	2.023	2.248	2.698	.2811	.371	.4047	.4272
6	.2448	.3672	.4896	.612	.7343	.8567	1.469	1.59	1.938	2.203	2.468	2.938	.306	.4038	.4406	.465
6 1/4	.2656	.3984	.5312	.6641	.7969	.9297	1.594	1.727	2.125	2.39	2.656	3.188	.332	.4383	.4781	.5047
6 1/2	.2872	.4309	.5745	.7182	.8618	1.005	1.724	1.897	2.298	2.585	2.873	3.447	.3591	.474	.5171	.5458
6 3/4	.3099	.4648	.6197	.7747	.9296	1.085	1.859	2.044	2.479	2.788	3.099	3.718	.3873	.5113	.5578	.5887
7	.3332	.4999	.6665	.8331	.9997	1.166	1.999	2.166	2.666	2.999	3.332	3.999	.4165	.5499	.5968	.6332
7 1/4	.4081	.6126	.8168	1.021	1.225	1.429	2.45	2.654	3.267	3.675	4.084	4.9	.5165	.6739	.7351	.7759
7 1/2	.4352	.6329	.8704	1.089	1.306	1.523	2.611	2.829	3.492	3.917	4.352	5.223	.544	.7181	.7894	.8269
8	.4598	.6529	.8963	1.102	1.317	1.532	3.350	3.580	4.406	4.957	5.508	6.610	.6885	.9089	9.915	10.46
10	.68	1.02	1.36	1.7	2.04	2.38	4.08	4.42	5.44	6.12	6.8	8.16	.85	11.22	12.24	12.92
10 1/2	.7497	1.125	1.499	1.874	2.249	2.624	4.498	4.873	5.998	6.747	7.497	8.996	.937	12.37	13.49	14.24
11	.8288	1.234	1.646	2.057	2.468	2.88	4.937	5.348	6.582	7.405	8.228	9.873	.1028	13.58	14.81	15.63
12	.9792	1.469	1.958	2.448	2.938	3.427	5.875	6.365	7.892	8.813	9.792	11.75	.1224	16.16	17.63	18.6
13	1.149	1.723	2.297	2.872	3.445	4.022	6.894	7.467	9.134	10.34	11.49	13.78	.1436	18.96	20.69	21.83
14	1.332	1.998	2.665	3.331	3.997	4.664	7.994	8.661	10.63	11.99	13.32	15.98	.1666	21.99	23.99	25.32
15	1.53	2.295	3.06	3.825	4.59	5.354	9.143	9.943	12.23	13.77	15.29	18.36	.1912	25.24	27.54	29.07
16	1.74	2.61	3.48	4.35	5.22	6.09	10.44	11.31	13.92	15.66	17.40	20.88	.2176	28.72	31.53	33.67
18	2.203	3.305	4.406	5.508	6.61	7.711	13.22	14.32	17.62	19.82	22.63	26.44	.2754	36.35	39.66	41.86
20	2.729	4.08	5.449	6.8	8.16	9.52	16.32	17.68	21.76	24.48	27.2	32.64	.34	44.88	48.96	51.68
22	3.291	4.936	6.582	8.228	9.874	11.52	19.75	21.39	26.31	29.62	32.91	39.49	.4114	54.3	59.24	62.53
24	3.916	5.875	7.833	9.792	11.75	13.71	23.5	25.49	31.33	35.25	39.16	47.0	.4896	64.63	70.59	74.49

Number of Gallons in Round Cisterns and Tanks

Depth in Feet	DIAMETER IN FEET																Depth in Feet
	5	6	7	8	9	10	11	12	13	14	15	16	18	20	22	24	25
2 1/2	735	1060	1440	1875	2380	2925	3550	4227	4960	5765	6638	7520	9516	11750	14215	16918	18255
3 1/2	1270	1770	2370	3075	3880	4685	5490	6295	7100	7905	8710	9515	11110	13345	15580	17815	20050
4 1/2	1905	2610	3415	4220	5025	5830	6635	7440	8245	9050	9855	10660	12255	14500	16745	18990	21235
5 1/2	2540	3445	4450	5455	6460	7465	8470	9475	10480	11485	12490	13495	15090	17335	19580	21825	24070
6 1/2	3175	4280	5485	6690	7895	9100	10305	11510	12715	13920	15125	16330	18325	20570	22815	25060	27305
7 1/2	3810	5115	6520	7925	9330	10735	12140	13545	14950	16355	17760	19165	21460	23755	26050	28345	30640
8 1/2	4445	5950	7555	9160	10765	12370	13975	15580	17185	18790	20395	21900	24495	26690	28885	31080	33275
9 1/2	5080	6785	8590	10395	12200	14005	15810	17615	19420	21225	23030	24835	27630	29825	32020	34215	36410
10 1/2	5715	7620	9625	11630	13635	15640	17645	19650	21655	23660	25665	27670	30865	32870	34875	36880	38885
11 1/2	6350	8455	10660	12865	15070	17275	19480	21685	23890	26095	28300	30505	33700	35705	37710	39715	41720
12 1/2	6985	9290	11695	14100	16505	18910	21315	23720	26125	28530	30935	33340	36535	38540	40545	42550	44555
13 1/2	7620	10125	12730	15335	17940	20545	23150	25755	28360	30965	33570	36175	39370	41375	43380	45385	47390
14 1/2	8255	10960	13765	16570	19375	22180	24985	27790	30595	33400	36205	39010	42205	44210	46215	48220	50225
15 1/2	8890	11795	14800	17805	20810	23815	26820	29825	32830	35835	38840	41845	45040	46845	48650	50455	52260
16 1/2	9525	12630	15835	19040	22245	25450	28655	31860	35065	38270	41475	44680	47885	49690	51495	53300	55105
17 1/2	10160	13365	16770	20175	23580	26985	30390	33795	37200	40605	44010	47415	50620	52425	54230	56035	57840
18 1/2	10795	14100	17605	21210	24615	28020	31425	34830	38235	41640	45045	48450	51655	53460	55265	57070	58875
19 1/2	11430	14835	18440	22245	25650	29055	32460	35865	39270	42675	46080	49485	52690	54500	56305	58110	59915
20 1/2	12065	15570	19275	23280	26685	30090	33495	36900	40305	43710	47115	50520	53725	55535	57340	59145	60950
21 1/2	12700	16305	20110	24215	27620	31025	34430	37835	41240	44645	48050	51455	54660	56470	58275	60080	61885
22 1/2	13335	17040	20945	25020	28425	31830	35235	38640	42045	45450	48855	52260	55465	57275	59080	60885	62690
23 1/2	13970	17775	21780	25725	29130	32535	35940	39345	42750	46155	49560	52965	56170	57980	59785	61590	63395
24 1/2	14605	18510	22515	26470	29875	33280	36685	40090	43495	46900	50305	53710	56915	58725	60530	62335	64140
25 1/2	15240	19245	23250	27215	30620	34025	37430	40835	44240	47645	51050	54455	57660	59470	61275	63080	64885

For tanks that are tapering, measure the diameter four-tenths from the large end.

Number of U. S. Gallons in Rectangular Tanks

For One Foot in Depth

LENGTH OF TANK

Width of Tank	LENGTH OF TANK																ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.
	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17							
2 ft. 6 in.	29.92	37.40	44.88	52.36	59.84	67.32	74.81	82.29	89.77	97.25	104.73	112.21	119.69	127.17	134.65	142.13	149.61	157.09	164.57	172.05	179.53	187.01	194.49
3 1/2	37.40	46.75	56.10	65.45	74.80	84.16	93.51	102.86	112.21	121.56	130.91	140.26	149.61	158.96	168.31	177.66	187.01	196.36	205.71	215.06	224.41	233.76	243.11
4 1/2	44.88	56.10	67.32	78.54	89.77	100.99	112.21	123.43	134.65	145.87	157.09	168.31	179.53	190.75	201.97	213.19	224.41	235.63	246.85	258.07	269.29	280.51	291.73
5 1/2	52.36	65.45	78.54	91.63	104.73	117.82	130.91	144.00	157.09	170.18	183.27	196.36	209.45	222.54	235.63	248.72	261.81	274.90	287.99	301.08	314.17	327.26	340.35
6 1/2	59.84	74.80	89.77	104.73	119.69	134.65	149.61	164.57	179.53	194.49	209.45	224.41	239.37	254.33	269.29	284.25	299.21	314.17	329.13	344.09	359.05	374.01	388.97
7 1/2	67.32	82.29	97.25	112.21	127.17	142.13	157.09	172.05	187.01	201.97	216.93	231.89	246.85	261.81	276.77	291.73	306.69	321.65	336.61	351.57	366.53	381.49	396.45
8 1/2	74.81	89.77	104.73	119.69	134.65	149.61	164.57	179.53	194.49	209.45	224.41	239.37	254.33	269.29	284.25	299.21	314.17	329.13	344.09	359.05	374.01	388.97	403.93
9 1/2	82.29	97.25	112.21	127.17	142.13	157.09	172.05	187.01	201.97	216.93	231.89	246.85	261.81	276.77	291.73	306.69	321.65	336.61	351.57	366.53	381.49	396.45	411.41
10 1/2	89.77	104.73	119.69	134.65	149.61	164.57	179.53	194.49	209.45	224.41	239.37	254.33	269.29	284.25	299.21	314.17	329.13	344.09	359.05	374.01	388.97	403.93	418.89
11 1/2	97.25	112.21	127.17	142.13	157.09	172.05	187.01	201.97	216.93	231.89	246.85	261.81	276.77	291.73	306.69	321.65	336.61	351.57	366.53	381.49	396.45	411.41	426.37
12 1/2	104.73	119.69	134.65	149.61	164.57	179.53	194.49	209.45	224.41	239.37	254.33	269.29	284.25	299.21	314.17	329.13	344.09	359.05	374.01	388.97	403.93	418.89	433.85
13 1/2	112.21	127.17	142.13	157.09	172.05	187.01	201.97	216.93	231.89	246.85	261.81	276.77	291.73	306.69	321.65	336.61	351.57	366.53	381.49	396.45	411.41	426.37	441.33
14 1/2	119.69	134.65	149.61	164.57	179.53	194.49	209.45	224.41	239.37	254.33	269.29	284.25	299.21	314.17	329.13	344.09	359.05	374.01	388.97	403.93	418.89	433.85	448.81
15 1/2	127.17	142.13	157.09	172.05	187.01	201.97	216.93	231.89	246.85	261.81	276.77	291.73	306.69	321.65	336.61	351.57	366.53	381.49	396.45	411.41	426.37	441.33	456.29
16 1/2	134.65	149.61	164.57	179.53	194.49	209.45	224.41	239.37	254.33	269.29	284.25	299.21	314.17	329.13	344.09	359.05	374.01	388.97	403.93	418.89	433.85	448.81	463.77
17 1/2	142.13	157.09	172.05	187.01	201.97	216.93	231.89	246.85	261.81	276.77	291.73	306.69	321.65	336.61	351.57	366.53	381.49	396.45	411.41	426.37	441.33	456.29	471.25
18 1/2	149.61	164.57	179.53	194.49	209.45	224.41	239.37	254.33	269.29	284.25	299.21	314.17	329.13	344.09	359.05	374.01	388.97	403.93	418.89	433.85	448.81	463.77	478.73
19 1/2	157.09	172.05	187.01	201.97	216.93	231.89	246.85	261.81	276.77	291.73	306.69	321.65	336.61	351.57	366.53	381.49	396.45	411.41	426.37	441.33	456.29	471.25	486.21
20 1/2	164.57	179.53	194.49	209.45	224.41	239.37	254.33	269.29	284.25	299.21	314.17	329.13	344.09	359.05	374.01	388.97	403.93	418.89	433.85	448.81	463.77	478.73	493.69
21 1/2	172.05	187.01	201.97	216.93	231.89	246.85	261.81	276.77	291.73	306.69	321.65	336.61	351.57	366.53	381.49	396.45	411.41	426.37	441.33	456.29	471.25	486.21	501.17
22 1/2	179.53	194.49	209.45	224.41	239.37	254.33	269.29	284.25	299.21	314.17	329.13	344.09	359.05	374.01	388.97	403.93	418.89	433.85	448.81	463.77	478.73	493.69	508.65
23 1/2	187.01	201.97	216.93	231.89	246.85	261.81	276.77	291.73	306.69	321.65	336.61	351.57	366.53	381.49	396.45	411.41	426.37	441.33	456.29	471.25	486.21	501.17	516.13
24 1/2	194.49	209.45	224.41	239.37	254.33	269.29	284.25	299.21	314.17	329.13	344.09	359.05	374.01	388.97	403.93	418.89	433.85	448.81	463.77	478.73	493.69	508.65	523.61
25 1/2	201.97	216.93	231.89	246.85	261.81	276.77	291.73	306.69	321.65	336.61	351.57	366.53	381.49	396.45	411.41	426.37	441.33	456.29	471.25	486.21	501.17	516.13	531.09

Contents of Cylinders, in Cubic Feet, and in U. S. Gallons for One Foot of Length

231 Cubic Inches Equals One Gallon, and 7.4805 Gallons Equals One Cubic Foot

For the contents of a greater diameter than any in the table, take the quantity opposite one half said diameter, and multiply it by 4. Thus the number of cubic feet in one foot length of a pipe 80 inches in diameter, is equal to $8.728 \times 4 = 34.912$ cubic feet. So also with gallons and areas.

Diam. in Inches	For 1 Foot in Length		Diam. in Inches	For 1 Foot in Length		Diam. in Inches	For 1 Foot in Length		Diam. in Inches	For 1 Foot in Length		Diam. in Inches	For 1 Foot in Length	
	Cubic Feet.	Gallons of 312 Cubic Inches		Cubic Feet.	Gallons of 312 Cubic Inches		Cubic Feet.	Gallons of 312 Cubic Inches		Cubic Feet.	Gallons of 312 Cubic Inches		Cubic Feet.	Gallons of 312 Cubic Inches
$\frac{1}{8}$	.0208	.0003	$\frac{1}{4}$	.3958	.1231	$\frac{1}{2}$	.9375	.6903	$\frac{3}{4}$	1.958	3.012	$1\frac{1}{8}$	3.467	5.586
$\frac{1}{4}$	.0290	.0005	$\frac{1}{2}$	.4167	.1364	$\frac{3}{4}$	.9583	.7213	$1\frac{1}{4}$	2.000	3.142	$1\frac{1}{2}$	3.409	5.500
$\frac{3}{8}$	.0313	.0008	$\frac{3}{4}$	.4375	.1503	$1\frac{1}{4}$	.9792	.7530	$1\frac{3}{4}$	2.083	3.409	$1\frac{7}{8}$	3.687	5.758
$\frac{1}{2}$	.0365	.0010	$1\frac{1}{4}$	.4583	.1650	$1\frac{3}{4}$	1.000	.7854	$1\frac{7}{8}$	2.166	3.687	$1\frac{5}{8}$	3.976	6.231
$\frac{5}{8}$	.0417	.0014	$1\frac{3}{4}$	.4792	.1803	$1\frac{7}{8}$	1.042	.8323	$1\frac{5}{8}$	2.250	3.976	$1\frac{3}{4}$	4.276	6.719
$\frac{3}{4}$	.0469	.0017	$1\frac{7}{8}$	.5000	.1963	$1\frac{5}{8}$	1.083	.8818	$1\frac{3}{4}$	2.333	4.276	$1\frac{1}{4}$	4.587	7.219
$\frac{7}{8}$	.0521	.0021	$1\frac{5}{8}$	.5208	.2130	$1\frac{3}{4}$	1.125	.9340	$1\frac{1}{4}$	2.416	4.587	$1\frac{1}{8}$	4.909	7.729
$1\frac{1}{8}$	.0573	.0026	$1\frac{3}{4}$	.5417	.2305	$1\frac{1}{4}$	1.167	.9869	$1\frac{1}{8}$	2.500	4.909	$1\frac{1}{4}$	5.231	8.250
$1\frac{1}{4}$	.0625	.0031	$1\frac{1}{4}$	.5625	.2485	$1\frac{1}{8}$	1.208	1.0417	$1\frac{1}{4}$	2.583	5.231	$1\frac{1}{8}$	5.562	8.781
$1\frac{3}{8}$	.0677	.0036	$1\frac{1}{8}$	.5833	.2673	$1\frac{1}{8}$	1.250	1.0980	$1\frac{1}{4}$	2.666	5.562	$1\frac{1}{4}$	5.904	9.321
$1\frac{1}{2}$	.0729	.0042	$1\frac{1}{8}$	.6042	.2868	$1\frac{1}{4}$	1.292	1.1561	$1\frac{1}{4}$	2.750	5.904	$1\frac{1}{4}$	6.250	9.875
$1\frac{5}{8}$	.0781	.0048	$1\frac{1}{4}$	.6250	.3068	$1\frac{1}{4}$	1.333	1.2167	$1\frac{1}{4}$	2.833	6.250	$1\frac{1}{4}$	6.604	10.444
$1\frac{3}{4}$	.0833	.0055	$1\frac{1}{4}$	.6458	.3275	$1\frac{1}{4}$	1.375	1.2792	$1\frac{1}{4}$	2.916	6.604	$1\frac{1}{4}$	6.963	11.033
$1\frac{7}{8}$	.0885	.0063	$1\frac{1}{4}$	.6667	.3490	$1\frac{1}{4}$	1.417	1.3438	$1\frac{1}{4}$	3.000	7.000	$1\frac{1}{4}$	7.369	11.633
$1\frac{1}{2}$	.0937	.0071	$1\frac{1}{4}$	.6875	.3713	$1\frac{1}{4}$	1.458	1.4100	$1\frac{1}{4}$	3.083	7.369	$1\frac{1}{4}$	7.750	12.250
$1\frac{5}{8}$	.0989	.0080	$1\frac{1}{4}$	.7083	.3940	$1\frac{1}{4}$	1.500	1.4779	$1\frac{1}{4}$	3.166	7.750	$1\frac{1}{4}$	8.142	12.889
$1\frac{3}{4}$	.1041	.0088	$1\frac{1}{4}$	.7292	.4175	$1\frac{1}{4}$	1.542	1.5477	$1\frac{1}{4}$	3.250	8.142	$1\frac{1}{4}$	8.542	13.542
$1\frac{7}{8}$	.1093	.0097	$1\frac{1}{4}$	.7500	.4418	$1\frac{1}{4}$	1.583	1.6194	$1\frac{1}{4}$	3.333	8.542	$1\frac{1}{4}$	8.958	14.219
$1\frac{1}{2}$	.1145	.0106	$1\frac{1}{4}$	.7708	.4668	$1\frac{1}{4}$	1.625	1.6938	$1\frac{1}{4}$	3.416	8.958	$1\frac{1}{4}$	9.389	14.919
$1\frac{5}{8}$	.1197	.0115	$1\frac{1}{4}$	.7917	.4923	$1\frac{1}{4}$	1.666	1.7713	$1\frac{1}{4}$	3.500	9.389	$1\frac{1}{4}$	9.833	15.633
$1\frac{3}{4}$	.1250	.0125	$1\frac{1}{4}$	.8125	.5185	$1\frac{1}{4}$	1.708	1.8513	$1\frac{1}{4}$	3.583	9.833	$1\frac{1}{4}$	10.292	16.375
$1\frac{7}{8}$	.1302	.0135	$1\frac{1}{4}$	.8333	.5455	$1\frac{1}{4}$	1.750	1.9338	$1\frac{1}{4}$	3.666	10.292	$1\frac{1}{4}$	10.767	17.133
$1\frac{1}{2}$	.1354	.0145	$1\frac{1}{4}$	.8542	.5730	$1\frac{1}{4}$	1.792	2.0188	$1\frac{1}{4}$	3.750	10.767	$1\frac{1}{4}$	11.258	17.919
$1\frac{5}{8}$	.1406	.0155	$1\frac{1}{4}$	.8750	.6013	$1\frac{1}{4}$	1.833	2.1063	$1\frac{1}{4}$	3.833	11.258	$1\frac{1}{4}$	11.767	18.729
$1\frac{3}{4}$	.1458	.0165	$1\frac{1}{4}$	.8958	.6303	$1\frac{1}{4}$	1.875	2.1963	$1\frac{1}{4}$	3.916	11.767	$1\frac{1}{4}$	12.292	19.558
$1\frac{7}{8}$	.1510	.0175	$1\frac{1}{4}$	.9167	.6600	$1\frac{1}{4}$	1.917	2.2883	$1\frac{1}{4}$	4.000	12.292	$1\frac{1}{4}$	12.833	20.419

Fire Streams

John R. Freeman, M. E.

Pressures required at nozzle and at pump, with quantity and pressure of water necessary to throw water various distances through different-sized nozzles—using 100 feet of $2\frac{1}{2}$ -inch rubber hose and smooth nozzles.

	Size of Nozzles									
	$\frac{1}{4}$ Inch					$\frac{3}{8}$ Inch				
Pressure at nozzle, pounds.....	30	40	50	60	80	30	40	50	60	80
*Pressure at pump or hydrant, pounds.....	32	43	54	65	86	34	46	57	69	91
Vertical height, feet.....	48	60	67	72	79	49	62	71	77	85
Horizontal distance, feet.....	37	44	50	54	62	42	40	55	61	70
Gallons, per minute.....	90	104	116	127	147	123	142	159	174	201

	Size of Nozzles									
	1 Inch					$1\frac{1}{2}$ Inch				
Pressure at nozzle, pounds.....	30	40	50	60	80	30	40	50	60	80
*Pressure at pump or hydrant, pounds.....	37	50	62	75	100	40	56	70	84	112
Vertical height, feet.....	51	64	73	79	89	52	65	75	83	92
Horizontal distance, feet.....	47	55	61	57	76	50	59	66	72	81
Gallons, per minute.....	161	186	208	228	263	206	238	266	291	336

	Size of Nozzles									
	$1\frac{3}{4}$ Inch					$2\frac{1}{2}$ Inch				
Pressure at nozzle, pounds.....	30	40	50	60	80	30	40	50	60	80
*Pressure at pump or hydrant, pounds.....	49	65	81	97	129	58	77	96	116	154
Vertical height, feet.....	53	67	77	85	95	55	69	79	87	97
Horizontal distance, feet.....	54	63	70	76	85	56	66	73	79	88
Gallons, per minute.....	256	296	331	363	419	315	363	406	445	514

*For greater lengths of $2\frac{1}{2}$ -inch hose, the increased friction can readily be obtained by noting the differences between the "pressure at nozzle" and the "pressure at pump or hydrant," as given above. For instance, if it requires at hydrant or pump 10 pounds more pressure than it does at nozzle to overcome the friction when pumping through 100 feet of $2\frac{1}{2}$ -inch hose (using 1-inch nozzle, with 40 pounds pressure at nozzle), then it requires 20 pounds pressure to overcome the friction in forcing through 200 feet of same size hose.

The heights and distances given for good "effective fire streams" are with moderate wind. The maximum vertical height reached by the spray or drops in still air, is from 22 per cent for the lower pressure, to 56 per cent for the higher pressures, greater than the elevations as given in the table above. The maximum horizontal distance reached by the spray or drops in still air is about 120 per cent for the lower pressures and 150 per cent for the higher pressures, greater than the distance given in the table.

Two hundred and fifty gallons per minute is considered a good "standard fire stream," with 80 pounds pressure at the pump or hydrant.

Weight and Capacity of Different Standard Gallons of Water

	Cubic inches in a Gallon	Weight of a Gallon in Pounds	Gallons in a Cubic Foot	Weight of a Cubic foot of Water English Standard 62.531 lbs. Avoirdupois.
Imperial or English.....	277.274	10.00000	6.232102	
United States.....	231.000	8.33333	7.480519	

Weight of crude petroleum, $6\frac{1}{2}$ pounds per United States gallon, 42 gallons to the barrel.

Weight of refined petroleum, $6\frac{1}{2}$ pounds per United States gallon, 42 gallons to the barrel.

A "miner's inch" of water is approximately equal to a supply of 12 United States gallons per minute.

Theoretical Flow of Water Through Nozzles

(Joshua Hendy Iron Works)

DIAMETER OF NOZZLES IN INCHES

Effective Head in Feet at the Nozzle	Equivalent Pressure in Pounds Due to Head Pounds per Square Inch	Theoretical Velocity of Efflux in Ft. per Sec. Due to Head (Squaring Vel.)	1	1 1/2	2	2 1/2	3	3 1/2	4	4 1/2	5	6	7	8	9	10	11	12
5	17.93	0.098	0.221	0.392	0.611	0.880	1.197	1.565	2.040	2.445	3.519	4.810	6.259	7.921	9.779	12.833	14.082	
10	35.86	0.138	0.312	0.553	0.864	1.245	1.694	2.213	2.875	3.459	4.978	6.778	8.853	11.204	13.821	16.737	19.917	
20	71.72	0.205	0.441	0.784	1.222	1.760	2.395	3.130	4.066	4.885	7.039	9.585	12.518	15.842	19.558	23.667	28.614	
30	107.58	0.256	0.540	0.957	1.497	2.156	2.933	3.834	4.980	5.990	8.621	11.739	15.332	19.403	23.953	28.987	34.494	
40	143.44	0.296	0.624	1.130	1.729	2.490	3.388	4.427	5.751	6.918	9.956	13.557	17.706	22.408	27.662	33.475	39.835	
50	179.30	0.321	0.697	1.236	1.933	2.794	3.793	4.950	6.429	7.735	11.132	15.158	19.797	25.054	30.929	37.428	44.540	
60	215.16	0.341	0.764	1.274	2.118	3.050	4.149	5.425	7.044	8.437	12.194	16.644	21.886	27.444	33.880	40.999	48.789	
70	251.02	0.359	0.825	1.264	2.285	3.294	4.482	5.857	7.609	9.152	13.171	17.935	23.644	29.644	36.596	44.280	52.790	
80	286.88	0.373	0.882	1.564	2.458	3.521	4.791	6.262	8.134	9.781	14.080	19.173	25.400	31.690	39.121	47.341	56.367	
90	322.74	0.386	0.936	1.650	2.594	3.735	5.082	6.641	8.627	10.377	14.934	20.346	26.559	33.612	41.494	50.212	59.755	
100	358.60	0.418	0.986	1.748	2.734	3.937	5.377	7.001	9.094	10.940	15.743	21.437	27.997	35.432	43.741	52.932	62.989	
110	394.46	0.462	1.035	1.833	2.968	4.129	5.618	7.342	9.538	11.472	16.510	22.442	29.262	37.159	45.873	55.512	66.059	
120	430.32	0.489	1.080	1.866	2.968	4.314	5.770	7.671	9.965	11.986	17.250	23.490	30.678	38.825	47.929	58.000	69.020	
130	466.18	0.506	1.124	1.903	3.118	4.489	6.108	7.982	10.369	12.472	17.949	24.441	31.921	40.208	49.871	60.350	71.817	
140	502.04	0.520	1.167	2.009	3.235	4.659	6.349	8.283	10.700	12.942	18.626	25.364	33.126	41.922	51.753	62.627	74.526	
150	537.90	0.540	1.208	2.112	3.349	4.822	6.559	8.584	11.138	13.357	19.290	27.254	34.287	43.393	53.569	64.825	77.141	
160	573.76	0.557	1.248	2.212	3.459	4.981	6.766	8.856	11.504	13.837	19.847	27.117	35.416	44.820	55.300	66.957	79.678	
170	609.62	0.574	1.287	2.279	3.566	5.134	7.046	9.128	11.857	14.261	20.257	27.948	36.601	46.194	57.027	69.009	82.021	
180	645.48	0.588	1.323	2.345	3.668	5.282	7.187	9.392	12.200	14.675	21.119	28.758	37.559	47.533	58.679	71.009	84.301	
190	681.34	0.601	1.359	2.410	3.769	5.427	7.324	9.630	12.535	15.077	21.999	29.547	38.589	48.836	60.288	72.556	86.818	
200	717.20	0.614	1.394	2.473	3.867	5.567	7.457	9.769	12.860	15.409	22.862	30.314	39.591	50.104	61.853	74.320	89.072	
210	753.06	0.624	1.430	2.534	3.963	5.706	7.594	9.900	13.136	15.739	23.683	31.065	40.572	51.445	63.389	76.205	91.301	
220	788.92	0.646	1.463	2.593	4.055	5.839	7.724	10.032	13.466	16.063	24.533	31.793	41.518	52.543	64.864	78.493	93.407	
230	824.78	0.664	1.496	2.651	4.147	5.972	8.144	10.161	13.791	16.388	25.375	32.509	42.457	53.731	66.331	80.269	95.500	
240	860.64	0.681	1.528	2.708	4.236	6.100	8.290	10.286	14.087	16.696	26.208	33.233	43.372	54.889	67.760	81.968	97.578	
250	896.50	0.698	1.560	2.764	4.323	6.225	8.470	10.409	14.379	17.005	27.034	33.983	44.265	56.020	69.156	83.688	99.589	
260	932.36	0.710	1.590	2.819	4.409	6.349	8.607	10.528	14.663	17.315	27.853	34.684	45.142	57.243	70.525	85.344	101.560	
270	968.22	0.727	1.620	2.873	4.493	6.475	8.832	10.644	14.944	17.624	28.668	35.354	46.074	58.400	71.872	86.974	103.560	
280	1004.08	0.738	1.650	2.926	4.576	6.589	9.064	11.005	15.218	17.934	29.478	36.035	46.949	59.339	73.202	88.572	105.461	
290	1039.94	0.751	1.680	2.977	4.657	6.705	9.191	11.122	15.487	18.249	30.288	36.713	47.766	60.336	74.470	90.136	107.400	
300	1075.80	0.761	1.709	3.028	4.736	6.820	9.270	11.236	15.752	18.599	31.097	37.380	48.493	61.370	75.761	91.680	109.099	
310	1111.66	0.773	1.737	3.078	4.814	6.932	9.402	11.356	16.012	18.909	31.907	37.342	49.292	62.382	77.010	93.129	110.898	
320	1147.52	0.785	1.765	3.128	4.892	7.044	9.583	11.524	16.299	19.209	32.713	38.349	50.085	63.300	78.446	94.690	112.681	
330	1183.38	0.799	1.793	3.178	4.968	7.145	9.732	11.816	16.521	19.512	33.524	39.342	50.888	64.465	79.459	96.135	114.524	
340	1219.24	0.813	1.819	3.234	5.042	7.246	9.880	12.069	16.799	19.819	34.330	40.329	51.682	65.333	80.673	97.600	116.344	
350	1255.10	0.825	1.845	3.271	5.116	7.366	10.022	12.308	17.014	20.126	35.134	40.405	52.378	66.287	81.831	99.026	118.141	
360	1290.96	0.836	1.872	3.317	5.188	7.474	10.164	12.583	17.254	20.434	35.949	40.600	53.119	67.224	82.988	100.400	119.890	
370	1326.82	0.848	1.898	3.363	5.260	7.574	10.304	12.666	17.493	20.741	36.754	41.233	53.852	68.152	84.133	101.811	121.155	
380	1362.68	0.860	1.923	3.408	5.330	7.675	10.442	12.747	17.707	21.048	37.560	41.881	54.574	69.066	85.262	103.177	122.781	
390	1398.54	0.870	1.948	3.453	5.400	7.776	10.579	12.826	17.909	21.353	38.365	42.533	55.290	69.972	86.180	104.530	124.390	
400	1434.40	0.883	1.973	3.497	5.469	7.877	10.714	12.908	18.189	21.658	39.170	43.242	56.095	70.864	87.482	105.884	125.978	
410	1470.26	0.892	1.998	3.540	5.537	7.977	10.845	13.175	18.437	21.963	40.000	43.943	56.966	71.739	88.562	107.170	127.733	
420	1506.12	0.903	2.022	3.583	5.604	8.092	10.978	13.327	18.637	22.268	40.721	44.633	57.774	72.609	89.836	108.471	129.080	
430	1541.98	0.912	2.045	3.625	5.670	8.165	11.108	13.477	18.838	22.572	41.444	45.319	58.625	73.471	90.700	109.758	130.612	
440	1577.84	0.922	2.069	3.673	5.736	8.289	11.237	13.685	19.078	22.875	42.155	46.044	59.496	74.319	91.667	111.025	132.119	
450	1613.70	0.936	2.093	3.719	5.801	8.352	11.364	13.851	19.301	23.178	42.865	46.769	60.367	75.159	92.783	112.227	133.612	
460	1649.56	0.946	2.116	3.763	5.865	8.415	11.489	14.015	19.524	23.480	43.576	47.484	61.240	76.000	93.895	113.273	135.100	
470	1685.42	0.956	2.139	3.806	5.928	8.478	11.617	14.179	19.747	23.783	44.285	48.199	62.111	76.821	94.999	114.318	136.578	
480	1721.28	0.966	2.161	3.848	5.991	8.541	11.745	14.343	19.969	24.086	45.000	48.914	62.982	77.642	96.100	115.366	138.046	
490	1757.14	0.976	2.183	3.890	6.053	8.604	11.873	14.507	20.191	24.388	45.801	49.629	63.853	78.463	97.201	116.414	139.514	
500	1793.00	0.988	2.206	3.930	6.115	8.667	11.999	14.671	20.413	24.690	46.602	50.350	64.724	79.222	98.302	117.462	140.982	
510	1828.86	0.998	2.228	3.969	6.176	8.729	12.125	14.835	20.635	24.992	47.403	51.071	65.595	80.043	99.403	118.510	142.450	
520	1864.72	1.004	2.249	4.008	6.237	8.790	12.251	15.000	20.858	25.294	48.204	51.792	66.466	80.784	100.504	119.558	143.918	
530	1900.58	1.014	2.270	4.047	6.298	8.851	12.377	15.164	21.080	25.596	49.005	52.503	67.337	81.525	101.605	120.606	145.386	
540	1936.44	1.024	2.291	4.086	6.359	8.912	12.503	15.328	21.301	25.897	49.806	53.212	68.208	82.266	102.707	121.654	146.854	
550	1972.30	1.034	2.312	4.125	6.419	8.973	12.629	15.492	21.522	26.199	50.607	53.921	69.079	83.007	103.808	122.702	148.322	
560	2008.16	1.044	2.333	4.164	6.479	9.034	12.755	15.656	21.743	26.501	51.408	54.630	69.950	83.748	104.909	123.750	149.790	
570	2044.02	1.054	2.354	4.203	6.539	9.095	12.881	15.820	21.964	26.803	52.209	55.339	70.821	84.489	106.010	124.798	151.258	
580	2079.88	1.064	2.375	4.242	6.599	9.156	13.007	15.984	22.185	27.105	53.000	56.048	71.692	85.230	107.111	125.846	152.726	
590	2115.74	1.074	2.396	4.281	6.659	9.217	13.133	16.148	22.406	27.407	53.801	56.757	72.563	85.971	108.212			

Table for Equalizing Pipes

Size of Main Pipe	NUMBER OF BRANCHES														
	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1 in.	.758	.644	.574	.525	.488	.459	.435	.415	.398	.383	.370	.358	.348	.338	.330
1 1/4 "	.985	.838	.747	.683	.635	.597	.556	.540	.518	.498	.482	.466	.452	.440	.428
1 1/2 "	1.14	.967	.861	.788	.733	.689	.653	.623	.597	.575	.555	.538	.522	.508	.494
2 "	1.52	1.29	1.15	1.05	.977	.918	.870	.830	.796	.766	.740	.717	.696	.677	.660
2 1/2 "	1.89	1.61	1.44	1.31	1.22	1.15	1.09	1.09	.995	.958	.925	.896	.870	.846	.825
3 "	2.27	1.92	1.72	1.58	1.47	1.38	1.31	1.25	1.19	1.15	1.11	1.08	1.04	1.02	.989
3 1/2 "	2.65	2.26	2.01	1.84	1.71	1.61	1.52	1.45	1.39	1.34	1.30	1.25	1.22	1.18	1.15
4 "	3.03	2.58	2.30	2.10	1.95	1.84	1.74	1.66	1.59	1.53	1.48	1.43	1.39	1.35	1.32
4 1/2 "	3.41	2.90	2.58	2.36	2.20	2.07	1.96	1.87	1.79	1.72	1.67	1.61	1.57	1.52	1.48
5 "	3.79	3.22	2.87	2.63	2.44	2.30	2.18	2.08	1.99	1.92	1.85	1.79	1.74	1.69	1.65
6 "	4.55	3.87	3.45	3.15	2.93	2.75	2.61	2.49	2.39	2.30	2.22	2.15	2.09	2.03	1.98
7 "	5.30	4.51	4.02	3.68	3.42	3.21	3.05	2.91	2.79	2.68	2.59	2.51	2.44	2.37	2.31
8 "	6.06	5.16	4.59	4.20	3.91	3.67	3.48	3.32	3.18	3.09	2.96	2.87	2.78	2.71	2.64
9 "	6.82	5.80	5.17	4.73	4.40	4.13	3.92	3.74	3.58	3.45	3.33	3.23	3.13	3.04	2.97
10 "	7.58	6.44	5.74	5.25	4.88	4.59	4.35	4.15	3.98	3.83	3.70	3.59	3.48	3.38	3.30
12 "	9.08	7.73	6.89	6.30	5.86	5.51	5.22	4.98	4.78	4.60	4.44	4.30	4.18	4.06	3.96

Air Consumption at Sea Level of Standard Size Rock Drills

Size of Cylinder	2	2 1/4	2 1/2	2 3/4	3	3 1/2	3 3/4	3 1/2
Usual Diameter of Hole Drilled	1-1 1/2	1 1/8-1 1/2	1-2	1 1/4-2 1/2	1 1/2-3	1 1/2-3	1 1/2-3	1 1/4-3
Air Pressures	Air Consumption at Sea Level of one Drill—Cubic feet per minute of free air							
60	60	65	70	80	90	100	110	120
70	70	75	80	90	105	115	125	135
80	80	85	90	100	115	130	140	150
90	85	90	95	115	130	140	150	170
100	95	100	110	125	140	155	170	185

Multiplication Factors for Altitude and Number of Drills

Altitude of Plant, Feet Above Sea Level	NUMBER OF DRILLS														
	1	2	3	4	5	6	7	8	9	10	11	12	15	20	30
Combined Factors															
0	1.	1.8	2.6	3.35	4.10	4.8	5.45	6.10	6.75	7.45	8.05	8.7	10.65	13.9	20.2
1,000	1.03	1.85	2.67	3.45	4.25	4.95	5.6	6.3	6.95	7.6	8.3	9.	11.	14.4	20.8
2,000	1.06	1.91	2.75	3.55	4.35	5.1	5.8	6.5	7.2	7.9	8.5	9.2	11.3	14.7	21.5
3,000	1.09	1.96	2.83	3.65	4.5	5.2	5.95	6.65	7.35	8.1	8.8	9.5	11.6	15.2	21.5
4,000	1.13	2.03	2.94	3.8	4.6	5.4	6.15	6.9	7.65	8.4	9.1	9.8	12.	15.7	22.8
5,000	1.17	2.1	3.04	3.9	4.8	5.6	6.4	7.1	7.9	8.7	9.4	10.2	12.4	16.2	23.6
6,000	1.21	2.18	3.15	4.06	4.96	5.8	6.6	7.4	8.2	9.	9.75	10.6	12.9	16.8	24.
7,000	1.25	2.25	3.25	4.2	5.15	6.	6.8	7.65	8.45	9.3	10.	10.9	13.3	17.4	25.3
8,000	1.29	2.32	3.35	4.35	5.3	6.2	7.05	7.9	8.7	9.6	10.4	11.3	13.8	18.	26.1
9,000	1.33	2.4	3.47	4.48	5.5	6.4	7.3	8.15	9.	9.9	10.7	11.6	14.2	18.6	27.
10,000	1.38	2.5	3.6	4.65	5.7	6.65	7.55	8.45	9.35	10.3	11.2	12.1	14.8	19.3	28.
12,000	1.48	2.67	3.86	5.	6.1	7.15	8.1	9.1	10.	11.	12.	13.	15.8	20.6	30.

As an example of the use of these rock-drill tables, we may assume that an outfit of ten 3-inch drills is projected at an altitude of 9,000 feet, and that it is proposed to carry 70 pounds pressure at the drills. The compressor displacement suitable for such a plant is required.

From table above we find that one 3-inch drill at sea-level uses at 70 pounds pressure the equivalent of 105 cubic feet per minute of free air. The factor of multiplication for 10 drills at 9,000 feet altitude is figured as 9.9. Multiplying 105 by 9.9 gives 1039.5 cubic feet per minute as the displacement of a compressor suitable, under average conditions, for such a plant.

Compressed Air Data (Ingersoll-Rand)

Discharge of Air Through an Orifice

In Cubic Feet of Free Air per Minute Flowing From a Round Hole in Receiver Into the Atmosphere

Receiver Gauge Pressure Pounds	Diameter of Orifice												
	$\frac{1}{16}$ inch	$\frac{1}{8}$ inch	$\frac{3}{16}$ inch	$\frac{1}{4}$ inch	$\frac{5}{16}$ inch	$\frac{3}{8}$ inch	$\frac{1}{2}$ inch	$\frac{5}{8}$ inch	$\frac{3}{4}$ inch	$\frac{7}{8}$ inch	1 inch	1 $\frac{1}{4}$ inch	1 $\frac{1}{2}$ inch
	Discharge in Cubic Feet of Free Air per Minute												
2	.038	.153	.647	2.435	9.74	21.95	39	61	87.60	119.50	156	242	350
5	.0597	.242	.965	3.86	15.40	34.60	61.60	96.50	133	189	247	384	550
10	.0842	.342	1.36	5.45	21.8	49	87	136	196	267	350	543	780
15	.103	.418	1.67	6.65	26.70	60	107	167	240	326	427	665	960
20	.119	.485	1.93	7.7	30.8	69	123	193	277	378	494	770	1100
25	.133	.54	2.16	8.6	34.5	77	138	216	310	422	550	860	1250
30	.156	.632	2.52	10	40	90	161	252	362	493	645	1000	1450
35	.173	.71	2.80	11.2	44.7	100	179	280	400	530	715	1100	1600
40	.19	.77	3.07	12.27	49.09	110.45	196.35	306.80	441.79	601.32	785.40	1200	1750
45	.208	.843	3.36	13.4	53.8	121	215	336	482	658	860	1300	1900
50	.225	.914	3.64	14.50	58.2	130	232	364	522	710	930	1400	2050
60	.26	1.05	4.2	16.8	67	151	268	420	604	822	1100	1600	2300
70	.295	1.19	4.76	19	76	171	304	476	685	930	1250	1800	2600
80	.33	1.33	5.32	21.2	85	191	340	532	765	1004	1400	2000	2850
90	.364	1.47	5.87	23.50	94	211	376	587	843	1150	1600	2250	3150
100	.40	1.61	6.45	25.8	103	231	412	645	925	1250	1750	2450	3400
125	.486	1.97	7.85	31.4	125	282	502	785	1100	1500	2100	2900	4000

Volume of Free Air Required for Operating Hoisting Engines

In the table, the hoisting engine is assumed to actually run but one-half of the time for hoisting, while the compressor, of course, runs continuously. If the engine runs less than one-half the time, as it usually does, the volume of air required will be proportionately less, and vice versa. The table is computed for maximum loads, which also in practice may vary widely. From the intermittent character of the work of a hoisting engine the parts are able to resume their normal temperature between the hoists, and there is little probability of the annoyance of freezing up the exhaust passages.

The Air Compressed to 60 Pounds Gauge Pressure. Double Cylinder Engines

Diameter of Cylinder Inches	Stroke, Inches	R. P. M.	Normal Horsepower	Actual Horsepower	Weight Lifted Single Rope	Cubic Feet of Free Air Required
5	6	200	6	11.8	1000	150
5	8	160	8	12.6	1650	160
6 $\frac{1}{4}$	8	160	12	19.8	2500	250
7	10	125	20	24.2	3500	302
8 $\frac{1}{2}$	10	125	30	33.6	6000	340
8 $\frac{3}{4}$	12	110	40	37.8	8000	476
10	12	110	50	52.4	10000	660
12 $\frac{1}{4}$	15	100	75	89.2	15000	1125

Globe Valves, Tees and Elbows

The reduction of pressure produced by globe valves is the same as that caused by the following additional lengths of straight pipe, as calculated by the formula:

$$\text{Additional length of pipe} = \frac{114 \times \text{diameter of pipe}}{1 + (3.6 \div \text{diameter})}$$

Diameter of pipe, inches	1	1 $\frac{1}{2}$	2	2 $\frac{1}{2}$	3	3 $\frac{1}{2}$	4	5	6
Additional length, feet	2	4	7	10	13	16	20	28	36
Diameter of pipe, inches	7	8	10	12	15	18	20	22	24
Additional length, feet	44	53	70	88	115	143	162	181	200
The reduction of pressure produced by elbows and tees is equal to two-thirds of that caused by globe valves. The following are the additional lengths of straight pipe to be taken into account for elbows and tees. For globe valves multiply by $\frac{2}{3}$:									
Diameter of pipe, inches	1	1 $\frac{1}{2}$	2	2 $\frac{1}{2}$	3	3 $\frac{1}{2}$	4	5	6
Additional length, feet	2	3	5	7	9	11	13	19	24
Diameter of pipe, inches	7	8	10	12	15	18	20	22	24
Additional length, feet	30	35	47	59	77	96	108	120	134

These additional lengths of pipe for globe valves, elbows and tees must be added in each case to the actual length of straight pipe. Thus a 6-inch pipe, 500 feet long, with 1 globe valve, 2 elbows and 3 tees, would be equivalent to a straight pipe 500 + 36 + (2 \times 24) + (3 \times 24) = 656 feet long.

Useful Information

Weights of Pipe Fittings

In Pounds, per Hundred

Size, Inches	½	¾	1	1¼	1½	2	2½	3	3½	4	4½	5	6
Bushings	5	13	25	45	58	71	104	163	218	300	312	375	612
Caps, cast											750	800	1,500
Caps, malleable	13	23	34	57	73	121	205	229	290	455			
Couplings	15	25	46	61	85	140	150	265	400	440	575	975	1,050
Couplings, R. & L.	18	31	43	70	100	130							
Crosses, malleable	25	45	80	145	195	315	540	945	1,100	1,575			
Elbows, cast	40	70	100	145	180	290	535	740	1,100	1,400	1,585	2,200	3,400
Elbows, malleable	25	40	60	90	125	190	310	510	855	960			
Elbows, 45°, cast	40	55	85	130	160	250	415	565	800	1,000	1,300	1,500	2,400
Elbows, 45°, malleable	22	35	60	90	110	200	275	355	430	480			
Elbows, malleable, street	25	40	65	90	135	220	395						
Flange unions, cast			260	395	440	640	820	1,020	1,120	1,580	1,740	2,340	2,580
Flange unions, malleable			165	275	440	640	815	1,025	1,415	1,525	1,800	2,400	2,765
Lock-nuts, malleable	6	10	16	18	30	47							
Nipples, close	6	11	16	21	25	50	80	120	140	180		265	335
Nipples, per inch	6	8	10	15	17	26	40	48	63	65		100	125
Plugs	9	15	20	35	50	80	120	140	260	300	420	500	630
Reducers, cast											1,050	1,400	1,900
Reducers, malleable	12	25	35	50	80	125	220	300	460	465			
Return bends, cast, close pattern		90	140	200	290	510	720	1,000					
Return bends, cast, open pattern		120	175	270	350	560	1,000	1,350					
Return bends, malleable, close pat.	39	65	90	135	205	300							
Return bends, malleable, open pat.	40	70	120	165	250	340	515	840					
Tees, cast	65	85	135	190	270	425	755	1,065	1,375	2,045	2,200	2,925	3,470
Tees, malleable	25	45	80	115	160	240	410	650	890	1,210			
Tees, reducing	65	95	150	210	300	470	830	1,175	1,510	2,250	2,420	3,220	3,820
Unions, malleable	50	75	100	125	150	250	440	515					

Weights of Cocks and Brass Valves

In Pounds, Each

Size, Inches	½	¾	1	1¼	1½	2	2½	3	3½	4
Cocks, asbestos packed	1	1½	2	4	7	11	14	20	35	58
Cocks, bibb			1	2	3	4				
Cocks, brass service			½	¾	1	1½	2	3		
Cocks, brass steam	½	¾	1	1½	2	4	6			
Cocks, rough stop			1	1½	2	4	5	8		
Cocks, straight-way, all iron				1½	2½	4½	7	11	18	28
Cocks, straight-way, brass plug				1½	3	5	7	11	19	29
Cocks, 3-way, all iron					4½	6	7	12	20	34
Valves, blow-off, Jenkins					2	4	6	9		
Valves, check, horizontal	¾	1	1½	2	4	7				
Valves, check, Jenkins swing			¾	1½	2½	4	7			
Valves, check, standard horizontal	¾	1	1½	2	4	7				
Valves, check, standard swing	¾	1	1½	2	4	7				
Valves, check, standard vertical			¾	1	1½	2½	4			
Valves, gate, Lunkenheimer	¾	1	1½	2	4	7				
Valves, gate, Chapman	¾	1	1½	2	4	7				
Valves, gate, standard	¾	1	1½	2	4	7				
Valves, globe, Jenkins	1	1½	2	4	7	11				
Valves, globe, Lunkenheimer	1	1½	2	4	7	11				
Valves, globe, Standard	¾	1	1½	2	4	7				
Valves, safety, lever			1	1½	2	4				
Valves, safety pop, standard			8	9	10	13	16	24		
Valves, safety pop, Lunkenheimer			1½	2	3	4	5	8	15	18
Valves, throttle, standard					3	6	7	9		
Valves, throttle, Lunkenheimer					3	4	5	6	10	
Valves, whistle			½	1	1½	2	3	4	7	10

Useful Information

Weights of Iron Body Valves

In Pounds, Each

SIZE, INCHES	1	1½	2	2½	3	3½	4	4½	5	6	7	8	9	10	12
Blow-off, Jenkins					53	64									
Check, Jenkins horizontal					28	40	50	64	86	100	142				
Check, Jenkins swing					32	44	49	64							
Check, standard horizontal					14	20	30	52	56	90	125				
Check, standard swing					19	30	45	50							
Check, standard vertical					16	28	39	52	54						
Foot, with strainer	2	3	4	6	7	10	12	16	20	30	45	120	140	200	350
Gate, hub end						50		88				170	280	450	680
Gate, standard, screwed				20	28	42	50	63	67	102	135	200	240	300	410
Gate, standard flanged					37	55	60	75	85	125	155	210	280	330	425
Gate, Lunkenheimer	4	5	6	10	18	40	45	60							
Gate, Lunkenheimer, all iron	4	5	6	10	18	40	45	58							
Globe, std. screwed, no yoke					11	16	23								
Globe, std. screwed, with yoke				17	22	32	43	54	70	90	130	180	240		
Globe, Jenkins screwed				22	35	60	70	100	120	140	210	280	380		
Globe, Jenkins flanged									160	230		420			
Safety, standard lever			20	36	57	80	100	105	125	170	240	290			
Safety, standard pop.				57	75	105	125								
Throttle, standard screwed				45	50	70	95								
Throttle, Lunkenheimer				35	40	50	65								

Weights of Flanged, Extra Heavy and Long Sweep Pipe Fittings

In Pounds, Each

SIZE, INCHES	1	1½	2	2½	3	3½	4	4½	5	6	7	8	9	10	12
Standard flanged tees					20	25	40	45	55	60	85	110	145	180	235
Standard flanged elbows					15	18	25	30	40	50	60	70	95	120	145
Standard flanged crosses					30	35	50	60	80	100	120	140	190	240	290
Extra heavy flanged tees					30	40	65	75	90	115	130	180	240	290	330
Extra heavy flanged elbows					20	25	45	50	60	80	95	120	160	190	220
Extra heavy flanged crosses					40	50	90	100	120	160	190	240	320	380	440
Extra heavy screwed tees	1½	2	3	5	8	10	13	18	23	28	44	65	85	115	143
Extra heavy screwed elbows	1	1½	2	3	6	7	9	12	16	20	32	47	62	84	104
Extra heavy screwed crosses	2	2½	3	6	10	13	16	21	27	33	51	76	100	135	165
Long sweep tees	2	3	4	6	11	15	19	24	30	42	60	92	122	165	210
Long sweep elbows	1½	2	2½	4	7	11	13	16	20	28	40	60	80	110	140
Long sweep crosses			5	8	15	22	26	32		55	80	125	165	225	290

Weights of Expansion Joints

Iron Body. Brass Sleeve

SIZE, INCHES	2x2½	2½x3	3x2½	3½x3	4x3½	5x4	6x5	7x6	8x7	10x7	12x8
Screwed, each, pounds	9	13	19	28	36	63	90	120	170	235	390
Flanged, each, pounds	20	30	35	45	55	80	110	.....	200	275	450

Standard Threads for Bolts

Giving the Number of Threads per Inch for Each Form

SIZE, INCHES	¼	⅜	½	⅝	¾	7⁄8	1	1½	1¾	1⅝	1½	1⅝	1¾	1⅞	2
V-thread	20	18	16	14	12	11	10	9	8	7	6	5	4	4½	4½
U. S. Standard	20	18	16	14	13	11	10	9	8	7	6	5½	5	5	4½
Whitworth	20	18	16	14	12	11	10	9	8	7	6	5	5	4½	4½

V-form thread is supplied unless otherwise ordered.

Electrical Data

1. A volt is the pressure which forces the electric current through the resistance of a circuit and is the unit of electro-motive force.
2. An ampere is the intensity of this electric current that flows through the circuit and is the unit of current.
3. The Watt is the work done in a circuit, with a current of one ampere flowing at a pressure of one volt, and is the unit of electrical energy.
4. A kilowatt is 1,000 watts, and is used as the unit of basis of charge for light and power, to avoid the use of a large number of figures, as when expressed in watts. Electrical energy is sold by the kilowatt hour or the use of one kilowatt for one hour.
5. A H. P. is a mechanical term, and is the energy required to raise 33,000 pounds one foot in one minute. Expressed in electrical terms it is equal to 746 watts or approximately three-fourths of a kilowatt. Electric energy is usually measured in kilowatts (k.w.).

Voltage in electricity is similar to pressure in water or steam power and amperage corresponds to volume.

$$\begin{aligned}\text{Volts} \times \text{Amperes} &= \text{Watts} \\ 1000 \text{ Watts} &= 1 \text{ K. W.} = 1.34 \text{ H. P. (horse power)} \\ 746 \text{ Watts} &= 1 \text{ H. P.} = .746 \text{ K. W.}\end{aligned}$$

Carbon lamps take from 3 to 5 watts per candle power (c.p.). Tungsten lamps take 1.23 watts per c.p., give a whiter, softer light, and are less affected by fluctuation in voltage.

While the Tungsten or Mazda lamp for higher voltages requires careful handling, the 32-volt Tungsten lamp is no more fragile than the ordinary carbon lamp, and can be had in the following sizes:

8 c.p.	= 10 watts or	.313 amperes at 32 volts
12 c.p.	= 15 watts or	.469 amperes at 32 volts.
16 c.p.	= 20 watts or	.625 amperes at 32 volts.
20 c.p.	= 25 watts or	.781 amperes at 32 volts.
32 c.p.	= 40 watts or	1.25 amperes at 32 volts.

A 32-volt Mazda lamp takes practically the same amperes as a 110-volt carbon lamp. If the current is to be transmitted more than 300 feet a higher voltage is desirable to avoid excessive drop in voltage at the end of the line.

Mechanical, Electrical and Heat Equivalents

Unit	Equivalent Value in other Units	Unit	Equivalent Value in other Units	Unit	Equivalent Value in other Units
1 Kilo- watt Hour =	1,000 watt hours.	1 Horse- Power =	746 watts.	1 Heat- Unit B. T. U.	1,055 watt seconds.
	1.34 horse power hours.		0.746 kilowatt.		778 foot-pounds.
	2,654,200 foot-pounds.		33,000 foot-pounds per minute.		107.6 kilogram metres.
	3,600,000 joules.		550 foot-pounds per second.		0.000293 kilowatt hour.
	3,412 heat-units. B. T. U.		2,645 heat-units per hour.		0.000393 horse power hour.
1 Horse Power Hour =	367,000 kilogram metres.	1 Joule =	42.4 heat-units per minute.	1 Heat Unit per Square Foot per Minute	0.000688 pound carbon oxidized with perfect efficiency.
	0.235 pound carbon oxidized with perfect efficiency.		0.707 heat-unit per second.		0.001036 pound water evap. from and at 212° F.
	3.53 pounds water evaporated from and at 212° F.		0.175 pound carbon oxidized per hour with perfect efficiency.		0.122 watt per square inch.
	22.75 pounds of water raised from 62° to 212° F.		2.64 pounds water evaporated per hour from and at 212° F.		0.0176 kilowatt per square foot.
					0.0236 horse power per square foot.
1 Horse Power Hour =	0.746 kilowatt hours.	1 Foot- Pound =	1 watt second.	1 Kilo- gram Metre =	7.233 foot-pounds.
	1,980,000 foot-pounds.		0.00000278 kilowatt hour.		0.00000365 horse power hour.
	2,545 heat-units.		0.102 kilogram metre.		0.00000272 kilowatt hour.
	273,740 kilogram metres.		0.0009477 heat-unit		0.0093 heat-unit.
	0.175 pound carbon oxidized with perfect efficiency.		0.7373 foot-pound.		
1 Kilo- watt =	2.64 pounds water evaporated from and at 212° F.	1 Watt =	1.356 joules.	1 Pound Carbon Oxid- ized with Perfect Efficiency =	14,544 heat-units.
	17 pounds water raised from 62° to 212° F.		0.1383 kilogram metre.		1.11 pounds anthracite coal oxidized.
			0.00000377 kilowatt hour.		2.5 pounds dry wool oxidized.
			0.001285 heat-unit.		21 cu. ft. illuminating gas.
			0.0000005 horse power hour.		4.26 kilowatt hours.
1 Kilo- watt =	1,000 watts.	1 Watt per Square Inch =	1 joule per second.	1 lb. Water Evap- orated from and at 212° F. =	5.71 horse power hours.
	1.34 horse power.		0.00134 horse power.		11,315,232 foot-pounds.
	2,654,200 foot-pounds per hour.		3.412 heat-units per hour.		5.06 pounds water evaporated from and at 212° F.
	44,240 foot-pounds per minute.		0.7373 foot-pound per second.		
	737.3 foot-pounds per second.		0.0035 pound water evaporated per hour from and at 212° F.		
1 Kilo- watt =	3,412 heat-units per hour.	1 Watt per Square Inch =	44.24 foot-pounds per minute.	1 lb. Water Evap- orated from and at 212° F. =	0.283 kilowatt hour.
	56.9 heat-units per minute.				0.379 horse power hour.
	0.948 heat-unit per second.				965.7 heat-units.
	0.2275 pound carbon oxidized per hour with perfect efficiency.				103,900 kilogram metres.
	3.53 pounds water evaporated per hour from and at 212° F.				1,019,000 joules.
1 Kilo- watt =		1 Watt per Square Inch =		1 lb. Water Evap- orated from and at 212° F. =	751,300 foot-pounds.
					0.0664 pound carbon oxidized with perfect efficiency.

Horse Power of Turned Shafting—(Kent)

As second movers or line shafting, bearings eight feet apart.

$$\text{Formula: H.P.} = \frac{D^3 \times R}{90}$$

DIAMETER OF SHAFT	NUMBER OF REVOLUTIONS PER MINUTE										
	100	125	150	175	200	225	250	275	300	325	350
1 $\frac{1}{8}$	6.	7.4	8.9	10.4	11.9	13.4	14.9	16.4	17.9	19.4	20.9
1 $\frac{1}{4}$	8.9	11.1	13.3	15.5	17.7	20.	22.2	24.4	26.6	28.8	31.
2 $\frac{1}{8}$	12.6	15.8	19.	22.	25.	28.	31.	35.	38.	41.	44.
2 $\frac{1}{4}$	17.	21.	26.	30.	34.	39.	43.	47.	52.	56.	60.
2 $\frac{3}{8}$	23.	29.	34.	40.	46.	52.	58.	64.	69.	75.	81.
2 $\frac{1}{2}$	30.	37.	45.	52.	60.	67.	75.	82.	90.	97.	105.
3 $\frac{1}{8}$	38.	47.	57.	66.	76.	85.	95.	104.	114.	123.	133.
3 $\frac{1}{4}$	47.	59.	71.	83.	95.	107.	119.	131.	143.	155.	165.
3 $\frac{3}{8}$	58.	73.	88.	102.	117.	132.	146.	162.	176.	190.	205.
4 $\frac{1}{8}$	71.	89.	107.	125.	142.	160.	178.	196.	213.	231.	249.

Horse Power of Turned Shafting—(Kent)

As prime mover or head shaft carrying main driving pulley or gear, well supported by bearings

$$\text{Formula: H.P.} = \frac{D^3 \times R}{125}$$

DIAMETER OF SHAFT	NUMBER OF REVOLUTIONS PER MINUTE										
	60	80	100	125	150	175	200	225	250	275	300
1 $\frac{1}{8}$	2.6	3.4	4.3	5.4	6.4	7.5	8.6	9.7	10.7	11.8	12.9
1 $\frac{1}{4}$	3.8	5.1	6.4	8.	9.6	11.2	12.8	14.4	16.	17.6	19.2
2 $\frac{1}{8}$	5.4	7.3	8.1	10.	12.	14.	16.	18.	20.	22.	24.
2 $\frac{1}{4}$	7.5	10.	12.5	15.	18.	22.	25.	28.	31.	34.	37.
2 $\frac{3}{8}$	10.	13.	16.	20.	24.	28.	32.	36.	40.	44.	48.
2 $\frac{1}{2}$	13.	17.	20.	25.	30.	35.	40.	45.	50.	55.	60.
3 $\frac{1}{8}$	16.	22.	27.	34.	40.	47.	54.	61.	67.	74.	81.
3 $\frac{1}{4}$	20.	27.	34.	42.	51.	59.	68.	76.	85.	93.	102.
3 $\frac{3}{8}$	30.	41.	51.	64.	76.	89.	102.	115.	127.	140.	153.
4 $\frac{1}{8}$	43.	58.	72.	90.	108.	126.	144.	162.	180.	198.	216.
4 $\frac{1}{4}$	60.	80.	100.	125.	150.	175.	200.	225.	250.	275.	300.
5 $\frac{1}{8}$	80.	106.	133.	166.	199.	233.	266.	299.	333.	366.	400.

Speed of Grain Elevator Belts

Size of Head Pulley, Diameter, Inches	Speed of Belt, Feet per Minute	Revolutions per Minute of Head Shaft	Size of Head Pulley, Diameter, Inches	Speed of Belt, Feet per Minute	Revolutions per Minute of Head Shaft
24	250 to 300	40 to 48	54	425 to 450	30 to 32
30	300 to 350	38 to 44	60	475 to 500	30 to 32
36	350 to 375	37 to 40	72	575 to 600	30 to 32
42	375 to 400	34 to 36	84	625 to 650	28 to 30
48	400 to 425	32 to 34			

Horse-Power of Belting

A simple rule for ascertaining transmitting power of belting, without first computing speed per minute that it travels, is as follows: Multiply diameter of pulley in inches by its number of revolutions per minute, and this product by width of the belt in inches; divide this product by 3,300 for single belting, or by 2,100 for double belting, and the quotient will be the amount of horse-power that can be safely transmitted.

For Single Leather, Four Ply Rubber and Four Ply Cotton Belting, Belts not Overloaded

1 inch wide, 800 feet per minute = 1 Horse-power

Speed in feet per minute	WIDTH OF BELT IN INCHES											
	2 H. P.	3 H. P.	4 H. P.	5 H. P.	6 H. P.	8 H. P.	10 H. P.	12 H. P.	14 H. P.	16 H. P.	18 H. P.	20 H. P.
400	1	1½	2	2½	3	4	5	6	7	8	9	10
600	1½	2¼	3	3¾	4½	6	7½	9	10½	12	13¾	15
800	2½	3	4	5	6	8	10	12	14	16	18	20
1000	2	3¾	5	6¼	7½	10	12½	15	17½	20	22½	25
1200	3	4½	6	7½	9	12	15	18	21	24	27	30
1500	3¾	5¼	7½	9½	11½	15	18¾	22½	26½	30	33¾	37½
1800	4½	6¾	9	11¼	13½	18	22½	27	31½	36	40½	45
2000	5	7½	10	12½	15	20	25	30	35	40	45	50
2400	6	9	12	15	18	24	30	36	42	48	54	60
2800	7	10½	14	17½	21	28	35	42	49	56	63	70
3000	7½	11¼	15	18¾	22½	30	37½	45	52½	60	67½	75
3500	8¾	13	17½	22	26	35	44	52½	61	70	79	88
4000	10	15	20	25	30	40	50	60	70	80	90	100
4500	11¼	17	22½	28	34	45	57	69	78	90	102	114
5000	12½	19	25	31	37½	50	62½	75	87½	100	112	125

Double leather, six-ply rubber or six-ply cotton belting will transmit 50 to 75 per cent more power than is shown in this table. (One-inch wide, 550 feet per minute = one horse-power).

Rules for Determining Diameter and Speed of Rope Sheaves, Pulleys or Gears

The driving pulley is called the Driver, and the driven pulley the Driven.

If the number of teeth in gears are used instead of diameter, in these calculations, number of teeth must be substituted wherever diameter occurs.

To determine the diameter of Driver, the diameter of the Driven and its revolutions, and also the revolutions of Driver being given:

$$\frac{\text{Diameter of Driven} \times \text{revolutions of Driven}}{\text{Revolutions of Driver}} = \text{Diam. of Driver}$$

To determine the diameter of Driven, the revolutions of the Driven, and diameter and revolutions of the Driver being given:

$$\frac{\text{Diameter of Driver} \times \text{revolutions of Driver}}{\text{Revolutions of Driven}} = \text{Diam. of Driven.}$$

To determine the revolutions of the Driver, the diameter and revolutions of the Driven, and diameter of the Driver being given:

$$\frac{\text{Diameter of Driven} \times \text{revolutions of Driven}}{\text{Diameter of Driver}} = \text{Rev. of Driver}$$

To determine the revolutions of the Driven, the diameter and revolutions of the Driver, and diameter of the Driven being given:

$$\frac{\text{Diameter of Driver} \times \text{revolutions of Driver}}{\text{Diameter of Driven}} = \text{Rev. of Driven}$$

NOTE—Rope sheaves should be at least 60 diameters of the rope, never less than 40, as the durability of the rope depends entirely upon this factor.

The diameter of pulleys should be as large as can be admitted, provided they will not produce a belt travel greater than 5,000 feet per minute. About 4,000 feet, and low tension is good practice.

Rules for Horse-Power of Gearing

$$\frac{\text{Face in inches} \times \text{square of thickness of Tooth at pitch line in inches} \times \text{velocity}}{\text{Length of Tooth from point to root in inches} \times 53}$$

Equals horse-power at safety of 8; ultimate tensile strength, 30,000 pounds per square inch. Velocity to be in feet per minute at pitch line.

For bevels, thickness, length and velocity to be taken at center of face. For mortise wheels and pinions use thickness of pinion tooth. If greater margin of safety is desired, multiply above result by 8 and divide by factor of safety desired; 2,200 feet per minute at pitch line for iron gearing, and 3,000 feet for wood and iron, are excessive velocities, and should be avoided, if possible.

Horse-Power to Drive Conveyors

The capacity of conveyor being generally given in bushels per hour, find the weight of the material to be carried by multiplying the number of bushels by the weight per bushel. Divide by 60 to find the weight to be carried per minute. Multiply the result by the length of the conveyor in feet, divide the product by 33,000, and divide by 3. The result will be the horse-power required.

Capacities of Troughed Conveyor Belts

In Cubic Feet of Material Delivered per Hour at a Speed of 100 Feet per Minute

The capacity of such conveying belts is in direct proportion to the speed. The speed at which a belt can be run depends upon the character of the material to be carried, and upon the special conditions of each case; 750 feet per minute is not an extraordinary speed for grain-carrying belts.

Width of Belt, inches.....	12	14	16	18	20	22	24	26	28	30	32	34	36
Capacity in cubic feet.....	187	255	333	413	521	630	750	880	1020	1170	1333	1505	1687
Capacity in bushels.....	150	200	265	332	418	506	602	707	820	940	1117	1210	1355

Horse-Power to Drive Elevators

The capacity of elevators being generally given in bushels per hour, find the number of pounds elevated per hour by multiplying the number of bushels by the weight of each bushel; dividing this by 60 will give the number of pounds lifted per minute.

Multiply the number of pounds lifted per minute by the height of the elevator, and divide the product by 33,000. The result will give the theoretical horse-power necessary, to which should be added 50 per cent for friction.

Capacity of Elevators

Size of Bucket	Distance Apart, Center to Center, Inches	Diameter of Head Pulley, Inches	Speed of Head Shaft, Revolutions per Minute	Speed of Belt, Feet per Minute	Capacity, Bushels per Hour
2 x2	10	16	48	200	28
2½x2½	10	16	48	200	50
3 x3	10	18	45	215	88
3½x3	10	18	45	215	98
4 x3	12	20	42	220	140
4½x3½	12	20	42	220	198
5 x4	12	20	42	220	264
5½x4	12	24	40	250	350
6 x4	12	24	40	250	430
7 x4½	12	24	40	250	614
8 x5	12	30	38	300	974
9 x5½	16	30	38	300	1,216
10 x5½	16	36	36	340	1,637
11 x6	16	40	34	360	2,309
12 x6½	16	40	34	360	2,820
14 x6½	16	48	32	400	3,134
16 x6½	16	48	32	400	4,450
18 x7	16	54	31	440	6,393
20 x7	16	60	30	470	7,450

The above table of capacity applies only to buckets with round bottom and corners, which, owing to their peculiar shape, take full load and discharge perfectly.

In figuring capacity of ordinary buckets a deduction of about 10 per cent should be made.

The size of pulleys and speed of belts given above are intended only to cover the average practice as to these items. With larger pulleys a greater belt speed may be used with satisfactory discharge of the buckets and with increased capacity.

Sizing and Cutting of Gear Wheels

Let D = Outside Diameter
 D' = Pitch Diameter.
 D'' = Working Depth.
 f = Clearance.

$D'' + f$ = Whole Depth.
 a = Addendum.
 $a + f$ = Root.
 t = Thickness.

P = Diametral Pitch.
 P' = Circular Pitch.
 N = Number of Teeth.

Formulae for Diametral Pitch

$$D = \begin{cases} \frac{N+2}{P} \text{ or } D + \frac{2}{P} \\ \frac{(N+2)D'}{N} \text{ or } (N+2)s \end{cases}$$

$$D' = \begin{cases} \frac{N}{P} \text{ or } \frac{D}{N+2} \\ \text{or } D - \frac{2}{P} \text{ or } sN \end{cases}$$

$$P = \frac{3.1416}{D'} \text{ or } \frac{N}{D'} \text{ or } \frac{N+2}{D}$$

$$N = D'P \text{ or } DP - 2$$

$$t = \frac{1.5708}{P}$$

$$s = \frac{1}{P} \text{ or } \frac{D'}{N}$$

$$a + f = \frac{1.57}{P}$$

$$f = \frac{157}{P} \text{ or } \frac{t}{10}$$

$$D'' = \frac{2}{P}$$

$$D'' + f = \frac{2.157}{P}$$

Diameter, when applied to gears, is always understood to mean the pitch diameter.

Diametral Pitch is the number of teeth to each inch of the pitch diameter.

Example: If a gear has 40 teeth and the pitch diameter is 4 inches, there are 10 teeth to each inch of the pitch diameter and the diametral pitch is 10, or, in other words, the gear is 10 diametral pitch.

Diametral Pitch required, number of teeth and outside diameter given. Add 2 to the number of teeth and divide by the outside diameter.

Example: If the number of teeth is 40, the diameter of the blank is $10\frac{1}{4}$ inches, add 2 to the number of teeth, making 42, and divide by $10\frac{1}{4}$ the quotient, 4, the diametral pitch.

Circular Pitch is the distance from the center of one tooth to the center of the next, measured along the pitch line.

Example: If the distance from the center of one tooth to the center of the next tooth, measured along the pitch circle, is $\frac{1}{2}$ inch, the gear is $\frac{1}{2}$ inch circular pitch.

Circular Pitch required, diametral pitch given. Divide 3.1416 by the diametral pitch.

Example: If the diametral pitch is 4, divide 3.1416 by 4 and the quotient, .7854 inch, is the circular pitch.

Number of Teeth required, pitch diameter and diametral pitch given. Multiply the pitch diameter by the diametral pitch.

Example: If the diameter of the pitch circle is 10 inches the diametral pitch is 4, multiply 10 by 4 and the product, 40, will be the number of teeth in the gear.

Distance Between Centers of two gears required. Add the number of teeth together and divide one-half the sum by the diametral pitch.

Example: If two gears have 50 and 30 teeth, respectively, and are 5 pitch, add 50 and 30, making 80, divide by 2 and then divide the quotient, 40, by the diametral pitch, 5, and the result 8 inches, is the center distance.

Formulae for Circular Pitch

$$D = \begin{cases} \frac{.3183P'}{(N+2)} \\ \text{or } \frac{s(N+2)}{D'} + .6336P' \end{cases}$$

$$D' = \begin{cases} \frac{.3183NP}{N+2} \\ \text{or } \frac{N}{N+2} \text{ or } D - .6366P' \end{cases}$$

$$P' = \begin{cases} \frac{3.1416}{P} \text{ or } \frac{D'}{.3183} \\ \text{or } \frac{D}{.3183N+2} \end{cases}$$

$$N = \frac{3.1416D'}{P'}$$

$$t = \frac{P'}{2}$$

$$s = .3183 P'$$

$$a + f = .3683 P'$$

$$f = .05P \text{ or } \frac{t}{10}$$

$$D'' = .6366 P'$$

$$D'' + f = .6866 P'$$

Diametral Pitch required, circular pitch given. Divide 3.1416 by the circular pitch.

Example: If the circular pitch is 2 inches, divide 3.1416 by 2 and the quotient, 1.5708, is the diametral pitch.

Number of Teeth required, outside diameter and diametral pitch given. Multiply the outside diameter by the diametral pitch and subtract 2.

Example: If the whole diameter is $10\frac{1}{4}$ and the diametral pitch is 4, multiply $10\frac{1}{4}$ by 4 and the product, 42 less 2, or 40, is the number of teeth.

Pitch Diameter required, number of teeth and diametral pitch given. Divide the number of teeth by the diametral pitch.

Example: If the number of teeth is 40 and the diametral pitch is 4, divide 40 by 4 and the quotient, 10, is the pitch diameter.

Outside Diameter or size of gear required, number of teeth and diametral pitch given. Add 2 to the number of teeth and divide by the diametral pitch.

Example: If the number of teeth is 40 and the diametral pitch is 4, add 2 to the 40, making 42, and divide by 4; the quotient, $10\frac{1}{2}$, is the whole diameter of the gear or blank.

Thickness of Tooth at Pitch Line required. Divide the circular pitch by 2, or 1.57, by the diametral pitch.

Example: If the circular pitch is 1.047 inch, or the diametral pitch is 3, divide 1.047 by 2, or 1.57 by 3, and the quotient, .523 inch, is the thickness of tooth.

Whole Depth of Tooth required. Divide 2.157 by the diametral pitch.

Example: If the diametral pitch of a gear is 6, the whole depth is 2.157 divided by 6, which equals .3595.

Whole Depth of Tooth is about 11-16 or exactly .6866 of the circular pitch.

Example: If the circular pitch is 2 inches, the whole depth of tooth is about 11-16 or 2 inches or $1\frac{1}{2}$ inches nearly.

Gear Diameters

Table for finding the diameter of a gear when the pitch is given, or the pitch of a gear when the diameter is given, that shall contain from 10 to 250 teeth, and any pitch required.

Rule:—Multiply X in the table by the pitch given and the product will be the pitch diameter of the gear required. Or, divide the pitch diameter of the gear by X in the table and the quotient will be the pitch of the gear required.

Teeth	X	Teeth	X	Teeth	X	Teeth	X	Teeth	X	Teeth	X
10	3,236	51	16,244	92	29,290	133	42,338	174	55,388	215	68,430
11	3,550	52	16,562	93	29,608	134	42,656	175	55,706	216	68,748
12	3,864	53	16,880	94	29,926	135	42,976	176	56,026	217	69,066
13	4,178	54	17,198	95	30,244	136	43,294	177	56,344	218	69,384
14	4,494	55	17,516	96	30,562	137	43,612	178	56,662	219	69,702
15	4,810	56	17,834	97	30,880	138	43,930	179	56,980	220	70,020
16	5,126	57	18,152	98	31,200	139	44,248	180	57,298	221	70,338
17	5,442	58	18,470	99	31,518	140	44,566	181	57,616	222	70,656
18	5,758	59	18,790	100	31,836	141	44,884	182	57,934	223	70,974
19	6,076	60	19,108	101	32,154	142	45,204	183	58,254	224	71,292
20	6,392	61	19,426	102	32,472	143	45,522	184	58,574	225	71,610
21	6,710	62	19,744	103	32,790	144	45,840	185	58,892	226	71,930
22	7,026	63	20,062	104	33,108	145	46,158	186	59,210	227	72,248
23	7,344	64	20,380	105	33,426	146	46,476	187	59,528	228	72,568
24	7,662	65	20,698	106	33,746	147	46,794	188	59,846	229	72,886
25	7,978	66	21,016	107	34,064	148	47,112	189	60,164	230	73,184
26	8,296	67	21,334	108	34,382	149	47,432	190	60,482	231	73,502
27	8,614	68	21,652	109	34,700	150	47,750	191	60,800	232	73,820
28	8,932	69	21,970	110	35,018	151	48,068	192	61,118	233	74,158
29	9,250	70	22,288	111	35,336	152	48,386	193	61,436	234	74,476
30	9,566	71	22,606	112	35,654	153	48,704	194	61,754	235	74,796
31	9,884	72	22,926	113	35,974	154	49,022	195	62,072	236	75,114
32	10,202	73	23,244	114	36,292	155	49,340	196	62,392	237	75,432
33	10,520	74	23,562	115	36,610	156	49,660	197	62,710	238	75,750
34	10,838	75	23,880	116	36,928	157	49,978	198	63,028	239	76,068
35	11,156	76	24,198	117	37,246	158	50,296	199	63,346	240	76,386
36	11,474	77	24,516	118	37,564	159	50,614	200	63,664	241	76,704
37	11,792	78	24,834	119	37,882	160	50,932	201	63,982	242	77,024
38	12,110	79	25,152	120	38,202	161	51,250	202	64,300	243	77,342
39	12,428	80	25,470	121	38,520	162	51,568	203	64,618	244	77,660
40	12,746	81	25,788	122	38,838	163	51,886	204	64,936	245	77,978
41	13,064	82	26,106	123	39,156	164	52,204	205	65,254	246	78,296
42	13,382	83	26,424	124	39,474	165	52,522	206	65,572	247	78,614
43	13,700	84	26,742	125	39,792	166	52,840	207	65,890	248	78,932
44	14,018	85	27,060	126	40,110	167	53,158	208	66,208	249	79,250
45	14,336	86	27,378	127	40,428	168	53,476	209	66,526	250	79,570
46	14,654	87	27,696	128	40,746	169	53,794	210	66,844	...	...
47	14,972	88	28,014	129	41,064	170	54,112	211	67,162	...	...
48	15,290	89	28,332	130	41,382	171	54,430	212	67,480	...	...
49	15,608	90	28,650	131	41,700	172	54,748	213	67,798	...	...
50	15,926	91	28,970	132	42,020	173	55,070	214	68,116	...	...

Circular Pitches with Their Corresponding Diametral Pitches

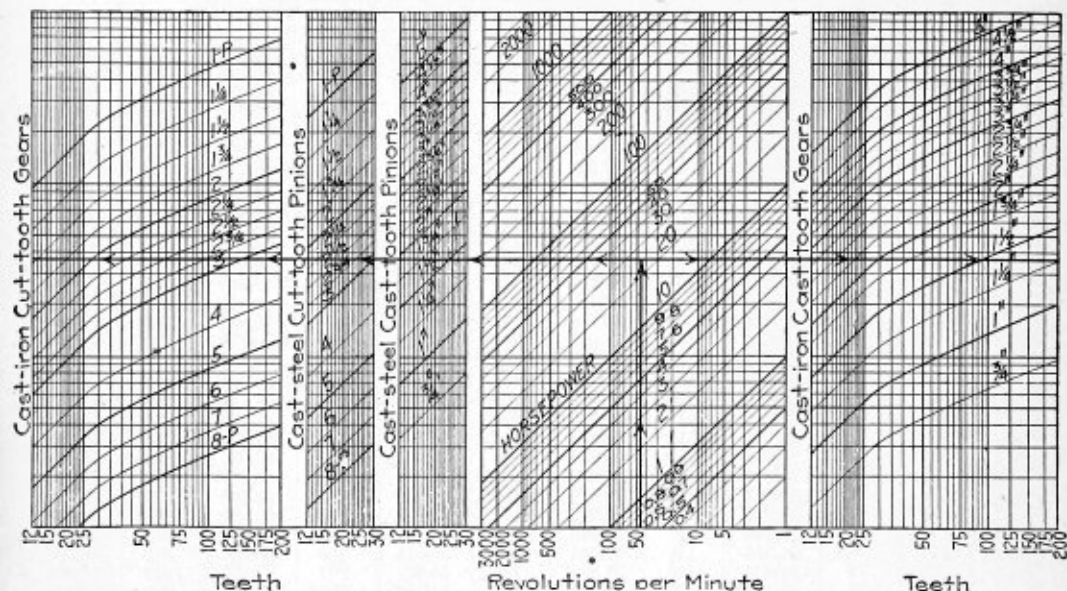
Circular Pitch	Diametral Pitch	Circular Pitch	Diametral Pitch	Circular Pitch	Diametral Pitch	Circular Pitch	Diametral Pitch
$\frac{3}{4}$ in.	4.1888	$1\frac{1}{4}$ in.	2.5133	$2\frac{1}{2}$ in.	1.2566	$4\frac{1}{2}$ in.	.6983
$\frac{7}{8}$ "	3.5904	$1\frac{1}{2}$ "	2.0944	3 "	1.0472	5 "	.6283
1 "	3.1416	$1\frac{3}{4}$ "	1.7952	$3\frac{1}{2}$ "	.8976	$5\frac{1}{2}$ "	.5711
$1\frac{1}{8}$ "	2.7925	2 "	1.5708	4 "	.7854	6 "	.5236

Diametral Pitch—Equivalent in Circular Pitches

Diametral Pitch	Circular Pitch	Diametral Pitch	Circular Pitch	Diametral Pitch	Circular Pitch	Diametral Pitch	Circular Pitch
$\frac{1}{2}$ in.	6.2832	$2\frac{1}{4}$ in.	1.1424	10 in.	.3142	26 in.	.1208
$\frac{3}{4}$ "	4.1888	3 "	1.0472	11 "	.2856	28 "	.1122
1 "	3.1416	$3\frac{1}{2}$ "	.8976	12 "	.2618	30 "	.1047
$1\frac{1}{4}$ "	2.5133	4 "	.7854	14 "	.2244	32 "	.0982
$1\frac{1}{2}$ "	2.0944	5 "	.6283	16 "	.1963	36 "	.0873
$1\frac{3}{4}$ "	1.7952	6 "	.5236	18 "	.1745	40 "	.0785
2 "	1.5708	7 "	.4488	20 "	.1571	48 "	.0654
$2\frac{1}{4}$ "	1.3963	8 "	.3927	22 "	.1428	...	...
$2\frac{1}{2}$ "	1.2566	9 "	.3491	24 "	.1309	...	...

Spur Gear Selection Chart

For Size or H. P. By E. E. Landahl From American Machinist



The accompanying logarithmic chart is for readily determining the size of a gear when the horsepower to be transmitted and the shaft speed are given or, conversely, the horsepower that can be transmitted by a given gear running at a known speed. The table is based on the Lewis formula as given in Kent's "Handbook," using stresses for S as there tabulated for cut cast-iron teeth, one-half of these values for plain cast-iron teeth, one and one-fourth times these values for plain cast-steel teeth and two and one-half times for cut cast-steel gears. The table is based on a gear face three times the circular pitch. For other faces divide the determined horsepower by the face on which the table is based and multiply by the one to be used.

In using the table there are certain further factors of vital importance that must be carefully considered. One of these is the peripheral speed. Authorities differ as to the limiting speeds for safe usage, but good practice has determined 700 feet per minute for rough teeth and 1,500 feet per minute for cut teeth as the limits to be used. Another point that should be borne in mind is that the horsepower of the pinion should be traced out when the same material is used in both of the mating wheels.

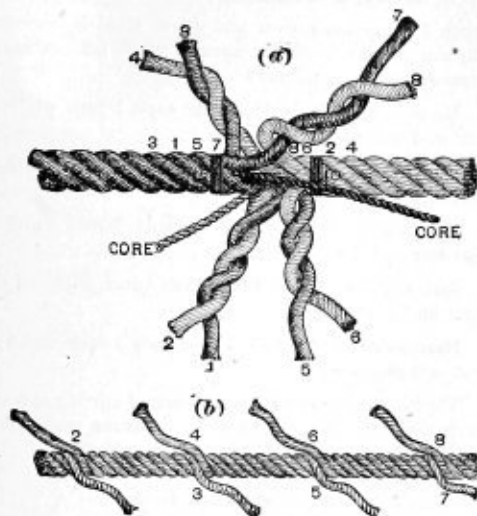
As an example of the use of the chart, let us trace out a problem. Assume that we desire to determine the proper size for a gear to transmit 25 horsepower, the shaft speed being 45 revolutions per minute. This problem is traced out with a heavy line on the chart. The procedure is as follows:

Find the horizontal line corresponding the 45 r.p.m. and trace upward until this line intersects an imaginry diagonal corresponding to 25 h.p. between the lines given for 20 and 30 h.p. From this point trace to the right or left of the table, depending on the kind of gear tooth desired. Assuming a plain cast-iron tooth, the righthand direction is taken. It will be noticed that the horizontal path intersects the vertical line representing 15 teeth midway between the curved diagonals for $2\frac{1}{2}$ in. and $2\frac{3}{4}$ in. This means that $2\frac{3}{4}$ -inch circular pitch should be used for a 15-tooth pinion. For a 17-tooth pinion a $2\frac{1}{2}$ -inch pitch is satisfactory. Gears of other types can be similarly determined from the tables above the r.p.m. section, notice being made that circular pitch is plotted for cast teeth and diametral pitch for cut teeth. For example:

1. If we wish to use cast-steel cast-tooth pinion, 17T should be $1\frac{3}{4}$ -inch pitch; 16T and below should be 2-inch pitch.
2. In the cast-steel cut-tooth table we could use 19T— $2\frac{1}{4}$ diametral pitch; or 15T to 18T inclusive, $2\frac{1}{4}$ pitch.
3. Passing on up to the cast-iron cut-tooth, gears, we could use 20T— $1\frac{3}{4}$ diametral pitch or $1\frac{1}{2}$ pitch with any less number of teeth.

For finding the horsepower for a certain gear at a given speed simply reverse this operation.

Splicing Manila Transmission Ropes



The successive operations for making a common or English splice in a $1\frac{3}{4}$ -inch 4 strand rope is as follows:

1. Tie a piece of twine, 9 and 10, around the rope to be spliced, about six feet from each end. Then unlay the strands of each end back to the twine.

2. Put the ropes together and twist each corresponding pair of strands loosely, to keep them from being tangled, as shown at (a).

3. The twine 10 is now cut, and the strand 8 unlayed and strand 7 carefully laid in its place for a distance of four and a half feet from the junction.

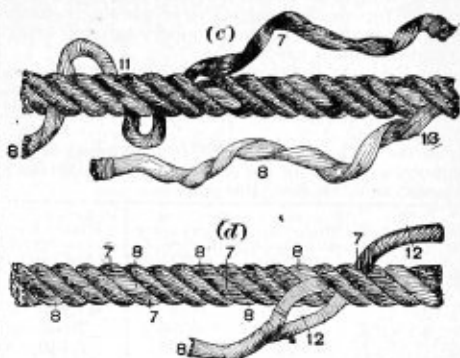
4. The strand 6 is next unlayed about one and a half feet and strand 5 laid in its place.

5. The ends of the cores are now cut off so they just meet.

6. Unlay strand 1 four and a half feet, laying strand 2 in its place.

7. Unlay strand 3 one and a half feet, laying in strand 4.

8. Cut all the strands off to a length of about twenty inches, for convenience in manipulation. The rope now assumes the form shown in (b), with the meeting points of the strands three feet apart.



Each pair of strands is now successively subjected to the following operations:

9. From the point of meeting of the strand 8 and 7 unlay each one three turns; split both the strand 8 and the strand 7 in halves, as far back as they are now unlayed, and the end of each half strand "whipped" with a small piece of twine.

10. The half of the strand 7 is now laid in three turns, and the half of 8 also laid in three turns. The half strands now meet and are tied in a simple knot 11, (c), making the rope at this point its original size.

11. The rope is now opened with a marlinspike, and the half strand of 7 worked around the half strand of 8 by passing the end of the half strand through the rope, as shown, drawn taut, and again worked around this half strand until it reaches the half strand 13 that was not laid in. This half strand 13 is now split, and the half strand 7 drawn through the opening thus made, and then tucked under the two adjacent strands, as shown in (d).

12. The other half of the strand 8 is now wound around the other half strand 7 in the same way. After each pair of strands has been treated in this manner, the ends are cut off at 12, leaving them about four inches long. After a few days wear they will draw into the body of the rope or wear off, so that the locality of the splice can scarcely be detected.

The chief trouble in the past, with rope transmission, has been in defective splicing. We have a corps of expert splicers to send out at any time.

From Channon's "A Treatise on Rope Transmission," Copyrighted 1896.



For greatest Strength, Safety and Economy—Specify Ajax Manila Transmission Rope.

Table of Emery Wheel Speeds

The following table designates number of revolutions per minute for specified diameters of wheels, to cause them to run at the respective periphery rates of 4,000, 5,000 and 6,000 feet per minute.

The medium of 5,000 feet is usually employed in ordinary work, but in special cases it is sometimes desirable to run them at a lower or higher rate according to requirements.

The stress on the wheel at 4,000 feet periphery speed per minute, is 48 pounds per square inch; at 5,000 feet, 75 pounds; at 6,000 feet, 108 pounds.

Diameter Wheel in Inches	Rev. per Minute for Surface Speed of 4,000 feet	Rev. per Minute for Surface Speed of 5,000 feet	Rev. per Minute for Surface Speed of 6,000 feet
1	15,279	19,099	22,918
2	7,639	9,549	11,459
3	5,093	6,366	7,639
4	3,820	4,775	5,730
5	3,056	3,820	4,584
6	2,546	3,183	3,820
7	2,183	2,728	3,274
8	1,910	2,387	2,865
10	1,528	1,910	2,292
12	1,273	1,592	1,910
14	1,091	1,364	1,637
16	955	1,194	1,432
18	849	1,061	1,273
20	764	955	1,146
22	694	868	1,042
24	637	796	955
30	509	637	764
36	424	531	637
42	364	455	546
48	318	397	477

Grades of Emery

(Kent's Mechanical Engineers' Pocket Book,
Eighth Edition)

The numbers representing the grades of emery run from 8 to 120 and the degree of smoothness of surface they leave may be compared to that left by files, as follows:

8 and 100	represent the cut of	a wood rasp.
16 "	20 "	" a coarse-rough file.
24 "	30 "	" an ordinary rough file
36 "	40 "	" a bastard file.
46 "	60 "	" a second-cut file.
70 "	80 "	" a smooth file.
90 "	100 "	" a superfine file.
120 F "	FF "	" a dead-smooth file.

Table of Speeds for Circular Saws

Size of Saw	Revs. per Minute	Size of Saw	Revs. per Minute	Size of Saw	Revs. per Minute
8	4,500	30	1,200	52	700
10	3,600	32	1,125	54	675
12	3,000	34	1,058	56	650
14	2,585	36	1,000	58	625
16	2,222	38	950	60	600
18	2,000	40	900	62	575
20	1,800	42	870	64	550
22	1,636	44	840	66	545
24	1,500	46	800	68	529
26	1,384	48	750	70	514
28	1,285	50	725	72	500

The Power Required to Saw Some Kinds of Timber

with 7 gauge saws, over and above what is necessary to run the saw and the carriage while not cutting, is approximately as follows:

Basswood, $\frac{1}{2}$ to $\frac{1}{2}$ H. P. for each 1 inch width of cut or 1 inch feed.

Pine, white, $\frac{1}{2}$ to $\frac{3}{8}$ H. P. for each 1 inch width of cut or 1 inch feed.

Pine, yellow, $\frac{3}{4}$ to 1 H. P. for each 1 inch width of cut or 1 inch feed.

Spruce, 3-5 to 4-5 H. P. for each 1 inch width of cut or 1 inch feed.

Hardwoods, 1 to 2+ H. P. for each 1 inch width of cut or 1 inch feed.

Thus it will be seen that the work of cutting and the increased resistance to the feed, in sawing white pine, a 12-inch cut on 2-inch feed would be about,

$$\frac{1}{2} \times 12 \times 2 = 12 \text{ H. P. or}$$

$$W \times 12 \times 2 = 16 \text{ H. P.}$$

Eight-gauge saws will do the work with a little less power.

Capacity of Stacks

Dia. in In.	Height of Stacks and Commercial Horse Power of Boilers										
	50 Ft.	60 Ft.	70 Ft.	80 Ft.	90 Ft.	100 Ft.	110 Ft.	125 Ft.	150 Ft.	175 Ft.	200- Ft.
	H.P.	H.P.	H.P.	H.P.	H.P.	H.P.	H.P.	H.P.	H.P.	H.P.	H.P.
18	23	25	27	29	31	33	35	37	39	41	43
21	35	38	41	44	47	50	53	56	59	62	65
24	49	54	58	62	66	70	74	78	82	86	90
27	65	72	78	83	87	92	97	102	107	112	117
30	84	92	100	107	113	119	125	131	137	143	149
33	105	115	125	133	141	149	157	165	173	181	189
36	128	141	152	163	173	182	191	200	209	218	227
39	154	168	183	196	208	219	229	239	249	259	269
42	182	200	216	231	245	258	271	285	298	311	324
48	269	290	311	330	348	365	389	412	435	458	481
54	348	376	402	427	449	472	503	531	559	587	615
60	436	471	503	536	565	593	632	662	692	748	798
66	579	620	658	694	728	776	849	918	981	1044	1107
72	698	746	792	835	876	934	1023	1105	1181	1257	1333
78	885	949	990	1038	1107	1212	1310	1400	1490	1580	1670
84	1035	1098	1157	1214	1294	1418	1531	1637	1743	1849	1955
90	1269	1338	1403	1496	1639	1770	1893	2016	2139	2262	2385
96	1532	1606	1712	1876	2027	2167	2307	2447	2587	2727	2867
100	1760	1865	2043	2197	2359	2521	2683	2845	3007	3169	3331
104	1899	2024	2218	2395	2560	2725	2890	3055	3220	3385	3550
108	2051	2190	2399	2591	2770	2949	3128	3307	3486	3665	3844

Strength of Bolts, Stays and Suspension Rods

U. S. Standard—At Reduced Area

Diam. of Bolt	Area of Bolt	Diam. at Root of Thread	Reduced Area	No. of Thread Per Inch	TENSILE STRENGTH PER SQUARE INCH						
					6,000 lbs.	7,000 lbs.	7,500 lbs.	8,000 lbs.	9,000 lbs.	10,000 lbs.	12,000 lbs.
1/4	.04909	.185	.0269	20	161	188	201	215	242	269	322
5/16	.0767	.240	.0452	18	271	316	339	361	406	452	542
3/8	.11045	.294	.0678	16	406	474	478	542	610	678	813
7/16	.15033	.344	.0930	14	558	651	697	744	837	930	1,116
1/2	.19635	.400	.1257	13	754	879	943	1,005	1,131	1,257	1,508
5/8	.2485	.454	.1619	12	971	1,133	1,214	1,295	1,457	1,619	1,942
3/4	.30679	.507	.2019	11	1,211	1,413	1,514	1,615	1,817	2,019	2,422
7/8	.44178	.620	.3019	10	1,811	2,113	2,284	2,415	2,717	3,019	3,622
1	.60132	.731	.4197	9	2,518	2,937	3,147	3,357	3,777	4,197	5,036
1 1/8	.7854	.837	.5502	8	3,391	3,851	4,126	4,401	4,951	5,502	6,602
1 1/4	.99402	.940	.6940	7	4,164	4,858	5,205	5,552	6,246	6,940	8,328
1 1/2	1.2271	1.065	.8908	7	5,344	6,235	6,681	7,126	8,017	8,908	10,689
1 3/4	1.4848	1.160	1.0568	6	6,340	7,397	7,926	8,454	9,511	10,568	12,681
1 7/8	1.7671	1.284	1.2950	6	7,770	9,065	9,712	10,360	11,655	12,950	15,540
2	2.0739	1.389	1.5152	5 1/2	9,091	10,606	11,364	12,121	13,636	15,152	18,182
2 1/4	2.4052	1.491	1.7460	5	10,476	12,232	13,095	13,968	15,714	17,460	20,952
2 1/2	2.7611	1.616	2.0510	5	12,306	14,357	15,380	16,408	18,459	20,510	24,612
2 3/4	3.1416	1.712	2.3020	4 1/2	13,812	16,114	17,265	18,416	20,718	23,020	27,624
3	3.976	1.962	3.0235	4 1/2	18,141	21,164	22,676	24,188	27,211	30,235	36,282
3 1/4	4.9087	2.176	3.7187	4	22,312	26,030	27,890	29,749	33,468	37,187	44,624
3 1/2	5.9395	2.426	4.6225	4	27,735	32,357	34,668	36,980	41,602	46,225	55,470
3 3/4	7.0686	2.629	5.4284	3 1/2	32,570	37,998	40,713	43,427	48,855	54,284	65,140
4	8.2957	2.879	6.5099	3 1/2	39,059	45,569	48,824	52,079	58,589	65,099	78,118
4 1/4	9.6211	3.100	7.5477	3 1/4	45,286	52,833	56,607	60,381	67,929	75,477	90,572
4 1/2	11.0446	3.317	8.6413	3	51,847	60,489	64,809	69,130	77,771	86,413	103,695
4 3/4	12.5664	3.567	9.9930	3	59,958	69,957	74,947	79,944	89,937	99,930	119,916
5	14.1862	3.708	11.3292	2 3/4	67,975	79,304	84,969	90,633	101,963	113,292	135,950
5 1/4	15.9043	4.028	12.7429	2 3/4	76,457	89,200	95,571	101,943	114,686	127,429	152,914

Shearing and Bearing Value of Rivets

DIAMETER-RIVET			ALL DIMENSIONS IN INCHES.														
Inches		Area Sq. In.	Single Shear in Pounds	Bearing value in pounds per square inch for different thickness plate													
Frac.	Dec.			1-4	5-16	3-8	7-16	1-2	9-16	5-8	11-16	3-4	13-16	7-8	15-16	1 in.	
3/8	.375	.1104	660	1130	1410	1690	....	....	....	....	....	....	....	....	....	....	....
1/2	.50	.1963	1180	1500	1880	2550	2630	3000	....	....	....	....	....	....	....	....	....
5/8	.625	.3063	1840	1880	2340	2810	3280	3750	4220	4690	....	....	....	....	....	....	....
3/4	.75	.4418	2650	2250	2810	3380	3940	4500	5060	5630	6190	6750	....	....	....	....	....
7/8	.875	.6013	3610	2630	3280	3940	4590	5250	5910	6560	7220	7880	8530	9190	9840	....	....
1 in.	1.00	.7854	4710	3000	3750	4500	5250	6000	6750	7500	8250	9000	9750	10500	12250	12000	....
3/8	.375	.1104	830	1410	1760	2110	....	....	....	....	....	....	....	....	....	....	....
1/2	.50	.1963	1470	1880	2340	2810	3280	3750	....	....	....	....	....	....	....	....	....
5/8	.625	.3063	2300	2340	2930	3520	4100	4690	5280	5860	....	....	....	....	....	....	....
3/4	.75	.4418	3310	2810	3520	4220	4920	5630	6330	7030	7720	8440	9160	9870	....	....	....
7/8	.875	.6013	4510	3280	4100	4920	5740	6560	7380	8200	9020	9840	10660	11480	12300	....	....
1 in.	1.00	.7854	5890	3750	4690	5620	6560	7500	8440	9380	10310	11250	12190	13130	14060	15000	....
3/8	.375	.1104	1100	1880	2340	2810	....	....	....	....	....	....	....	....	....	....	....
1/2	.50	.1963	1960	2500	3130	3750	4380	5000	....	....	....	....	....	....	....	....	....
5/8	.625	.3063	3070	3130	3910	4690	5470	6250	7030	7810	....	....	....	....	....	....	....
3/4	.75	.4418	4420	3750	4690	5630	6560	7500	8440	9380	10310	11250	....	....	....	....	....
7/8	.875	.6013	6010	4380	5470	6570	7660	8750	9840	10940	12030	13130	14220	15310	16410	....	....
1 in.	1.00	.7854	7850	5000	6250	7500	8750	10000	11250	12500	13750	15000	16250	17500	18750	20000	....
3/8	.375	.1104	1320	2350	2930	3520	....	....	....	....	....	....	....	....	....	....	....
1/2	.50	.1963	2360	3130	3910	4690	5470	6250	....	....	....	....	....	....	....	....	....
5/8	.625	.3063	3680	3910	4880	5860	6840	7810	8790	9770	....	....	....	....	....	....	....
3/4	.75	.4418	5300	4690	5860	7030	8210	9380	10550	11720	12890	14060	....	....	....	....	....
7/8	.875	.6013	7220	5470	6840	8210	9580	10940	12310	13670	15040	16410	17770	19140	20510	....	....
1 in.	1.00	.7854	9430	6250	7820	9380	10940	12500	14060	15630	17190	18750	20320	21880	23440	25000	....

Areas of Circles

[illegible]

To determine the Area of a Circle multiply the square of its diameter by .7854. Example, a 12-inch circle; $12 \times 12 = 144 \times .7854 = 113.976$ inches, the area of a 12-inch circle.

Circumferences of Circles

[illegible]

To determine the circumference of a circle, multiply the diameter by 3.1416.

U. S. Measures and Weights

Dry Measure—U. S.

2 pints = 1 quart. 8 quarts = 1 peck. 4 pecks = 1 bushel.
The standard U. S. bushel is in cylinder form, 18½ inches diameter and 8 inches deep, and contains 2150.42 cubic inches.
A struck bushel = 2150.42 cubic inches, or 1.2445 cubic feet.
A heaped bushel = 1½ struck bushels.

Shipping Measure

100 cubic feet = 1 register ton.
1 U. S. shipping ton.
40 cubic feet = 31.16 Imperial bushels.
32.143 U. S. bushels.
1 British shipping ton.
42 cubic feet = 32.719 Imperial bushels.
33.75 U. S. bushels.

Measures of Weight.—Avoirdupois or Commercial Weight

16 drachms, or 437.5 grains = 1 ounce, oz.
16 ounces, or 7,000 grains = 1 pound, lb.
28 pounds = 1 quarter, qr.
4 quarters = 1 hundred-weight, cwt. = 112 lbs.
20 hundred-weight = 1 ton of 2240 pounds, or long ton.
2000 pounds = 1 net, or short ton.
2204.6 pounds = 1 metric ton.
1 stone = 14 pounds. 1 quintal = 100 pounds.

Troy Weight

24 grains = 1 pennyweight, dwt.
20 pennyweights = 1 ounce, oz. = 480 grains.
12 ounces = 1 pound, lb. = 5760 grains.

Apothecaries' Weight

20 grains = 1 scruple.
3 scruples = 1 drachm = 60 grains.
8 drachms = 1 ounce = 480 grains.
12 ounces = 1 pound = 5760 grains.

Circular Measure

60" = 1 minute'.
60 minutes' = 1 degree'.
90 degrees = 1 quadrant.
360 degrees = 1 circumference.

Time

60 seconds = 1 minute.
60 minutes = 1 hour.
24 hours = 1 day.
7 days = 1 week.
365 days, 5 hours, 48 minutes, 48 seconds = 1 year.

Board Measure

The number of feet, board measure (B. M.) = length in feet x breadth in feet x thickness in inches.

1 U. S. gallon = 8.33 pounds. 1 English gallon = 10 pounds.
1 cubic foot of ice = 37.2 pounds.
1 ton of water = 35.90 cubic feet.
1 cubic foot of water at 39.1°F = 62.425 pounds.
1 cubic inch of water at 39.1°F = .036 pounds.
1 pound of water = 27.72 cubic inches.

Long Measure—Measures of Length

12 inches = 1 foot.
3 feet, or 36 inches = 1 yard.
3½ yards, or 10½ feet = 1 rod, pole or perch.
40 rods, or 220 yards = 1 furlong.
8 furlongs, or 320 rods, or 1,760 yards or 5,280 feet = 1 mile.
3 miles = 1 league.

Additional Measures of Length

1,000 mills = 1 inch. 4 inches = 1 hand. 9 inches = 1 span.
2½ feet = 1 military pace. 2 yards = 1 fathom.

Square Measure—Measures of Surface

144 square inches, or 183.35 circular inches = 1 square foot.
9 square feet = 1 square yard.
30¼ square yards, or 272¼ square feet = 1 square rod, pole or perch.
160 square rods = 1 acre.
640 acres = 1 square mile.
An acre equals a square whose side is 208.71 feet.
A circular inch is the area of a circle 1 inch in diameter = 0.785398 square inches.
1 square inch = 1.2732 circular inches.
A circular mil is the area of a circle 1 mil or .001 in diameter.
The mil is used in electrical calculations.

Solid or Cubic Measure—Measures of Volume

1728 cubic inches = 1 cubic foot.
27 cubic feet = 1 cubic yard.
1 cord of wood = a pile, 4x4x8 feet = 128 cubic feet.
1 perch of masonry = 16½x1½x1 foot = 24¼ cubic feet.

Liquid Measure

4 gills = 1 pint.
2 pints = 1 quart.
4 quarts = 1 gallon U. S. 231 cubic inches.
English 277.274 cubic inches.
31½ gallons = 1 barrel.
42 gallons = 1 tierce.
2 barrels or 63 gallons = 1 hogshead.
84 gallons or 2 tierces = 1 puncheon.
2 hogsheads or 126 gallons = 1 pipe or butt.
2 pipes or 3 puncheons = 1 tun.
7.4805 U. S. gallons = 1 cubic foot.
1 British Imperial gallon = 1.20032 U. S. gallons.

Apothecaries' Fluid Measure

60 minims = 1 fluid drachm.
8 drachms, or 437½ grains, or 1.732 cubic inches = 1 fluid ounce.
Water is at its greatest density at 39.2°F.
Sea water is 1.6 to 1.9 heavier than fresh water.
1 cubic inch of water makes approximately 1 cubic foot of steam at atmospheric pressure.
27222 cubic feet of steam at atmospheric pressure weighs 1 pound.

Proportion of Nut Heads, Nuts and Washers

Diameter of bolt = 1.
Diameter of the head and nut, square or hexagon = 1½ from side to side.

Diameter of head and nut, hexagon = 2 over the angles.
Thickness of head = ¾ of diameter of bolt.
Thickness of nut = 1½ of diameter of bolt.
Washers should equal half the thickness of the head, and have twice the area.

Approximately—The weight of a hexagon head and square nut together will equal a rod of iron in length five times the diameter of the bolt.

For square heads and nuts, six times the diameter.
And for rose heads and square nuts, four times the diameter.

Rivets

Diameter of rivets for plates less than ½ inch thick = twice thickness of the plate.

Diameter of rivets for plates ½ inch thick and upwards = once and a half the thickness of the plate.

Length of rivet measured before clinching = the thickness of the plate + 2½ times the diameter of the rivet.

Shrinkage of Castings

In locomotive cylinders is ¼ inch in a foot.
Pipes is ¼ inch in a foot.
Girders, beams, etc., is ¼ inch in 15 inches.
Engine beams, connecting rods, etc., is ¼ inch in 16 inches.
Large cylinders, say 70 inch diameter, 10 foot stroke, the contraction of diameter is ¾ inch at top, ½ inch at bottom, and ¼ inch in 16 inches in length.
Thin brass is ¼ inch in 9 inches.
Thick brass is ¼ inch in 10 inches.
Zinc is ¼ inch in a foot.
Lead is ¼ inch in a foot.
Copper is ¼ inch in a foot.
Bismuth is ¼ inch in a foot.
Tin is ¼ inch in a foot.

Metric System and Equivalents

The Metric System is based on the Meter which was designed to be one ten-millionth ($\frac{1}{10,000,000}$) part of the earth's meridian, passing through Dunkirk and Formentera. Later investigations, however, have shown that the Meter exceeds one ten-millionth part by almost one part in 6400. The value of the Meter, as authorized by the U. S. Government, is 39.37 inches. The Metric system was legalized by the U. S. Government in 1866.

The three principal units are the meter, the unit of length, the liter, the unit of capacity, and the gram, the unit of weight. Multiples of these are obtained by prefixing the Greek words: deka (10), hekto (100), and kilo (1000). Divisions are obtained by prefixing the Latin words: deci ($\frac{1}{10}$), centi ($\frac{1}{100}$), and milli ($\frac{1}{1000}$). Abbreviations of the multiples begin with a capital letter, and of the divisions with a small letter, as in the following tables:

Measures of Length

10 millimeters (mm.)	= 1 centimeter (cm.)	= .3937 in.
10 decimeters	= 1 meter (m.)	= 3.28083 ft. = 39.37 in.
10 meters	= 1 dekameter (Dm.)	
10 dekameters	= 1 hektometer (Hm.)	
10 hektometers	= 1 kilometer (Km.)	= 0.62137 mile
1 foot	= .3048 meter	
1 inch	= .0254 meters	

Measures of Surface (not Land)

100 sq. millimeters	= 1 sq. centimeter (cm. ²)	= 0.155 sq. in.
100 sq. centimeters	= 1 sq. decimeter (dm. ²)	
100 sq. decimeters	= 1 sq. meter (m. ²)	= 10.764 sq. ft.
1 sq. yard	= .836 sq. meter	
1 sq. foot	= .0929 sq. meter	
1 sq. inch	= .00645 sq. millimeters	

Measures of Volume

1000 cubic millimeters (mm. ³)	= 1 cubic centimeter (cm. ³)	= .061 cu. in.
1000 cubic centimeters	= 1 cubic decimeter (dm. ³)	= 1 liter = 61.023 cu. in.
1000 cubic decimeters	= 1 cubic meter (m. ³)	= 35.314 cu. ft. = 264.2 gallons.
1 cubic yard	= .7645 cubic meter	
1 cubic foot	= .02832 cubic meter	
1 cubic inch	= .016387 cubic centimeters	

Measures of Capacity

10 millimeters (ml.)	= 1 centiliter (cl.)	
10 centiliters	= 1 deciliter (dl.)	
10 deciliters	= 1 liter (l.)	= 1.0567 qts. (U. S.) = 61.023 cu. in.
10 liters	= 1 dekaliter (Dl.)	
10 dekaliters	= 1 hektoliter (Hl.)	
10 hektoliters	= 1 kiloliter (Kl.)	
1 gallon (U. S.)	= 3.785 liters	
1 gallon (British)	= 4.543 liters	

Measures of Weight

10 milligrams (Mg.)	= 1 centigram (cg.)	
10 centigrams	= 1 decigram (dg.)	
10 decigrams	= 1 gram (g.)	= 15.432 grains.
10 grams	= 1 dekagram (Dg.)	
10 dekagrams	= 1 hektogram (Hg.)	
10 hektograms	= 1 kilogram (Kg.)	= 2.2046 pounds.
1000 kilograms	= 1 ton (T.)	= .9842 ton of 2,240 pounds

Note.—The gram is the weight of one cubic centimeter of pure distilled water at a temperature of 39.2°F.; the kilogram is the weight of 1 liter of water; the ton is the weight of 1 cubic meter of water.

1 grain	= .0648 gram	1 ounce (Avo.) = 28.35 grams.
1 pound	= 453.6 kilograms	1 ton of 2240 pounds = 1.016 metric tons.

Metric Units

The most common of these units, with their abbreviations, are as follows:

meter (m.)	1 inch (in.) = 2.54 cm.	1 m.	= .3937 in.
kilometer (km.)	1 foot (ft.) = 30.48 cm.	1 cm.	= .3937 in.
centimeter (cm.)	1 sq. in. = 6.45 sq. cm.	1 sq. cm.	= .1550 sq. in.
millimeter (mm.)	1 sq. ft. = .0929 sq. m.	1 sq. m.	= 10.06 sq. ft.
liter (l.)	1 cu. ft. = 28.317 cc.	1 cu. m.	= 35.32 cu. ft.
cubic centimeter (cc.)	1 qt. = .9463 l.	1 l.	= 1.057 qt.
gram (g.)	1 oz. av. = 28.35 g.	1 g.	= .0353 oz.
kilogram (kg.)	1 lb. av. = 4.537 kg.	1 kg.	= 2.204 lb.
milligram (mg.)			

Decimal Equivalents of Millimeters and Fractions of Millimeters

$$\frac{1}{1000} \text{ mm.} = .0003937''$$

mm. Inches	mm. Inches	mm. Inches	mm. Inches
1/50 = .00079	39/50 = .00371	27 = 1.06299	64 = 2.51968
2/50 = .00157	40/50 = .00315	28 = 1.10236	65 = 2.55905
3/50 = .00236	41/50 = .00328	29 = 1.14173	66 = 2.59842
4/50 = .00315	42/50 = .00342	30 = 1.18110	67 = 2.63779
5/50 = .00394	43/50 = .00356	31 = 1.22047	68 = 2.67716
6/50 = .00472	44/50 = .00369	32 = 1.25984	69 = 2.71653
7/50 = .00551	45/50 = .00383	33 = 1.29921	70 = 2.75590
8/50 = .00630	46/50 = .00396	34 = 1.33858	71 = 2.79527
9/50 = .00709	47/50 = .00410	35 = 1.37795	72 = 2.83464
10/50 = .00787	48/50 = .00424	36 = 1.41732	73 = 2.87401
11/50 = .00866	49/50 = .00438	37 = 1.45669	74 = 2.91338
12/50 = .00945	1 = .03937	38 = 1.49606	75 = 2.95275
13/50 = .01024	2 = .07874	39 = 1.53543	76 = 2.99212
14/50 = .01102	3 = .11811	40 = 1.57480	77 = 3.03149
15/50 = .01181	4 = .15748	41 = 1.61417	78 = 3.07086
16/50 = .01260	5 = .19685	42 = 1.65354	79 = 3.11023
17/50 = .01339	6 = .23622	43 = 1.69291	80 = 3.14960
18/50 = .01417	7 = .27559	44 = 1.73228	81 = 3.18897
19/50 = .01496	8 = .31496	45 = 1.77165	82 = 3.22834
20/50 = .01575	9 = .35433	46 = 1.81102	83 = 3.26771
21/50 = .01654	10 = .39370	47 = 1.85039	84 = 3.30708
22/50 = .01732	11 = .43307	48 = 1.88976	85 = 3.34645
23/50 = .01811	12 = .47244	49 = 1.92913	86 = 3.38582
24/50 = .01890	13 = .51181	50 = 1.96850	87 = 3.42519
25/50 = .01969	14 = .55118	51 = 2.00787	88 = 3.46456
26/50 = .02047	15 = .59055	52 = 2.04724	89 = 3.50393
27/50 = .02126	16 = .62992	53 = 2.08661	90 = 3.54330
28/50 = .02205	17 = .66929	54 = 2.12598	91 = 3.58267
29/50 = .02283	18 = .70866	55 = 2.16535	92 = 3.62204
30/50 = .02362	19 = .74803	56 = 2.20472	93 = 3.66141
31/50 = .02441	20 = .78740	57 = 2.24409	94 = 3.70078
32/50 = .02520	21 = .82677	58 = 2.28346	95 = 3.74015
33/50 = .02598	22 = .86614	59 = 2.32283	96 = 3.77952
34/50 = .02677	23 = .90551	60 = 2.36220	97 = 3.81889
35/50 = .02756	24 = .94488	61 = 2.40157	98 = 3.85826
36/50 = .02835	25 = .98425	62 = 2.44094	99 = 3.89763
37/50 = .02913	26 = 1.02362	63 = 2.48031	100 = 3.93700
38/50 = .02992			

Miscellaneous

1 kilogram per meter	= .6720 pounds per foot.
1 gram per square millimeter	= 1.422 pounds per square inch.
1 kilogram per square meter	= 0.2084 per square foot.
1 kilogram per cubic meter	= .0624 per cubic foot.
1 degree centigrade	= 1.8 degrees Fahrenheit.
1 pound per foot	= 1.488 kilograms per meter.
1 pound per square foot	= 4.882 kilograms per square meter.
1 pound per cubic foot	= 16.02 kilograms per cubic meter.
1 degree Fahrenheit	= .5556 degrees centigrade.
1 Calorie (French Thermal Unit)	= 3.968 B. T. U. (British Thermal Unit).
1 Horse Power	= 33,000 foot pounds per minute.
	= 746 Watts.
1 Watt (Unit of)	= .00134 Horse Power.
Electrical Power	= 1.474 foot pounds per minute.
	= 1000 Watts.
1 Kilowatt	= 1.34 Horsepower.
	= 44240 foot pounds per minute.

Metric Conversion Table

Millimetres $\times .03937$ = inches.
 Millimetres $\div 25.4$ = inches.
 Centimetres $\times .3937$ = inches.
 Centimetres $\div 2.54$ = inches.
 Metres $\times 39.37$ = inches.
 Metres $\times 3.281$ = feet.
 Metres $\times 1.094$ = yards.
 Kilometres $\times 621$ = miles.
 Kilometres $\div 1.6093$ = miles.
 Kilometres $\times 3280.8693$ = feet.
 Sq. Millimetres $\times .00155$ = sq. in.
 Sq. Millimetres $\div 645.16$ = sq. in.
 Sq. Centimetres $\times .155$ = sq. in.
 Sq. Centimetres $\div 6.451$ = sq. in.
 Sq. Metres $\times 10.764$ = sq. ft.
 Sq. Kilometres $\times 247.1$ = acres.
 Hectare $\times 2.471$ = acres.
 Cu. Centimetres $\div 16.383$ = cu. in.

Cu. Centimetres $\div 3.69$ = fluid drams.
 Cu. Centimetres $\div 29.57$ = fluid ounces.
 Cu. Metres $\times 35.315$ = cu. ft.
 Cu. Metres $\times 1.308$ = cu. yds.
 Cu. Metres $\times 264.2$ = gals. (231 cu. in.)
 Litres $\div 61.022$ = cu. in.
 Litres $\times 33.84$ = fluid ounces.
 Litres $\times 2.642$ = gals. (231 cu. in.)
 Litres $\div 3.78$ = gals. (231 cu. in.)
 Litres $\div 28.316$ = cu. ft.
 Hectolitres $\times 3.531$ = cu. ft.
 Hectolitres $\times 2.84$ = Bu. (2150.42 cu. in.)
 Hectolitres $\times 1.31$ = cu. yds.
 Hectolitres $\div 26.42$ = gals. (231 cu. in.)
 Grammes $\times 15.432$ = grains.
 Grammes $\times 981$ = dynes.
 Grammes (water) $\div 29.57$ = fluid oz.
 Grammes $\div 28.35$ = oz. avoirdupois.

Grammes per cu. cent. $\div 2.77$ = lbs. p. cu. in.
 Joule $\times 7373$ = ft. lbs.
 Kilo-grammes $\times 2.2046$ = pounds.
 Kilo-grammes $\times 35.3$ = oz. avoirdupois.
 Kilo-grammes $\div 907.2$ = tons (2000 lbs.)
 Kilo-gr. p. sq. cent. $\times 14.223$ = lbs. p. sq. in.
 Kilo-gram-metres $\times 7.233$ = ft. lbs.
 Kilo-gr. p. Metre $\times .672$ = lbs. per ft.
 Kilo-gr. p. cu. Metre $\times .062$ = lbs. p. cu. ft.
 Kilo-gr. p. Cheval $\times 2.235$ = lbs. p. H. P.
 Kilo-Watts $\times 1.34$ = Horse-power.
 Watts $\div 746$ = Horse-power.
 Watts $\times 7373$ = ft. pounds p. second.
 Calorie $\times 3.968$ = B. T. U.
 Cheval vapeur $\times 9863$ = Horse-power.
 (Centigrade $\times 1.8$) $\div 32$ = degrees Fahr.
 Franc $\times 193$ = Dollars.
 Gravity Paris = 980.94 centimetres per sec.

Pound Equivalents in Kilograms

Lbs.	Kilo-grams	Lbs.	Kilo-grams	Lbs.	Kilo-grams	Lbs.	Kilo-grams	Lbs.	Kilo-grams	Lbs.	Kilo-grams	Lbs.	Kilo-grams
1	.4535	14	6.3490	27	12.2445	40	18.14	53	24.0355	65	29.4775	77	34.9195
2	.9070	15	6.8025	28	12.6980	41	18.5935	54	24.4890	66	29.9310	78	35.3730
3	1.3605	16	7.2560	29	13.1515	42	19.0470	55	24.9425	67	30.3845	79	35.8265
4	1.8140	17	7.7095	30	13.6050	43	19.5005	56	25.3960	68	30.8380	80	36.28
5	2.2675	18	8.1630	31	14.0585	44	19.9540	57	25.8495	69	31.2915	81	36.7335
6	2.7210	19	8.6165	32	14.5120	45	20.4075	58	26.3030	70	31.7450	82	37.1870
7	3.1745	20	9.07	33	14.9655	46	20.8610	59	26.7565	71	32.1985	83	37.6405
8	3.6280	21	9.5235	34	15.4190	47	21.3145	60	27.21	72	32.6520	84	38.0940
9	4.0815	22	9.9770	35	15.8725	48	21.7680	61	27.6635	73	33.1055	85	38.5475
10	4.5350	23	10.4305	36	16.3260	49	22.2215	62	28.1170	74	33.5590	86	39.0010
11	4.9885	24	10.8840	37	16.7795	50	22.6750	63	28.5705	75	34.0125	87	39.4545
12	5.4420	25	11.3375	38	17.2330	51	23.1285	64	29.0240	76	34.4660	88	39.9080
13	5.8955	26	11.7910	39	17.6865	52	23.5820					89	40.3615

Barometric Pressures at Different Altitudes

With Equivalent Head of Water and the Vertical Suction Lift of Pumps

Altitude	Barometric Pressure	Equivalent Head of Water Feet	Practical Suction Lift of Pump, Feet
Sea Level	14.70 lbs. per sq. in.	33.95	25
1 mile (3200 feet) above sea level	14.02 " "	32.38	24
1 1/2 " (2640 feet) " " "	13.33 " "	30.79	23
2 " (3960 feet) " " "	12.66 " "	29.24	21
1 " (5280 feet) " " "	12.02 " "	27.76	20
1 1/4 " (6600 feet) " " "	11.42 " "	26.38	19
1 1/2 " (7920 feet) " " "	10.88 " "	25.13	18
2 " (10560 feet) " " "	9.88 " "	22.82	17

For Reference

Diameter of a circle $\times 3.1416$ = circumference.
 Diameter of a circle $\times .8862$ = side of an equal square.
 Diameter of a circle $\times .7071$ = side of an inscribed square.
 Square of a diameter $\times .7854$ = area of circle.
 Circumference of a circle $\times .31831$ = diameter.
 Side of a square $\times 1.128$ = diameter of equal circle.
 Square root of an area $\times 1.12837$ = diameter of equal circle.
 Square of the diameter of a sphere $\times 3.1416$ = convex surface.
 Cube of the diameter of a sphere $\times .5236$ = solidity.
 Diameter of a sphere $\times .806$ = dimensions of equal cube.
 Diameter of a sphere $\times .6667$ = length of equal cylinder.
 Square inches $\times .00695$ = square feet.
 Cubic inches $\times .00058$ = cubic feet.
 Cubic feet $\times .03704$ = cubic yards.
 Cylindrical inches $\times .0004546$ = cubic feet.
 Cylindrical feet $\times .02909$ = cubic yards.
 Cubic inches $\times .003607$ = imperial gallons.
 Cubic feet $\times .6232$ = imperial gallons.

Cylindrical inches $\times .002832$ = imperial gallons.

Cylindrical feet $\times 4.895$ = imperial gallons.

183.346 circular inches = 1 square foot.

2,200 cylindrical inches = 1 cubic foot.

Avoirdupois pounds $\times .009$ = cwt.

Avoirdupois pounds $\times .00045$ = tons.

Lineal feet $\times .00019$ = statute miles.

Lineal yards $\times .000568$ = statute miles.

To find the pressure in pounds per square inch of a column of water, multiply height of column in ft. by .434.

Doubling the diameter of a circle increases its area four times.

Area of a triangle = base multiplied by half the altitude.

Area of a sector of a circle = one-half the length of the arc multiplied by the radius of the circle.

To find the capacity (U. S. gallons) of cylindrical tanks, square the diameter expressed in inches, multiply by the length and by .0034.

Useful Information

Approximate Weight of Hose
In Pounds, per Length of 50 Feet

SIZE, INCHES.....	$\frac{1}{2}$	$\frac{3}{4}$	1	1 $\frac{1}{4}$	1 $\frac{1}{2}$	2	2 $\frac{1}{2}$	3	4
Water, 3-ply.....	13	19	24	32	38	49	70	80	115
Water, 4-ply.....	18	22	28	37	46	54	70	80	115
Steam, 4-ply.....	18	20	40	60	70	85	100	115	150
Steam, 5-ply.....	22	32	45	60	70	85	100	115	150
Steam, 6-ply.....	22	40	50	65	80	95	110	125	160
Air, wire-wound, 4-ply.....	41	50	55	65	75	85	100	115	150
Air, wire-wound, 5-ply.....	50	55	60	70	80	90	100	115	150
Rubber-lined cotton.....	10	15	20	25	30	35	40	45	50
Unlined linen.....	5	6	7	8	9	10	11	12	13

Approximate Weight of Rubber Belting

Width, inches.....	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Ply.....	3	3	3	3	3	3	4	4	4	4	4	4	4	4	4	4	4	4
Per foot, ounces.....	6	8	10	12	15	16	8	9	12	14	18	19	22	24	26	28	30	32
Width, inches.....	12	14	16	6	7	8	9	10	12	14	8	9	10	11	12	13	14	15
Ply.....	4	4	4	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Per foot, ounces.....	28	34	39	18	21	24	27	30	35	43	28	33	35	38	41	44	47	50

Approximate Weight of Leather Belting

In Pounds, per 100 Feet

WIDTH, INCHES.....	1	1 $\frac{1}{2}$	2	2 $\frac{1}{2}$	3	3 $\frac{1}{2}$	4	5	6
Single, pounds.....	8	12	16	20	24	28	32	40	48
Light double, pounds.....	12	18	24	30	36	42	48	60	72
Extra heavy double, pounds.....	16	24	32	40	48	56	64	80	96

Greater widths are in direct proportion.

Tee-Rails and Track Equipment
Rails, Splices, Spikes and Bolts

For Single Track (Two Rails) Ties 2 Feet Center to Center, 4 Spikes Each

SIZE OF RAILS, POUNDS, PER YARD.....	8	12	16	20	25	30	40
Rails, per mile, tons of 2,000 pounds.....	14.08	21.12	28.16	35.20	44.00	52.80	70.40
Rails, per 100 feet, pounds.....	533	800	1,067	1,333	1,667	2,000	2,667
Splice bars, weight, per pair, pounds.....	21	34.4	4.36	4.86	5.70	10.45	16.10
Spikes, size under head, inches.....	2x2 $\frac{1}{4}$	$\frac{3}{4}$ x2 $\frac{1}{4}$	$\frac{3}{4}$ x3	$\frac{3}{4}$ x3 $\frac{1}{4}$	$\frac{3}{4}$ x3 $\frac{1}{4}$	$\frac{1}{2}$ x4	$\frac{1}{2}$ x4 $\frac{1}{4}$
Spikes, per mile, pounds.....	978	1,320	1,542	1,790	1,790	3,320	3,865
Spikes, per 100 feet, pounds.....	19	25	30	35	35	67	75
Spikes, per ton rails, pounds.....	70	63	55	51	41	67	56
Spikes, number per keg of 200 pounds.....	2,160	1,600	1,570	1,180	1,180	600	530
Bolts, size, inches.....	$\frac{3}{8}$ x1 $\frac{1}{4}$	$\frac{3}{8}$ x1 $\frac{1}{4}$	$\frac{3}{8}$ x2				
Bolts, number per keg of 200 pounds.....	1,300	1,800	1,560				

Nearest Number of Rails, Splices and Bolts

For Single Track (2 Rails)

LENGTH OF RAILS, FEET.....	12	13	14	15	16	18	20	22	24	30
Per 100 feet, number of rails.....	17	15	14	13	12	11	10	9	8	7
Per 100 feet, pairs splices.....	17	15	14	13	12	11	10	9	8	7
Per 100, number bolts, 4 per joint.....	68	60	56	52	48	44	40	36	32	28
Per 100, number bolts, 2 per joint.....	34	30	28	26	24	22	20	18	16	14
Per mile, number rails.....	880	812	755	704	660	608	578	528	480	440
Per mile, pairs splices.....	880	812	755	704	660	608	578	528	480	440
Per mile, number bolts, 4 per joint.....	3,520	3,252	3,020	2,816	2,640	2,412	2,212	1,920	1,760	1,608
Per mile, number bolts, 2 per joint.....	1,760	1,626	1,510	1,408	1,320	1,206	1,056	960	880	794
8-pound rails, number, per ton.....	62.5	57.7	53.6	50.0	46.9	41.7	37.5	34.1	31.3	25.0
12-pound rails, number, per ton.....	41.7	38.5	35.7	33.3	31.3	27.8	25.0	22.8	20.8	16.7
16-pound rails, number, per ton.....	31.3	28.9	26.8	25.0	23.4	20.8	18.8	17.1	15.6	12.5
20-pound rails, number, per ton.....	25.0	23.1	21.4	20.0	18.8	16.7	15.0	13.6	12.5	10.0
25-pound rails, number, per ton.....	20.0	18.5	17.1	16.0	15.0	13.3	12.0	10.9	10.0	8.0
30-pound rails, number, per ton.....	16.7	15.4	14.3	13.3	12.5	11.1	10.0	9.1	8.3	6.7
40-pound rails, number, per ton.....	12.5	11.5	10.7	10.0	9.3	8.3	7.5	6.8	6.3	5.0

Useful Information

Different Standards for Wire Gauge in Use in the United States

Dimensions of Sizes in Decimal Parts of an Inch

No. of Wire Gauge.	American or Brown & Sharpe.	Birmingham or Stubbs Wire.	Washburn & Moore Co. Wire.	Imperial Wire Gauge.	Subs. Steel Wire.	U. S. Standard for Plate.
000000				.464		.46875
00000				.432		.4375
0000	.46	.454	.3938	.400		.40625
000	.40964	.425	.3625	.372		.375
00	.3648	.38	.3310	.348		.34375
0	.32486	.34	.3065	.324		.3125
1	.2893	.314	.2730	.300	.327	.28125
2	.25763	.284	.2425	.276	.219	.265625
3	.22942	.259	.2137	.252	.212	.25
4	.20431	.238	.2253	.232	.207	.234375
5	.18194	.22	.2070	.212	.204	.21875
6	.16202	.203	.1920	.192	.201	.203125
7	.14428	.18	.1770	.176	.199	.1875
8	.12849	.165	.1620	.160	.197	.171875
9	.11443	.148	.1483	.144	.194	.15625
10	.10189	.134	.1350	.128	.191	.140625
11	.090742	.12	.1205	.116	.188	.125
12	.080808	.109	.1055	.104	.185	.109375
13	.071961	.095	.0915	.092	.182	.09375
14	.064084	.083	.0800	.080	.180	.078125
15	.057068	.072	.0720	.072	.178	.0703125
16	.05082	.065	.0625	.064	.175	.0625
17	.045257	.058	.0540	.056	.172	.05625
18	.040303	.049	.0475	.048	.168	.05
19	.03589	.042	.0410	.040	.164	.04375
20	.031961	.035	.0348	.036	.161	.0375
21	.028462	.032	.03175	.032	.157	.034375
22	.025347	.028	.0286	.028	.155	.03125
23	.022571	.025	.0258	.024	.153	.028125
24	.0201	.022	.0230	.022	.151	.025
25	.0179	.02	.0204	.020	.148	.021875
26	.01594	.018	.0181	.018	.145	.01875
27	.014195	.016	.0173	.0164	.143	.0171875
28	.012641	.014	.0162	.0149	.139	.015625
29	.011257	.013	.0150	.0136	.134	.0140625
30	.010025	.012	.0140	.0124	.127	.0125
31	.008928	.01	.0132	.0116	.120	.0109375
32	.00795	.009	.0128	.0108	.115	.01015625
33	.00708	.008	.0118	.0100	.112	.009375
34	.006304	.007	.0104	.0092	.110	.00859375
35	.005614	.005	.0095	.0084	.108	.0078125
36	.005	.004	.0090	.0076	.106	.00703125
37	.004453			.0068	.103	.00640625
38	.003965			.0060	.101	.00625
39	.003531			.0052	.099	
40	.003144			.0048	.097	

Weights per Square Foot of Sheet Wrought Iron, Steel, Copper and Brass

For Thickness by American (Brown & Sharpe's) Gauge

For Thickness by American (Brown & Sharpe's) Gauge.

No. of Gauge.	Thickness in inches.	Iron.	Steel.	Copper.	Brass.
0000	.46	18.46	18.70	20.84	19.69
000	.4096	16.44	16.66	18.66	17.53
00	.3648	14.64	14.83	16.53	15.61
0	.3249	13.04	13.21	14.72	13.90
1	.2893	11.61	11.76	13.11	12.38
2	.2576	10.34	10.48	11.67	11.03
3	.2294	9.21	9.33	10.39	9.82
4	.2043	8.20	8.31	9.26	8.74
5	.1819	7.30	7.40	8.24	7.79
6	.1620	6.50	6.59	7.34	6.93
7	.1443	5.79	5.87	6.54	6.18
8	.1285	5.16	5.22	5.82	5.50
9	.1144	4.59	4.65	5.18	4.90
10	.1019	4.09	4.14	4.62	4.36
11	.0907	3.64	3.69	4.11	3.88
12	.0808	3.24	3.29	3.68	3.46
13	.0720	2.89	2.93	3.26	3.08
14	.0641	2.57	2.61	2.90	2.74
15	.0571	2.29	2.32	2.59	2.44
16	.0508	2.04	2.07	2.30	2.18
17	.0453	1.82	1.84	2.05	1.94
18	.0403	1.62	1.64	1.83	1.73
19	.0359	1.44	1.46	1.63	1.54
20	.0320	1.28	1.30	1.45	1.37
21	.0285	1.14	1.16	1.29	1.22
22	.0253	1.02	1.03	1.15	1.08
23	.0226	.906	.918	1.02	.966
24	.0201	.807	.817	.911	.860
25	.0179	.718	.728	.811	.766
26	.0159	.640	.648	.722	.682
27	.0142	.570	.577	.643	.608
28	.0126	.507	.514	.573	.541
29	.0113	.452	.458	.510	.482
30	.0100	.402	.408	.454	.429
31	.0089	.358	.363	.404	.382
32	.0080	.319	.323	.360	.340
33	.0071	.284	.288	.321	.303
34	.0063	.253	.256	.286	.270
35	.0056	.226	.228	.254	.240
Specific gravity.....		7.704	7.806	8.698	8.218
Weight per cubic inch.....		.2787	.2823	.3146	.2972
Weight per cubic foot.....		481.25	487.75	543.60	513.60

Table Showing the Number of Feet, Board Measure, Contained in a Piece of Joist, Scantling, or Timber of the Sizes Given

Size in inches.	LENGTH IN FEET OF JOISTS, SCANTLING AND TIMBER.															Size in inches.	LENGTH IN FEET OF JOISTS, SCANTLING AND TIMBER.														
	12	14	16	18	20	22	24	26	28	30	42	44	45	12	14		16	18	20	22	24	26	28	30	42	44	45				
2x 4	8	9	11	12	13	15	16	17	19	20	28	29	30	4x12	48	56	64	72	80	88	96	104	112	120	168	176	180				
2x 6	12	14	16	18	20	22	24	26	28	30	42	44	45	6x 6	36	42	48	54	60	66	72	78	84	90	126	132	136				
2x 8	16	19	21	24	27	29	32	35	37	40	53	58	60	6x 8	48	56	64	72	80	88	96	104	112	120	168	176	180				
2x10	20	23	27	30	33	37	40	43	47	50	70	74	75	6x10	60	70	80	90	100	110	120	130	140	150	210	220	225				
2x12	24	28	32	36	40	44	48	52	56	60	84	88	90	6x12	72	84	96	108	120	132	144	156	168	180	250	265	270				
3x 4	12	14	16	18	20	22	24	26	28	30	42	44	45	8x 8	64	75	85	96	107	117	128	139	149	160	224	234	240				
3x 6	18	21	24	27	30	33	36	39	42	45	58	63	65	8x10	80	93	107	120	133	147	160	173	187	200	280	294	300				
3x 8	24	28	32	36	40	44	48	52	56	60	84	88	90	8x12	96	112	128	144	160	176	192	208	224	240	336	352	360				
3x10	30	35	40	45	50	55	60	65	70	75	105	110	113	10x10	100	117	133	150	167	183	200	217	233	250	350	366	375				
3x12	36	42	48	54	60	66	72	78	84	90	125	132	135	10x12	120	140	160	180	200	220	240	260	280	300	420	440	450				
4x 4	16	19	21	24	27	29	32	35	37	40	56	58	60	12x12	144	168	192	216	240	264	288	312	336	360	504	528	540				
4x 6	24	28	32	36	40	44	48	52	56	60	84	88	90	12x14	168	196	224	252	280	308	336	364	392	420	588	616	630				
4x 8	32	37	43	48	53	59	64	69	75	80	112	118	120	14x14	196	229	261	294	327	359	392	425	457	490	686	716	735				
4x10	40	47	53	60	67	73	80	87	93	100	140	146	150																		

Rule for finding the Weight of Castings or Forgings by the Weight of their Patterns THEIR PATTERNS.

Multiply the weight of the white pine pattern by 16 for cast iron; 17.1 for wrought iron; 17.3 for steel; 18 for copper; 25 for lead; 12.2 for tin; 13 for brass; 11.4 for zinc, and the product is the weight of the casting

H. Channon Company Chicago

Weights of • and ■ Steel per Lineal Foot

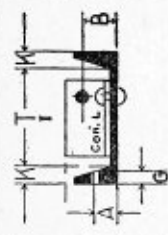
(Based on 489.6 Lbs. per Cubic Foot)

Size, Inches	Wt. of • 1 ft. long	Wt. of ■ 1 ft. long	Size, Inches	Wt. of • 1 ft. long	Wt. of ■ 1 ft. long	Size, Inches	Wt. of • 1 ft. long	Wt. of ■ 1 ft. long	Size, Inches	Wt. of • 1 ft. long	Wt. of ■ 1 ft. long
0.375	.0026	.0033	1 3/4	8.178	10.41	3 1/2	32.71	41.65	5 1/4	73.60	93.72
0.5	.0104	.0133	1 1/2	8.773	11.17	3 3/8	33.90	43.14	5 1/2	75.37	95.96
0.625	.0417	.0531	1 1/4	9.388	11.95	3 1/2	35.09	44.68	5 3/8	77.15	98.29
0.75	.0938	.1195	1 1/8	10.02	12.76	3 1/4	36.31	46.24	5 1/2	78.95	100.5
0.875	.1669	.2123	1 1/8	10.68	13.60	3 3/4	37.56	47.82	5 1/2	80.77	102.8
1.0	.2608	.3333	1 3/8	11.36	14.46	3 1/2	38.81	49.42	5 1/2	82.62	105.2
1.125	.3756	.4782	1 3/8	12.06	15.35	3 3/4	40.10	51.05	5 3/8	84.49	107.6
1.25	.5111	.6508	1 3/4	12.78	16.27	3 1/2	41.40	52.71	5 3/8	86.38	110.0
1.375	.6676	.8500	1 3/4	13.52	17.22	4	42.73	54.40	5 3/4	88.29	112.4
1.5	.8449	1.076	1 3/4	14.28	18.19	4 1/8	44.07	56.11	5 3/4	90.22	114.9
1.625	1.043	1.328	1 3/4	15.07	19.18	4 1/8	45.44	57.85	5 3/4	92.17	117.4
1.75	1.262	1.608	1 3/4	15.86	20.20	4 1/8	46.83	59.62	5 3/4	94.14	119.9
1.875	1.502	1.913	1 3/4	16.69	21.25	4 1/8	48.24	61.41	6	96.14	122.4
2.0	1.763	2.245	1 3/4	17.53	22.33	4 1/8	49.66	63.23	6	98.14	125.0
2.125	2.044	2.603	1 3/4	18.40	23.43	4 1/8	51.11	65.08	6 1/8	100.2	127.6
2.25	2.347	2.989	1 3/4	19.29	24.56	4 1/8	52.58	66.95	6 1/8	102.2	130.2
2.375	2.670	3.400	1 3/4	20.20	25.00	4 1/2	54.07	68.85	6 1/8	104.3	132.8
2.5	3.014	3.838	1 3/4	21.12	26.90	4 1/2	55.59	70.78	6 1/8	106.4	135.5
2.625	3.379	4.303	1 3/4	22.07	28.10	4 1/2	57.12	72.73	6 1/8	108.5	138.2
2.75	3.766	4.795	1 3/4	23.04	29.34	4 1/2	58.67	74.70	6 1/8	110.7	140.9
2.875	4.173	5.312	1 3/4	24.03	30.60	4 1/2	60.25	76.71	6 1/2	112.8	143.6
3.0	4.600	5.857	1 3/4	25.04	31.89	4 1/2	61.84	78.74	6 1/2	114.9	146.5
3.125	5.019	6.428	1 3/4	26.08	33.20	4 1/2	63.46	80.81	6 1/2	117.2	149.2
3.25	5.518	7.026	1 3/4	27.13	34.55	4 1/2	65.10	82.89	6 1/2	119.4	152.1
3.375	6.008	7.650	1 3/4	28.20	35.92	5	66.76	85.00	6 1/2	121.7	154.9
3.5	6.520	8.301	1 3/4	29.30	37.31	5	68.44	87.14	6 1/2	123.9	157.8
3.625	7.051	8.978	1 3/4	30.42	38.73	5	70.14	89.30	6 1/2	126.2	160.8
3.75	7.604	9.682	1 3/4	31.56	40.18	5	71.86	91.49	6 1/2	128.5	163.6

These figures represent the theoretical weights of steel. Iron will run about 2 per cent lighter.

Weights of Flat Rolled Steel, per Lineal Foot

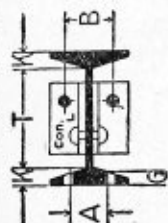
Thickness, Inches	Width, Inches															
	1/8	3/16	1/4	5/16	3/8	7/16	1/2	9/16	5/8	3/4	7/8	1	1 1/8	1 1/4	1 1/2	1 3/4
1/8	.1060	.1381	.1594	.1859	.212	.2391	.2656	.292	.319	.372	.425	.478	.531	.584	.638	.744
3/16	.2125	.2656	.3188	.3720	.4252	.4782	.5312	.585	.638	.744	.850	.96	1.06	1.17	1.28	1.49
1/4	.319	.399	.478	.558	.638	.717	.797	.875	.967	1.15	1.28	1.44	1.59	1.75	1.91	2.23
5/16	.425	.531	.636	.743	.850	.957	1.06	1.17	1.28	1.49	1.70	1.92	2.12	2.34	2.55	2.98
3/8	.531	.664	.797	.929	1.06	1.20	1.33	1.46	1.59	1.86	2.12	2.39	2.65	2.92	3.19	3.72
7/16	.638	.797	.957	1.116	1.28	1.43	1.59	1.76	1.92	2.23	2.55	2.87	3.19	3.51	3.83	4.47
1/2	.744	.929	1.116	1.302	1.49	1.68	1.86	2.05	2.23	2.60	2.98	3.35	3.72	4.09	4.46	5.20
5/8	.850	1.06	1.275	1.487	1.70	1.92	2.12	2.34	2.55	2.98	3.40	3.82	4.25	4.67	5.10	5.95
3/4	.957	1.20	1.424	1.674	1.92	2.15	2.39	2.63	2.87	3.35	3.83	4.30	4.78	5.26	5.74	6.70
7/8	1.06	1.33	1.594	1.859	2.12	2.29	2.65	2.92	3.19	3.72	4.25	4.78	5.31	5.84	6.38	7.44
1	1.17	1.46	1.753	2.045	2.34	2.63	2.92	3.22	3.51	4.09	4.67	5.26	5.84	6.43	7.02	8.18
1 1/8																
1 1/4	1.28	1.60	1.913	2.232	2.55	2.87	3.19	3.51	3.83	4.47	5.10	5.75	6.38	7.02	7.65	8.93
1 1/2	1.38	1.73	2.072	2.417	2.76	3.11	3.45	3.80	4.14	4.84	5.53	6.21	6.90	7.60	8.29	9.67
1 3/4	1.49	1.86	2.232	2.604	2.98	3.35	3.72	4.09	4.47	5.20	5.95	6.69	7.44	8.18	8.93	10.41
2	1.60	1.99	2.391	2.789	3.19	3.59	3.99	4.39	4.78	5.58	6.38	7.18	7.97	8.77	9.57	11.16
2 1/8																
2 1/4	1.70	2.13	2.55	2.98	3.40	3.83	4.25	4.68	5.10	5.95	6.80	7.65	8.50	9.35	10.20	11.90
2 1/2	1.81	2.26	2.710	3.161	3.61	4.04	4.52	4.97	5.42	6.32	7.22	8.13	9.03	9.93	10.84	12.65
2 3/4	1.91	2.39	2.868	3.347	3.83	4.29	4.78	5.26	5.74	6.70	7.65	8.61	9.57	10.52	11.48	13.39
3	2.02	2.52	3.03	3.532	4.04	4.54	5.05	5.56	6.06	7.07	8.08	9.09	10.10	11.11	12.12	14.13
3 1/8																
3 1/4	2.12	2.66	3.19	3.72	4.25	4.79	5.31	5.85	6.38	7.44	8.50	9.57	10.63	11.69	12.75	14.87
3 1/2	2.23	2.79	3.35	3.91	4.46	5.02	5.58	6.14	6.69	7.81	8.93	10.04	11.16	12.27	13.39	15.62
3 3/4	2.34	2.92	3.51	4.09	4.67	5.26	5.84	6.43	7.02	8.18	9.35	10.52	11.69	12.85	14.03	16.36
4	2.45	3.06	3.67	4.28	4.89	5.50	6.11	6.72	7.34	8.56	9.78	11.00	12.22	13.44	14.66	17.10
4 1/8																
4 1/4	2.55	3.19	3.83	4.47	5.10	5.74	6.38	7.02	7.65	8.93	10.20	11.48	12.75	14.03	15.30	17.85
4 1/2	2.66	3.32	3.99	4.65	5.32	5.98	6.64	7.31	7.97	9.30	10.63	11.95	13.28	14.61	15.94	18.60
4 3/4	2.76	3.45	4.15	4.84	5.52	6.20	6.90	7.60	8.29	9.67	11.06	12.43	13.81	15.19	16.58	19.34
5	2.87	3.59	4.31	5.02	5.74	6.46	7.17	7.89	8.61	10.04	11.47	12.91	14.34	15.78	17.22	20.08
5 1/8																
5 1/4	2.98	3.72	4.47	5.21	5.95	6.70	7.44	8.19	8.93	10.42	11.90	13.40	14.88	16.37	17.85	20.83
5 1/2	3.08	3.85	4.62	5.40	6.16	6.93	7.70	8.48	9.24	10.79	12.33	13.86	15.40	16.96	18.49	21.57
5 3/4	3.19	3.99	4.79	5.58	6.38	7.17	7.97	8.77	9.57	11.15	12.75	14.34	15.94	17.53	19.13	22.31
6	3.30	4.12	4.94	5.77	6.59	7.42	8.24	9.06	9.88	11.53	13.18	14.83	16.47	18.12	19.77	22.66
6 1/8																
6 1/4	3.40	4.25	5.10	5.95	6.80	7.65	8.50	9.35	10.20	11.90	13.60	15.30	17.00	18.70	20.40	23.20



Standard Steel Channels

Weights and Dimensions

Size	Weight Per Foot	Flange Width	Area Section	Maximum Rivet Grip	Punch Gauge, Inches	K	T	Connection L's	A	B
3	4.00	1.410	1.19	3/4	1 1/2	5%	1 1/4	2x4x7.16x0 2" Wt. 7 lb.	1 1/2	2 1/2
4	5.00	1.504	1.47	7/8	2 1/2		2 1/4	2x4x7.16x0 2" Wt. 7 lb.	1 1/2	2 1/2
5	6.00	1.602	1.76	1	3 1/2		3 1/4	2x4x7.16x0 2" Wt. 7 lb.	1 1/2	2 1/2
6	8.00	1.828	2.13	1 1/4	4 1/2		4 1/4	2x4x7.16x0 2" Wt. 8 lb.	1 1/2	2 1/2
7	10.00	2.037	2.58	1 3/4	5 1/2		5 1/4	2x4x7.16x0 2" Wt. 9 lb.	1 1/2	2 1/2
8	12.00	2.233	3.09	2	6 1/2		6 1/4	2x4x7.16x0 2" Wt. 10 lb.	1 1/2	2 1/2
9	14.00	2.413	3.60	2 1/4	7 1/2		7 1/4	2x4x7.16x0 2" Wt. 11 lb.	1 1/2	2 1/2
10	16.00	2.578	4.11	2 3/4	8 1/2		8 1/4	2x4x7.16x0 2" Wt. 12 lb.	1 1/2	2 1/2
11	18.00	2.733	4.62	3	9 1/2		9 1/4	2x4x7.16x0 2" Wt. 13 lb.	1 1/2	2 1/2
12	20.00	2.878	5.13	3 1/4	10 1/2		10 1/4	2x4x7.16x0 2" Wt. 14 lb.	1 1/2	2 1/2
13	22.00	3.013	5.64	3 3/4	11 1/2		11 1/4	2x4x7.16x0 2" Wt. 15 lb.	1 1/2	2 1/2
14	24.00	3.143	6.15	4	12 1/2		12 1/4	2x4x7.16x0 2" Wt. 16 lb.	1 1/2	2 1/2
15	26.00	3.268	6.66	4 1/4	13 1/2		13 1/4	2x4x7.16x0 2" Wt. 17 lb.	1 1/2	2 1/2
16	28.00	3.388	7.17	4 3/4	14 1/2		14 1/4	2x4x7.16x0 2" Wt. 18 lb.	1 1/2	2 1/2
17	30.00	3.503	7.68	5	15 1/2		15 1/4	2x4x7.16x0 2" Wt. 19 lb.	1 1/2	2 1/2
18	32.00	3.613	8.19	5 1/4	16 1/2		16 1/4	2x4x7.16x0 2" Wt. 20 lb.	1 1/2	2 1/2
19	34.00	3.718	8.70	5 3/4	17 1/2		17 1/4	2x4x7.16x0 2" Wt. 21 lb.	1 1/2	2 1/2
20	36.00	3.818	9.21	6	18 1/2		18 1/4	2x4x7.16x0 2" Wt. 22 lb.	1 1/2	2 1/2
21	38.00	3.913	9.72	6 1/4	19 1/2		19 1/4	2x4x7.16x0 2" Wt. 23 lb.	1 1/2	2 1/2
22	40.00	4.003	10.23	6 3/4	20 1/2		20 1/4	2x4x7.16x0 2" Wt. 24 lb.	1 1/2	2 1/2
23	42.00	4.088	10.74	7	21 1/2		21 1/4	2x4x7.16x0 2" Wt. 25 lb.	1 1/2	2 1/2
24	44.00	4.168	11.25	7 1/4	22 1/2		22 1/4	2x4x7.16x0 2" Wt. 26 lb.	1 1/2	2 1/2
25	46.00	4.243	11.76	7 3/4	23 1/2		23 1/4	2x4x7.16x0 2" Wt. 27 lb.	1 1/2	2 1/2
26	48.00	4.313	12.27	8	24 1/2		24 1/4	2x4x7.16x0 2" Wt. 28 lb.	1 1/2	2 1/2
27	50.00	4.378	12.78	8 1/4	25 1/2		25 1/4	2x4x7.16x0 2" Wt. 29 lb.	1 1/2	2 1/2
28	52.00	4.438	13.29	8 3/4	26 1/2		26 1/4	2x4x7.16x0 2" Wt. 30 lb.	1 1/2	2 1/2
29	54.00	4.493	13.80	9	27 1/2		27 1/4	2x4x7.16x0 2" Wt. 31 lb.	1 1/2	2 1/2
30	56.00	4.543	14.31	9 1/4	28 1/2		28 1/4	2x4x7.16x0 2" Wt. 32 lb.	1 1/2	2 1/2
31	58.00	4.588	14.82	9 3/4	29 1/2		29 1/4	2x4x7.16x0 2" Wt. 33 lb.	1 1/2	2 1/2
32	60.00	4.628	15.33	10	30 1/2		30 1/4	2x4x7.16x0 2" Wt. 34 lb.	1 1/2	2 1/2
33	62.00	4.663	15.84	10 1/4	31 1/2		31 1/4	2x4x7.16x0 2" Wt. 35 lb.	1 1/2	2 1/2
34	64.00	4.693	16.35	10 3/4	32 1/2		32 1/4	2x4x7.16x0 2" Wt. 36 lb.	1 1/2	2 1/2
35	66.00	4.718	16.86	11	33 1/2		33 1/4	2x4x7.16x0 2" Wt. 37 lb.	1 1/2	2 1/2
36	68.00	4.743	17.37	11 1/4	34 1/2		34 1/4	2x4x7.16x0 2" Wt. 38 lb.	1 1/2	2 1/2
37	70.00	4.763	17.88	11 3/4	35 1/2		35 1/4	2x4x7.16x0 2" Wt. 39 lb.	1 1/2	2 1/2
38	72.00	4.778	18.39	12	36 1/2		36 1/4	2x4x7.16x0 2" Wt. 40 lb.	1 1/2	2 1/2
39	74.00	4.788	18.90	12 1/4	37 1/2		37 1/4	2x4x7.16x0 2" Wt. 41 lb.	1 1/2	2 1/2
40	76.00	4.793	19.41	12 3/4	38 1/2		38 1/4	2x4x7.16x0 2" Wt. 42 lb.	1 1/2	2 1/2
41	78.00	4.798	19.92	13	39 1/2		39 1/4	2x4x7.16x0 2" Wt. 43 lb.	1 1/2	2 1/2
42	80.00	4.798	20.43	13 1/4	40 1/2		40 1/4	2x4x7.16x0 2" Wt. 44 lb.	1 1/2	2 1/2
43	82.00	4.793	20.94	13 3/4	41 1/2		41 1/4	2x4x7.16x0 2" Wt. 45 lb.	1 1/2	2 1/2
44	84.00	4.788	21.45	14	42 1/2		42 1/4	2x4x7.16x0 2" Wt. 46 lb.	1 1/2	2 1/2
45	86.00	4.778	21.96	14 1/4	43 1/2		43 1/4	2x4x7.16x0 2" Wt. 47 lb.	1 1/2	2 1/2
46	88.00	4.763	22.47	14 3/4	44 1/2		44 1/4	2x4x7.16x0 2" Wt. 48 lb.	1 1/2	2 1/2
47	90.00	4.743	22.98	15	45 1/2		45 1/4	2x4x7.16x0 2" Wt. 49 lb.	1 1/2	2 1/2
48	92.00	4.718	23.49	15 1/4	46 1/2		46 1/4	2x4x7.16x0 2" Wt. 50 lb.	1 1/2	2 1/2
49	94.00	4.688	24.00	15 3/4	47 1/2		47 1/4	2x4x7.16x0 2" Wt. 51 lb.	1 1/2	2 1/2
50	96.00	4.653	24.51	16	48 1/2		48 1/4	2x4x7.16x0 2" Wt. 52 lb.	1 1/2	2 1/2
51	98.00	4.613	25.02	16 1/4	49 1/2		49 1/4	2x4x7.16x0 2" Wt. 53 lb.	1 1/2	2 1/2
52	100.00	4.568	25.53	16 3/4	50 1/2		50 1/4	2x4x7.16x0 2" Wt. 54 lb.	1 1/2	2 1/2



Standard Steel "I" Beams

Weights and Dimensions

Size	Weight Per Foot	Flange Width	Area Section	Maximum Rivet Grip	Punch Gauge, Inches	K	T	Connections
3	4.00	1.410	1.19	3/4	1 1/2	1%	1 1/4	2x4x7.16x0 2" Wt. 7 lb.
4	5.00	1.504	1.47	7/8	2 1/2	2%	2 1/4	2x4x7.16x0 2" Wt. 7 lb.
5	6.00	1.602	1.76	1	3 1/2	3%	3 1/4	2x4x7.16x0 2" Wt. 8 lb.
6	8.00	1.828	2.13	1 1/4	4 1/2	4%	4 1/4	2x4x7.16x0 2" Wt. 9 lb.
7	10.00	2.037	2.58	1 3/4	5 1/2	5%	5 1/4	2x4x7.16x0 2" Wt. 10 lb.
8	12.00	2.233	3.09	2	6 1/2	6%	6 1/4	2x4x7.16x0 2" Wt. 11 lb.
9	14.00	2.413	3.60	2 1/4	7 1/2	7%	7 1/4	2x4x7.16x0 2" Wt. 12 lb.
10	16.00	2.578	4.11	2 3/4	8 1/2	8%	8 1/4	2x4x7.16x0 2" Wt. 13 lb.
11	18.00	2.733	4.62	3	9 1/2	9%	9 1/4	2x4x7.16x0 2" Wt. 14 lb.
12	20.00	2.878	5.13	3 1/4	10 1/2	10%	10 1/4	2x4x7.16x0 2" Wt. 15 lb.
13	22.00	3.013	5.64	3 3/4	11 1/2	11%	11 1/4	2x4x7.16x0 2" Wt. 16 lb.
14	24.00	3.143	6.15	4	12 1/2	12%	12 1/4	2x4x7.16x0 2" Wt. 17 lb.
15	26.00	3.268	6.66	4 1/4	13 1/2	13%	13 1/4	2x4x7.16x0 2" Wt. 18 lb.
16	28.00	3.388	7.17	4 3/4	14 1/2	14%	14 1/4	2x4x7.16x0 2" Wt. 19 lb.
17	30.00	3.503	7.68	5	15 1/2	15%	15 1/4	2x4x7.16x0 2" Wt. 20 lb.
18	32.00	3.613	8.19	5 1/4	16 1/2	16%	16 1/4	2x4x7.16x0 2" Wt. 21 lb.
19	34.00	3.718	8.70	5 3/4	17 1/2	17%	17 1/4	2x4x7.16x0 2" Wt. 22 lb.
20	36.00	3.818	9.21	6	18 1/2	18%	18 1/4	2x4x7.16x0 2" Wt. 23 lb.
21	38.00	3.913	9.72	6 1/4	19 1/2	19%	19 1/4	2x4x7.16x0 2" Wt. 24 lb.
22	40.00	4.003	10.23	6 3/4	20 1/2	20%	20 1/4	2x4x7.16x0 2" Wt. 25 lb.
23	42.00	4.088	10.74	7	21 1/2	21%	21 1/4	2x4x7.16x0 2" Wt. 26 lb.
24	44.00	4.168	11.25	7 1/4	22 1/2	22%	22 1/4	2x4x7.16x0 2" Wt. 27 lb.
25	46.00	4.243	11.76	7 3/4	23 1/2	23%	23 1/4	2x4x7.16x0 2" Wt. 28 lb.
26	48.00	4.313	12.27	8	24 1/2	24%	24 1/4	2x4x7.16x0 2" Wt. 29 lb.
27	50.00	4.378	12.78	8 1/4	25 1/2	25%	25 1/4	2x4x7.16x0 2" Wt. 30 lb.
28	52.00	4.438	13.29	8 3/4	26 1/2	26%	26 1/4	2x4x7.16x0 2" Wt. 31 lb.
29	54.00	4.493	13.80	9	27 1/2	27%	27 1/4	2x4x7.16x0 2" Wt. 32 lb.
30	56.00	4.543	14.31	9 1/4	28 1/2	28%	28 1/4	2x4x7.16x0 2" Wt. 33 lb.
31	58.00	4.588	14.82	9 3/4	29 1/2	29%	29 1/4	2x4x7.16x0 2" Wt. 34 lb.
32	60.00	4.628	15.33	10	30 1/2	30%	30 1/4	2x4x7.16x0 2" Wt. 35 lb.
33	62.00	4.663	15.84	10 1/4	31 1/2	31%	31 1/4	2x4x7.16x0 2" Wt. 36 lb.
34	64.00	4.693	16.35	10 3/4	32 1/2	32%	32 1/4	2x4x7.16x0 2" Wt. 37 lb.
35	66.00	4.718	16.86	11	33 1/2	33%	33 1/4	2x4x7.16x0 2" Wt. 38 lb.
36	68.00	4.743	17.37	11 1/4	34 1/2	34%	34 1/4	2x4x7.16x0 2" Wt. 39 lb.
37	70.00	4.763	17.88	11 3/4	35 1/2	35%	35 1/4	2x4x7.16x0 2" Wt. 40 lb.
38	72.00	4.778	18.39	12	36 1/2	36%	36 1/4	2x4x7.16x0 2" Wt. 41 lb.
39	74.00	4.788	18.90	12 1/4	37 1/2	37%	37 1/4	2x4x7.16x0 2" Wt. 42 lb.
40	76.00	4.793	19.41	12 3/4	38 1/2	38%	38 1/4	2x4x7.16x0 2" Wt. 43 lb.
41	78.00	4.798	19.92	13	39 1/2	39%	39 1/4	2x4x7.16x0 2" Wt. 44 lb.
42	80.00	4.798	20.43	13 1/4	40 1/2	40%	40 1/4	2x4x7.16x0 2" Wt. 45 lb.
43	82.00	4.793	20.94	13 3/4	41 1/2	41%	41 1/4	2x4x7.16x0 2" Wt. 46 lb.
44	84.00	4.788	21.45	14	42 1/2	42%	42 1/4	2x4x7.16x0 2" Wt. 47 lb.
45	86.00	4.778	21.96	14 1/4	43 1/2	43%	43 1/4	2x4x7.16x0 2" Wt. 48 lb.
46	88.00	4.763	22.47	14 3/4	44 1/2	44%	44 1/4	2x4x7.16x0 2" Wt. 49 lb.
47	90.00	4.743	22.98	15	45 1/2	45%	45 1/4	2x4x7.16x0 2" Wt. 50 lb.
48	92.00	4.718	23.49	15 1/4	46 1/2	46%	46 1/4	2x4x7.16x0 2" Wt. 51 lb.
49	94.00	4.688	24.00	15 3/4	47 1/2	47%	47 1/4	2x4x7.16x0 2" Wt. 52 lb.
50	96.00	4.653	24.51	16	48 1/2	48%	48 1/4	2x4x7.16x0 2" Wt. 53 lb.
51	98.00	4.613	25.02	16 1/4	49 1/2	49%	49 1/4	2x4x7.16x0 2" Wt. 54 lb.
52	100.00	4.568	25.53	16 3/4	50 1/2	50%	50 1/4	2x4x7.16x0 2" Wt. 55 lb.

Useful Information

Weights of Various Substances per Cubic Foot

Names of Substances.	Average Weight, lbs.	Names of Substances.	Average Weight, lbs.
Anthracite, solid, of Pennsylvania.....	93	Limestones and Marbles.....	168
" broken, loose.....	54	" loose, in irregular fragments.....	96
" moderately shaken.....	58	Mahogany, Spanish, dry.....	53
" heaped bushel, loose.....	(80)	Honduras, dry.....	35
Ash, American white, dry.....	38	Maple, dry.....	49
Asphaltum.....	87	Marbles, see Limestones.....	
Brass (copper and zinc), cast.....	504	Masonry, of granite or limestone, well dressed.....	165
Brick, best pressed.....	524	" of mortar rubble.....	154
" common hard.....	150	" of dry rubble (well cabbled).....	138
" soft, inferior.....	125	" of sandstone, well dressed.....	144
Brickwork, pressed brick.....	140	Mercury, at 32° Fahrenheit.....	849
" ordinary.....	112	Mica.....	183
Cement, hydraulic, ground, loose, American, Rose- dale.....	56	Mortar, hardened.....	103
Cement, hydraulic, ground, loose, American, Louis ville.....	50	Mud, dry, close.....	80 to 110
Cement, hydraulic, ground, loose, English, Portland.....	90	" wet, fluid, maximum.....	120
Cherry, dry.....	42	Oak, live, dry.....	59
Chestnut, dry.....	41	" white, dry.....	52
Coal, bituminous, solid.....	84	" other kinds.....	32 to 45
" broken, loose.....	49	Petroleum.....	55
" heaped bushel, loose.....	(74)	Pine, white, dry.....	25
Coke, loose, of good coal.....	27	" yellow, Northern.....	45
" heaped bushel.....	(38)	" Southern.....	45
Copper, cast.....	542	Platinum.....	1,342
" rolled.....	548	Quartz, common, pure.....	165
Earth, common loam, dry, loose.....	76	Rosin.....	69
" moderately rammed.....	95	Salt, coarse, Syracuse, N. Y.....	45
" as a soft flowing mud.....	108	" Liverpool, fine, for table use.....	49
Ebony, dry.....	76	Sand, of pure quartz, dry, loose.....	90 to 106
Elm, dry.....	35	" well shaken.....	99 to 117
Flint.....	162	" perfectly wet.....	120 to 140
Glass, common window.....	157	Sandstones, fit for building.....	151
Gneiss, common.....	168	Shales, red or black.....	162
Gold, cast, pure, or 24 carat.....	1,204	Silver.....	655
" pure hammered.....	1,217	Slate.....	175
Granite.....	170	Snow, freshly fallen.....	5 to 12
Gravel, about the same as sand, which see.....		" moistened and compacted by rain.....	15 to 10
Hemlock, dry.....	25	Spruce, dry.....	25
Hickory, dry.....	53	Steel.....	490
Hornblende, black.....	203	Sulphur.....	125
Ice.....	63.7	Sycamore, dry.....	37
Iron, cast.....	485	Tar, cast.....	62
" wrought.....	480	Tin, cast.....	459
" average.....	480	Turf or Peat, dry, unpressed.....	20 to 30
Ivory.....	114	Walnut, black, dry.....	38
Lead.....	711	Water, pure rain or distilled, at 60° Fahrenheit.....	62½
Lignum Vitæ, dry.....	83	" sea.....	64
Lime quick, ground, loose, or in small lumps.....	53	Wax, bees.....	60.5
" thoroughly shaken.....	75	Zinc or Spelter.....	437
" per struck bushel.....	(66)		

Green timbers usually weigh from one-fifth to one-half more than dry.

Melting Point of Metals

Name.	Fahr.	Fahr.	Authority.
Platina.....	4,593		
Antimony.....	955	842	J. Lowthian Bell
Bismuth.....	487	507	
Tin (average).....	475		
Lead.....	622	620	"
Zinc.....	772	782	"
Cast Iron.....	2,010	1922-2012	White, Pouillet
Wrought Iron.....	2,910	2,192-2192	Gray, Welding Heat
Steel.....	2,370	2,733	
Copper (average).....	2,174	2,550	

General Rules for Determining the Weight of Any Piece of Wrought Iron

One cubic foot of wrought iron.....	= 480 lbs.
One square foot, one inch thick.....	= $\frac{480}{12}$ = 40 lbs.
One square inch, one foot long.....	= $\frac{480}{12 \times 12}$ = 3½ lbs.
One square inch, one yard long.....	= $\frac{480}{3 \times 12 \times 12}$ = 10 lbs.

Hence, the weight of any piece of wrought iron in pounds per yard is equal to 10 times its area in square inches

Example.—The area of a bar 3" x 1" = 3 square inches, and its weight is 30 lbs. per yard.

For round iron the weight per foot may be found by taking the diameter in quarter inches, squaring it, and dividing by 6

Example.—What is the weight of 2" round iron?
 $2'' = 8$ quarter inches. $8^2 = 64$.
 $\frac{64}{6} = 10\frac{2}{3}$ lbs per foot of 2" round.

Example.—What is the weight of ¾" round iron?
 $\frac{3}{4}'' = 3$ quarter inches. $3^2 = 9$.
 $\frac{9}{6} = 1\frac{1}{2}$ lbs. per foot of ¾" round.

INDEX

A	Page
Abernathy Wood Worker's Vises	139
Abrasive Wheels	242 to 248
Abrasives	239 to 244
Absorbers—Shock, Automobile	937
Acetylene—	
Decarbonizing Outfits	568
Lanterns	975
Regulators	568
Welding Outfits	567, 568
Acid Hose	485
Acme Threads	281
Adelite Varnish Remover	291
Adze Handles	356
Adzes—	
Railroad	322
Ship	322
Agitators, Kettle	561
Agricultural Wrenches	184
Agrippa—	
Knurling Tool Holders	157
Planing Tools	156
Special Cutters	156
Threading Tools	156
Tool Holders	155, 157
Air—	
Cocks	513
Compressed, Data on	1090, 1091
Couplings	485
Guns	783
Hoists	426
Hose	485
Pressure, Data	1090, 1091
Pressure Required for Hoist-	
ing Engines	1091
Pumps, Divers	794, 795
Pumps, Tire	783, 993
Pumps, "Midjet"	780
Receivers	791
Compressor Lubricators	509
Air Compressors—	
Brunner	781
Contractors' Portable Plant	789
Curtis	782
Divers' Air Pumps	794, 795
"Duplex"	789
Electric Driven	785
Electric Driven Units	782
Garage Set, Electric	785
Gardner Air Cooled	780
Gardner Horizontal	789
Gardner-Rix High Speed	784
"Gee-Gee"	780
Imperial Vertical	788
Ingersoll-Rand	788
"Midjet"	780
Portable Electric Garage Pumps	783
Portable Electric Units	782, 783
Portable Pneumatic Plants	782, 786, 787
"Savage"	780
Short Belt Driven	788
Water Separators for	791
Westinghouse Vertical	790
"Zin-Ho" Portable	786
Air Consumption of Rock Drills	1090
Air Drills—	
"Jackhammer"	858
"Little David"	857
"Little Giant"	855
Sergeant Rock	860
Sullivan Rock	861
Air Valves—	
Automatic Tire	935
Radiator	528
Regulators	534
Ajax Rope—	
Drive in Steel Mill	389
Manila	385 to 389
Manila Specifications	388
Prices	386
Alford Vises	143
Alligator	
Belt Lacing	479
Wrenches	176
Almond—	
Drill Chucks	152
Micrometers	77

A	Page
Almond—Cont'd	
Turret Head Tool	154
Aloxite—	
Cloth	239
Grains or Powder	244
Alternating Current Motors	884, 885
Altitude Gauge and Thermometer	528
Altitude Gauges	516
Aluminum—	
Checks	250
Enamel	932
Flux	236
Paint	930 to 986
Alundum Grains, or Powder	244
Alundum Wheels	242, 243
Amazon Tents	1035
Ambulance Stretchers	1057
Ambulances—For Automobiles	837
American Flash Light Batteries	972
American Gauge Testers	536
American Inspectors' Testing Outfits	536
American Test Pumps	536
American-Thompson Engine Indicator	536
American Water Meters	553
Ames Scoops	351
Ammeters—Battery	941
Anchor Bolts	282 to 285
Anchor Shackles	392
Anchors—	
Lead Drive	285
Screw	283
Anderson Gasoline Engines	889
Angle	
Bar Benders	847, 848
Iron, Weights of	1111
Milling Cutters	73
Angles—	
Brass	309
Bronze	309
Steel, Weights and Dimensions of	1111
Angular Bit Stock	214, 215
Anti-Fouling Paint and Compositions	986
Anti-Friction Bearing Bronze	308
Anti-Friction Metal	237
Anti-Rust Lacquer	983
Anvil Tools	360
Anvils—	
Bullock	359
Peter Wright	359
Vulcan	359
Apothecaries' Weights and Measures	1105
Aprons—	
Canvas, Mechanics'	1064
Rubber	1068
Arbor Presses	836
Arbors—	
Bench, Flexible Shaft	446
Drill Chuck	154
Milling Cutter	75
Pile Saw	683
Reamer	55
Shell End Mill	75
Arc Light Wire Rope	383
Arches—Boiler, Skeleton	903
Architects' Levels	117
Areas of Circles	1103
Armored Hose	486
Armstrongs—	
Boring Tools	161, 162
Cutting Off Tools	159
Drill Drift, Automatic	61
Drill Press Vises	148
Drill Ratchets	221, 222
Knurling Tools	165
Lathe Tools	160, 164
Machinists' Clamps	167
Pipe Tools	33
Planer Jacks	163
Planer Tools	160
Side Tools	159
Slotter Tools	162

A	Page
Armstrong—Cont'd	
Stocks and Dies, Adjustable	32
Threading Tools	160
Tool Holders	158 to 162
Tool Posts	158
Wrenches	167
Art Gum	119
Artesian Well Cylinders—	
Brass	753
Asbestos—	
And Magnesia Cement	1029
Cement	1028, 1029
Dry Paste	1029
Gaskets	500
Mill Board Weights, per foot	1029
Paper, Corrugated	1029
Paste	1029
Pipe Covering	1028
Rope Packing	503
Sheet Millboard	1029
Wicking	503
Ash Cans	1010 to 1012
Ashes—Elevators, Basement Hoists	698
Asphalt—	
Heaters	1023
Kettles, Roofers'	1023
Mattocks	354
Paint	982
Rakes	352
Roofing	1018, 1019
Shingles	1019
Atkins Hand Saws	195
Attachments—	
Drill Point Thinning	323
For Link Belting	460
Milling Machine	802
Auger Bit—	
Braces	214, 215
Files	139
Handles	212
Sets	211, 212
Auger Bits	211 to 213
Augers—	
Barrel	1017
Boring Machine	213
Bridge	213
Bung Hole	1017
Earth	747
Nut	213
Post Hole	353
Ship	212
Well	747
Automatic Drills	216
Automatic Lowering Jacks	323, 324
Automobile Accessories—	
Air Compressors, Garage	780 to 783
Air Valves	935
Aluminum Enamel	932
Aluminum Paint	930
Ambulance, Auto Towing	837
Battery Ammeters	941
Battery Syringe Hydrometers	940
Battery Voltmeters	941
Battery Voltmeters	941
Bearing Scrapers	238
Bodies, Commercial	949
Body Polish	930
Body Varnish	930
Brake Band Rivets	266
Brake Lining	951
Brass Lacquer	932
Brushes, Garage	995
Bumpers	946, 947
Calipers, Tire	941
Canvas Patches	928
Carbon Remover	930, 931
Carbon Scrapers	238
Carburetors	937
Castor Oil Compound	932
Celluloid Cleaner	931
Cement, Puncture	929
Chairs, Folding	954
Cleaner, Hand	931
Cooking Outfits	948
Covers, Radiator and Hood	954
Covers, Seat	953
Crank Case Oil Gauge, Ford	940
Creeper, Steel	950

INDEX—Continued

A		A		A	
Automobile Accessories—Cont'd		Automobile Accessories—Cont'd		Automobile Accessories—Cont'd	
Curtains, Window.....	944	Paint.....	930	Tow Lines.....	952
Demountable Rim Tool.....	181	Paint Colors.....	988	Towing, Truck.....	837
Demountable Rims.....	949	Patches, Blowout.....	921	Tread Filler.....	929
Dimmers, Headlight.....	944	Patches, Canvas.....	928	Tube Bags.....	922
Dry Batteries.....	940	Patches, Tire.....	928	Valve Bases, Tire.....	928
Duster, Auto.....	931	Patches, Top.....	944	Valve Grinding Compound.....	
Dutch Brand Products.....	929, 930	Patches, Tube.....	928		929 to 931
Elevators, Platform.....	695	Pipe Joint Compound.....	1006	Varnish.....	932 to 991
Enamel, Engine.....	932	Piston Rings.....	949	Varnish, Body.....	932
Enamel, Fender.....	932	Polish Body.....	1004	Vises.....	140
Engine Heaters.....	945	Polish, Metal.....	931	Vulcanizers.....	926 to 928
Engine Paint.....	930	Presses, Garage.....	837	Vulcanizing Cement, Tire.....	928
Fan Belts, Ford.....	951	Pump Connectors.....	935	Vulcanizing Gum.....	928
Fender Enamel.....	932	Pump Gauges.....	935	Washers.....	951
Fenders, Crown.....	948	Pump Tubing.....	935	Wheels, Wire.....	949
Filling Cans.....	1013	Pumps, Electric, Garage, Air.....	783	Wind Shield Cleaner.....	948
Fire Extinguishers.....	955	Pumps, Tire.....	783, 933	Windows, Curtain.....	944
Floating Flaps.....	921	Pumps, Tire, Running Board.....	934	Wire Wheels.....	949
Folding Chairs.....	954	Pumps, Tire, Spark Plug.....	934	Wrench Sets.....	171, 172
Ford Oil Gauge.....	940	Pumps, Tire, Stewart.....	934	Wrench Sets, Ford.....	180
Ford Timers.....	938	Pumps, Valveless Bucket.....	940	Wrenches.....	178
Freight Carriers, Ford.....	950	Puncture, Cement.....	929	Wrenches, Adjustable.....	183
Funnels, Gasoline.....	1014	Radiator Cement.....	932	Wrenches, Speed Nut.....	185
Garage Tents.....	1041	Radiator and Hood Covers.....	954		
Gasket Shellac.....	930 to 932	Radiator Ornaments.....	945	Automobile Reamers—Cyl-	
Gasoline Gauge for Fords.....	941	Radiator Seal Compound.....	930	inder.....	56
Gasoline Measures.....	1014	Radiator Shields.....	950	Automobile Screw Plates.....	18 to 20
Gasoline Tank Filler and Gauge.....	951	Repair Gums and Fabrics.....	928	Automobile Truck Scales.....	580
Gasoline Tanks.....	1011	Rim Tools.....	922	Avoldupols Weights—Table	
Gasoline Vacuum System.....	938	Running Board Mats.....	938	of.....	1105
Gauges, Gasoline.....	941	Scrapers, Carbon.....	238	Awls—Belt.....	481
Goggles.....	955	Screw Plates.....	18, 20	Awning Blocks.....	414, 1069
Graphite Lubricant.....	1006	Seat Covers.....	953	Awning Cleats.....	1072
Grease.....	1005	Shellac, Gasket.....	932	Awning Grommets, Brass.....	1072
Grease, Fibre.....	1005	Shock Absorbers.....	937	Awning Rings.....	1068
Grease in Tubes.....	1005	Side Lights.....	943	Awnings.....	1064
Grease Pump.....	940	Soap, Oil.....	931	Axe Handles.....	355
Grease Retainers.....	938	Spark Intensifier.....	924	Axes.....	210
Grinding Compound, Valve.....		Spark Plug Wrenches.....	181	Hunters.....	1069
	929 to 931	Spark Plugs.....	936	Scout's.....	1069
Gripwell Tires.....	918, 919	Spot Lights.....	942	Axe Grease.....	1007
Hand Cleaner.....	931	Spring Lubricants.....	931	Axe Shrinkers.....	372
Headlight Dimmers.....	944	Spring Oilers.....	925	Babbitt.....	
Heaters.....	954	Spring.....	925	Float Files.....	131
Heaters, for Engines and		Stabilizers, Ford Car.....	949	Ladies.....	563, 569
Radiators.....	945	Starter Compound, Engine.....	932	Metals.....	237
Heatometers.....	941	Steer Easiers for Ford Cars.....	948	Back Bearing Bars, Bolter.....	903
Horns and Warning Signals.....	945	Steering Wheels.....	924	Back Saws.....	195
Hose Bands.....	935	Step Plates.....	955	Backing Out Punches.....	316
Hose Connections.....	935	Storage Batteries.....	939, 940	Bag.....	
Hose Nipples.....	935	Tank Filler and Gauge, Gasoline.....	951	Baler, Cement.....	652
Hydrometer.....	940	Tape, Tire.....	921	Cleaner, Cement.....	652
Inner Tire "Interlock".....	921	Tents.....	1037, 1041	Fillers.....	964
Inner Tubes.....	920	Timers, Ford Car.....	938	Holder, Mosher.....	964
Jacks, Hovey.....	923	"Toline" Motor Oil.....	1004	Trucks.....	344
Jacks, Tire Saving.....	957	Tire Boots and Patches.....	921, 922	Baggage.....	
Lacquer, Brass.....	932	Tire Calipers.....	941	Barrows.....	345
Lamps.....	942, 943	Tire Chains, Weed.....	924	Wagons.....	345
Lenses, Prismolight.....	944	Tire Chain Repair Tool.....	230	Bags.....	
Lifting Jacks.....	957	Tire Changers.....	923	Bond.....	1061
Light Equalizer, Ford Car.....	948	Tire Covers.....	922	Campers' Food.....	1060
Lights, Head.....	943	Tire Flaps, Gripwell.....	921	Carry-All.....	1062
Lights, Side.....	943	Tire Fluid.....	929	Coal.....	1063, 1067
Lights, Spot.....	942	Tire Gauges.....	935	Duffle.....	1060
Lining, Brake.....	951	Tire Holders.....	925	Feed.....	1067
Liquid, Gloss.....	930	"Tire-It" Preservative.....	928	Gashtters'.....	1063
Lisk Funnels.....	1013, 1014	Tire Locks.....	925	Inner Tube.....	922
Locks, Manifold.....	940	Tire Mica.....	1004	Inter-Department.....	1061
Locks, Pad.....	940	Tire Powder.....	922	Mail.....	1061
Locks, Tire.....	940	Tire Preservative.....	932	Mailing, Parcel Post.....	1062
Lubricant, "Cook's".....	1005	Tire Racks.....	923	Tools, Linemen's.....	1062, 1063
Lubricant, Spring.....	931	Tire Reliners.....	921	Tools, Masons'.....	1062
Luncheon Cases.....	948	Tire Repair Fabric.....	928	Tools, Plumbers'.....	226, 1063
Mats, Running Board.....	938	Tire Repair Gum.....	929	Shell.....	1062
Measures, Gasoline.....	1014	Tire Shoes.....	921	Sleeping.....	1059
Metal Polish.....	931	Tire Talc.....	922	Balanced Handles—Drop	
Meters, Battery.....	941	Tire Tape.....	921	Forged.....	170
Mirrorscope.....	942	Tire Testers.....	922, 935	Balancing Tools.....	836
Misto Clean.....	930	Tire Tester Attachment.....	922	Balata.....	
Misto-Kloth.....	930	Tire Valve Bases.....	928	Belted.....	475
Mixing Valves.....	937	Tire Valves "Schroeder".....	935	Valves.....	502
Motor Meters.....	941	Tires.....	918 to 920	Bale Hooks.....	396
Oil Soap.....	941	Tires, Gripwell.....	918, 919	Balers.....	
Oilers, Pump.....	940	Tires, Inner Tube.....	921	Bag, Cement.....	652
Oilers, Spring.....	925	Tool Boxes.....	951	Paper.....	962
Oils.....	931 to 1003	Tool Kits.....	956	Ball Bearing.....	
Ornaments, Radiator.....	945	Top Coating.....	930	Collars.....	444
Overalls.....	955	Top Dressing.....	930 to 932	Hand Punches.....	841
Overhead Washer.....	951	Top Dye.....	932	Turn-Tables.....	608
Pails, Collapsible.....	1069	Top Patches.....	944	Ball Bearings.....	444
		Top Waterproofing.....	932	Ball Pen Hammers.....	207
				Ball Points—Starrett.....	114

INDEX—Continued

B	Page	B	Page	B	Page
Ball and Socket Bearings	440, 441	Beam—Cont'd		Belts—Cont'd	
Ballast Cars	605	Punches, Hydraulic, Portable.....	840	Grain Elevator, Speeds of.....	1095
Ballast Forks	352	Trammels.....	87	Tool.....	234
Balls—Fall Line Derrick	645	Scales, Recording.....	579	Window Washers.....	1068
Bally-Ho Curtains	1040	Bearing Bronze	308	Wire Transmission.....	382
Band Clutch Pulleys	454	Bearing Scrapers	238		
Band Lugs—Tank	292	Beams		Bench	
Band Saw		Ball.....	444	Arbors, Flexible Shaft.....	446
Blades.....	199	Ball Collar.....	444	Dusters.....	995
Clamps.....	199	Common, Flat Boxes, Bab- bitted.....	440	Drawers.....	255
Files.....	130	Four Point Adjustment.....	442, 443	Drills.....	219, 800
Solder, Silver.....	199	Hangers, Drop B. & S.....	440	Grinder-Lathe Attachments.....	815
Band Saws		Hyatt Roller, Adjustable.....	442	Grinders, Air Cooled.....	854
Metal, Tilting.....	829	Hyatt Roller Hangers, Post.....	442	Grinders, Channon.....	815
Wood, Belt Driven.....	878	Hyatt Roller, General.....	441	Grinders, Electric.....	852
Wood, Motor Driven.....	873	Pillow Blocks, Ball and Socket.....	440	Hooks.....	194
Bands		Pillow Blocks, Rigid.....	440	Lathes.....	814, 815
Hose.....	494, 935	Post Boxes, Rigid, Babbitted.....	440	Lathes, Amateur.....	815
Pile.....	681	Post Hangers, Ball and Socket.....	440	Legs.....	194
Pile Follower.....	681	Post Hangers, Four Point Adjustment.....	443	Levels, Starrett.....	109
Banjo Torches	978	Post Hangers, Extension.....	443	Planers, Wood Working.....	867
Bar		Radial.....	444	Screws.....	194
Benders.....	847, 848	Roller, Pile Driver.....	683	Shears.....	229
Cutters, Reinforcing.....	843	Solid Journal Boxes.....	440	Stamps.....	194
Screens.....	685			Tapping Machines.....	12
Shears.....	845			Benches	
Solder.....	237			Cabinet Makers'.....	193
Barbed Nails	298, 299			Conduit.....	142
"Bard" Adjustable Bushings	32			Manual Training Work.....	192, 193
Barometric Pressure at Dif- ferent Altitudes	1107	Beaver		Benders	
Barn Door		Pipe Die Stocks.....	25	Angle Reinforcing Bar.....	848
Fasteners.....	259 to 262	Pipe Threading Tool.....	25	Bar.....	847, 848
Hangers.....	259, 260, 262	Square End Pipe Cutters.....	27	Conduit.....	849
Rails.....	262	Beaverette Pipe Die Stocks	25	Eye.....	847
Stay Rollers.....	262	Bed		Pipe.....	849
Barn Paint	985	Rolls.....	1059	Rail.....	317
Barrel		Sheets, Stockmen's.....	1059	Time.....	372
Augers.....	1017	Beds		"Up".....	847
Hooks.....	396	Contractors' Bunks.....	1057	Bending	
Pumps.....	741	Cots, Double Deck.....	1057	Machines and Tools.....	847 to 849
Spray Pumps.....	745	Stretchers.....	1057	Pins, Steel.....	226
Trucks.....	344	Beetles, Calkers, Hawsing	1024	Springs.....	226
Barrels		Beil Centering Punches	228	Bends—Pipe, Return	549
Pump Working.....	754	Bells—Hand	538	"Berlin"	
Steel.....	255, 1011	Bells		Concrete Mixers.....	647, 648
Barrett		Church.....	518	Portable Wood Working Mills.....	874, 875
Files.....	132	Farm.....	518	Bessemer	
Jacks, Lifting.....	323, 324	Fire.....	518	Oil Engines, Horizontal.....	893
Barrows		Gong.....	517	Steel Rods, Copper Plated.....	303
Charging.....	341	School.....	518	Bethlehem Jacks	330
Baggage.....	345	Belt		Bevel Gear Milling Cutters 70 to 72	
Locomotive, Coaling.....	341	Awls.....	481	Bevel Gears	
Two-Wheel.....	341	Balata, Victor.....	475	Horse Powers of.....	459
Wheel.....	338 to 341	Canvas.....	476	Bevel Protractors	
Bars		Cement.....	476	Brown & Sharp.....	84
Boring, Portable Cylinder.....	835	Clamps.....	478	Starrett.....	101, 103
Boring, Valve Seat.....	835	Conveyor.....	475 to 477	Bevels	
Claw.....	315	Cotton.....	475 to 477	Starrett.....	203
Concrete Reinforcing.....	306	Couplers.....	480	Universal, Brown & Sharp.....	84
Crow.....	315, 320	Couplings, Round Leather.....	478	Bibb Cocks	529
Grate.....	902	Cutters.....	481	Bicycle Sundries	
Pry.....	250	Dressing.....	478	Lamps.....	960
Splice.....	312	Groovers.....	481	Pumps, Tire.....	933
Tamping.....	315, 320	Hooks.....	480	Puncture Cement.....	929
Track, Goose Neck.....	315	Horse Powers of.....	1096	Repair Gum, Tire.....	929
Track Lining.....	315	Lace Cutter.....	481	Rim Cement.....	929
Barth Jacks	325	Lacing, Bristol.....	479	Rubber Cement.....	929
Basement Hoists	698	Lacing Hooks.....	480	Tire Fluid.....	929
Bases		Lacing Machines.....	479	Tires.....	960
Boiler.....	902	Lacing, Rawhide.....	479	Wrenches.....	183
Valves, Auto Tire.....	928	Lacing Studs.....	480	Bicycles—Bullock	958, 959
Bass Fibre—Brooms	997	Lacing Tools.....	481	Bifurcated	
Bathroom Fixtures	769 to 772	Lacing Wire.....	478	Rivets.....	266
Bathubs—Enamel	769	Leather.....	474	Spouts, Grain.....	473
Batteries		Link.....	460 to 462	Bilge Pumps	
Automobile Storage.....	939	Link, Attachments for.....	460 to 462	Diaphragm Trench.....	735 to 738
Electric, Dry Cell.....	940	Markers.....	480	Spiral Riveted, Hand.....	706
Electric, Flashlight.....	972	Plates.....	480	Steam Jet.....	523
Electric, Storage.....	939, 940	Pliers.....	481	Bill Posters' Hammers	208
Stamp.....	687	Preservative.....	478	Bill Posters' Tacks	267
Battery		Punches.....	481	Billet Cars	602
Hydrometers.....	940	Rivets.....	267, 480	Bin Gates	
Meters.....	941	Rivets, Bifurcated Copper.....	480	Grain.....	473
"Bay State"		Round Leather.....	478	Ore.....	687
Die Stocks.....	22	Rubber.....	476	Sand and Gravel.....	676
Dies.....	13	Shears.....	481	Binder Hooks Chain	396
Screw Plates.....	16, 17	Splicing Tools.....	481	Binders	
Taps.....	5	"Stanley".....	477	Log.....	347
Beading Tools	558	Suds.....	480	Wall, Boiler.....	903
Beam		Tighteners, Flat Belt.....	452	Binks Electric Tire Pump	783
Clamps, Derrick.....	646	Belts		Bit Brace	
		Automobile Fan.....	951	Die Holders.....	22
		Conveyor, Capacities of.....	1097	Extensions.....	181

INDEX—Continued

B		Page	B		Page	B		Page
Bit Braces		214, 215	Blocks, Manila Rope—Cont'd			Boiler—Cont'd		
Bit Countersinks		215	Light Pattern	402		Patch Bolts	274	
Bit Holder—Extensions		215	Loading	410		Plugs, Fusible	514	
Bit Sets—Auger	211, 212		Lumberman's	410		Rivets	293	
Bit Stock—Angular	214		Producers', Snatch	405		Room Tools	322	
Bit Taper Reamers	60		Side Pulley	410		Taps	8	
Bits			Steel Shell	404, 405		Test Pumps	741	
Auger	211 to 213		Snatch, Wood	406		Wall Binders	903	
Auger, Car	212		Snatch, Steel	406		Boiler Makers'		
Auger, Well	747		Strengths of	401		Forges	368	
Expansive	212		Tackle	402		Punches	839, 840, 842	
Machine	212, 213		Wide Mortise	402, 403		Screw Plates	19	
Machine, Straight Shank	50		Wood Shell	402, 403		Boiler Tube		
Reamer	228		Working Load	401		Boading Tools	558	
Screw Driver	228		Wrecking	403, 405		Calking Tools	558	
Track	314		Blocks, Wire Rope			Cleaners	555, 556	
Blackmer Rotary Force Pumps	732		Coal Hoisting	407		Cutters	558	
Blacksmiths' Tools—			Extra Heavy	408		Expanders	557, 558	
Anvils	359		Ferry Travelers	409		Ferrules	546	
Axle Shrinkers	372		Heavy Pattern	407		Boiler Tubes	546	
Benders, Tire	372		Jackson, Snatch	409		Boilers—Farm	561	
Buffers	360		Loading	410		Roofers' Mastic	1023	
Chisels, Hot and Cold	360		Oil Well	405		Steel	561	
Complete Outfits	365, 366		Producers	405, 408		Boilers, Heating, Hot Water—		
Cones	362		R. R. Ballast	406		Chicago Heater and Garbage		
Cutters, Hot and Cold	360		Skidder	409		Burner	906	
Drills, Post	373 to 376		Snatching	406, 409		"Higrade"	911	
Drill Sockets	223		Team Snatch	406		Leader	909, 910	
Drills, Twist	48		Blow off Valves—Everlasting	529		Progress	905	
Flatters	360		Blow Out Patches	921, 922		Wilkes Heaters	905	
Forges and Blowers	368 to 371		Blow Pipes—Brazing	565		Boilers, Heating, Steam—		
Fullers	360		Blow Pipes—Brazing	565		Highgrade	911	
Hammers and Mauls	207, 363		Blow Torches	564, 568		Leader	909, 910, 913	
Hardies	360		Blowers and Exhausters—			Progress	909, 910	
Headings	360		Blacksmiths	367		Boilers, Heating, Steam and		
Mandrels	362		Blast Gates for	777		Hot Water	906, 909 to 912	
Pincers	361		Champion Blowers	779		Boilers—Power—		
Punches, Eye and Center	360		"Connerville" Positive Pres-			Hoisting	591	
Set Hammers	360		sure Blowers	773		Horizontal Tubular	899, 900	
Sledges	363		Fan (Volume) Blowers	778		Locomotive Fire Box	899	
Starrett's Rules	116		Flue	554		Portable Fire Box	899	
Sledge Blocks	362		Foot	565		Portable—Internal Furnace	900	
Swages	360		Hand, Forge Blowers	367		Vertical Tubular	898	
Tire Shrinkers	372		Noiseless Positive Pressure			Bolt—		
Toe Knives	360		Blowers	774		Cutters	34, 229	
Tongs	361		Planing Mill	776		Dies	14	
Tuyere Irons	362		Propeller Fans	777		Ends	279	
Twist Drills	48		Shafting Exhausters	775		Taps	8	
Upsetters and Welders	372		Steel Plate	776		Threads, Standards for	1093	
Vises, Solid Box	142		Steel Pressure Blowers	778		Tongs	361	
Blacksmiths' Supplies—			U. S. Positive Pressure			Bolts—		
Horse and Mule Shoes	364		Blowers	773		Anchor	282 to 285	
Horseshoe Nails	364		Vacuum Pumps, Rotary	774		Boiler	279	
Toe Calks	364		Variable Speed Blowers	779		Carriage	274	
Welding Compounds	361		Blue Lacquer	983		Coupling	274	
Blades—			Board Measures	1109		Chain	262	
Cabinet Scraper	200		Board Measure Table	1105		Cross Arm	281	
Floor Scraper	200		Board, Mill—Asbestos Sheet	1029		Door, Thumb	262	
Hack Saw	189, 190		Board Rules	123		Double Eye	281	
Jewelers' Saw	196		Boards—Drawing	120		Drift	280	
Scroll Saw	877		Boat Cleats	392		Elevator	277	
Blake Rock Crusher	684		Boat Sump Hooks	392		Eye	400	
Blakeslee Steam Jet Bilge			Boat Spikes	297		Expansion	283, 284	
Pumps	523		Bobs, Plumb	206		Expansion Shield	283, 284	
Blankets—			Mercury, B. & S.	89		Foot	281	
Horse	1066		Mercury, Starrett	110		Hook	281	
Campers'	1059		Body Filler	958		Machine	275, 276	
Blast Gates—Champion	777		Body Polish—Automobiles	930		Machine, Contents of Pack-		
Blast Outfits—Sand	792		"Boggle" Rollers	347		ages	275	
Blasting Supplies	333, 334		Boiler—			Machine, Weights of	275	
Blind Set Screws	201		Arches, "Skeleton"	903		Paine Toggle	283	
Block Planes	237		Back Angle Bars	903		Planer Head	274	
Block Tin			Back Bearing Bars	903		Plow	277	
Blocks—			Bases	902		Ring	400	
Awning	414, 1069		Bolts	279		Special	281	
Caisson	660		Cleaner, "Metla-Cota"	1007		Step	279	
Chain Hoist	415 to 426		Cleaning Compound	1007		Stove	278	
Deck	414		Dead Plates	901		Strengths of	1103	
Eye	410		Drill Ratchets	221		Stud	274	
Drill and Clamps, B. & S.	85		Feedpumps, Automatic Electric	730		Tire	278	
Drill and Clamps, Starrett	106		Feed Pumps	708, 710, 711, 742		Toggle	278	
Leveling	362		Front Angle Plates	901		Track	311	
Swage	362		Fronts	901		"U"	281	
Blocks, Manila Rope	401		Gauges, Heating	528		Books—Mechanical	76	
Bullock Extra Heavy	403		Graphite	1008		Boom—		
Cargo Hoisters	409		Grate Bars	902, 903		Bands, Derrick	641	
Chicago Steel	404		Grates, Rocking, Shaking and			Knds, Derrick	641	
Gin Blocks	409		Dumping	904		Fittings, Derrick	682	
Halyard	414		Liner Plates	901		Plates, Derrick	638	
Hay Fork	410		Lugs	902		Points, Derrick	644	
Hot House	410		Man Hole Collars, Plates			Seats, Derrick	637	
Ice Gin	409		and Crabs	902		Swinging Gear, Reversing	594	
Iron Strapped	402		Parts	901 to 904		Swinging Engine, "Mundy"	596	

INDEX—Continued

B	Page
Boom—Cont'd	
Swinging Engine, "Duke".....	598
Shafts, Derrick.....	643
Boot Protectors	353
Boots—	
Elevator.....	470
Rubber.....	1052
Tire.....	921, 922
Bond Bags	1061
Borax	237
Boraxette Welding Compound	361
Borers—	
Sill.....	215
Tap.....	226
Boring Attachment for Foot Power Saw	879
Boring Bars—	
Cylinder, Portable.....	835
Valve Seat, Portable.....	835
Boring Machines—	
(See also Tools Machine)	
Auger.....	213
Joist.....	213, 215
Millers Falls.....	213
Wood, Pneumatic.....	855
Boring Tools—	
(See also Augers, Drills, Etc.)	
Automatic.....	216
Holders for Agrippa.....	155
Joist.....	213, 215
Lathe.....	161, 162
Lathe with Clamp Rest.....	161
Three Bar.....	161
Boss Improved Power Hammer	833
Bottoms—Bin	473
Bottom	
Draw Melting Furnaces.....	569
Pour Ladles.....	569
Bought	
Asphalt Roofing.....	1018
Building Paper.....	1020
Deadening Felt.....	1020
Oils and Greases.....	1001 to 1007
Paints.....	980 to 985
Roof Coating.....	1020
Box—	
Hooks.....	250
Nails.....	296, 298
Lining, Screw Conveyor.....	472
Trucks.....	347
Wrenches, Hex.....	174
Boxes—	
Post.....	440
Take Up.....	470
Taper, Shop.....	255
Tool, Automobile.....	951
Tool, Steel.....	226, 254, 255
Tool, Wood.....	254
Tote.....	255
Wagon, Dump.....	336
Boxwood Rules	121
Box Scout—	
Axes.....	1069
Tents.....	1036
Tool Kits.....	1069
Brace—	
Bit, Die Holders.....	22
Wrenches.....	179
Braces—	
Auger Bit.....	214, 215
Corner Bit.....	215
Drill.....	215
Ratchet.....	214, 215
Trench.....	332
Brackets—	
Crow Bar.....	358
Fire Axe.....	358
Flag Staff.....	1065
Hose Pipe.....	358
Trolley Parallel Door.....	260
Wall, Bearing.....	443
Underwriters' Fire Tool.....	358
Brads—	
Common.....	298
Fluorine.....	298
Wire.....	300
Brake Band—Slotted Rivets	266
Brake Lining—Automobile	951
Branch Tees	549
Brands—Burning	251

B	Page
Brass—	
Angles.....	309
Channels.....	309
Pipe.....	310
Rods.....	308
Screen Cloth.....	965
Sheet.....	309
Sheets, Weights of.....	1109
Tubing.....	310
Wire.....	302
Brattice Cloth—Old Canvas	1050
Brazing—	
Blow Pipes.....	565
Compound.....	237
Forges.....	564
Flux.....	237
Outfits, Saw.....	199
Oxy-Acetylene Outfits.....	567, 568
Spelter.....	237
Breaker Fabric—Automobile	928
Breakers—Rock	684
Breast Drills—	
Hand Power.....	217, 218
Electric.....	850
Brick—	
Chisels.....	227
Clamps.....	358
Coating, Paint.....	981
Hods.....	358
Rubbing.....	244
Shovels.....	349, 351
Trowels.....	206
Bricklayers'—	
Hammers.....	208
Trowels.....	206
Brick Masons' Hoisting Engines	655
Bridge—	
Augers.....	213
Cranes.....	435, 436, 437
Jacks, Norton.....	329
Jacks, "Postop".....	328
Reamers, Taper.....	59
Rods.....	280
Rod Turnbuckles.....	399
Tools.....	182, 316
Wrenches.....	182
"Bristol" Belt Lacing	479
Broaches or 5-Sided Reamers	55
Bronze Bushings	412
Bronzing Brushes—Radiator	993
Brooms	
Bass Fibre.....	997
Frog.....	997
House.....	997
Mill.....	997
Push.....	997
Rattan.....	997
Snow.....	997
Switch.....	997
Wire.....	997
Warehouse.....	997
Bronze—	
Angles.....	309
Bearing.....	308
Channels.....	309
Commercial.....	309
Powders.....	986
Rods.....	308
Sheet.....	309
Tubing.....	310
Bronzing Liquid	986
Bronzite Paint	986
Brown Chain	397
Brown & Sharp Tools—	
Bevels, Universal.....	84
Caliper Gauges, "Rolling Mill".....	96
Caliper Gauges, Wire.....	96
Caliper Rules, Slide.....	93, 95
Caliper Sets, Micrometer.....	80
Caliper Squares.....	92
Calipers, Firm Joint.....	88
Calipers, "Hermaphrodite".....	87
Calipers, Key Hole.....	88
Calipers, Micrometer.....	78 to 81
Calipers, Spring.....	88
Calipers, Standard Gauge.....	89, 90
Calipers, Vernier.....	82
Centre Punches.....	89
Centre Squares, Universal.....	92
Clamps, "V" Blocks.....	85
Clamps, Toolmakers'.....	85
Gauges, Centre.....	96, 97

B	Page
Brown & Sharp Tools—Cont'd	
Gauges, Depth.....	83
Gauges, Gear Tooth.....	82, 96
Gauges, Height.....	81, 83
Gauges, Inside Micrometer.....	81
Gauges, Music Wire.....	97, 98
Gauges, Screw and Wire, Long.....	98
Gauges, Screw and Wire, Pocket.....	96
Gauges, Screw Thread, Tool.....	98
Gauges, Surface.....	97
Gauges, Thickness.....	86, 97
Gauges, Twist Drill.....	98
Gauges, Vernier.....	83
Gauges, Wire.....	96, 97
Indicators, Centre.....	87
Indicators, Dial Test.....	85
Indicators, Lathe Test.....	87
Indicators, Speed.....	87
Micrometer Cases, Leather.....	81
Micrometer Calipers and Gauges.....	77 to 96
Micrometer Heads.....	81
Micrometers, Instructions for Reading.....	81
Measuring Rods, End.....	87
Paper Gauges, Micrometer.....	80
Protractors, Bevel.....	84, 91
Protractors, Draughtman's.....	89
Plumb Bobs, Mercury.....	89
Reference Disks.....	87
Rules, Steel.....	94, 95
Scales, Draughtman's.....	93
Screw Pitch Gauges.....	86
Scribers.....	89
Squares.....	91 to 93
Squares, Combination.....	91
Straight Edges.....	93
Thread Gauge, Vernier.....	82
Trammels.....	87
"V" Blocks.....	85
Vernier Calipers and Gauges.....	82, 83
Vises.....	85, 149
Brownhoist Trolleys	428
Brush Holders	1025
Brushes—	
Automobile Wash.....	993
Bench Dusters.....	995
Calimine.....	993
Capital Factory.....	995
Car Wash.....	994
Casting.....	996
Cuspidor.....	994, 1025
Fibre, Floor.....	995
File Cleaning.....	135
Floor.....	995, 1025
Furniture.....	554
Furniture Rubbing.....	994
Garage.....	995
Glue.....	994
Hand.....	994
Hand, Janitors.....	1025
Lavatory.....	994, 1025
Marking.....	993
Moulders, Dusting.....	995
Paint.....	992
Radiator Bronzing.....	993
Roofing.....	994, 1020
Sash.....	993
Scratch.....	996
Scrub, Fibre.....	994, 1026
Scrub, Wire.....	996
Ship Seam.....	994
Soldering.....	236
Stencil.....	993
Stucco, Wall.....	992
Varnish.....	992
Whitewash.....	993
Window Washing.....	994, 1026
Wire.....	996
Brunner Air Compressors	781
Buck Scrapers—Contractors'	
Dirt.....	337
Bucket Elevators—Capacities	1097
Bucket Hooks—Caisson	660
Buckets—	
Bottom Dump.....	658
Caisson.....	660
Clam Shell.....	663, 664
Concrete, Hoist.....	651
Contractors' Dumping.....	657
Controllable, Concrete.....	658

INDEX—Continued

B		Page	B		Page	C		Page
Buckets—Cont'd			Burr—			Calking—Cont'd		
Derrick, Skip	659		Hand Key Seater	438, 804		Ladders, Roofers'	1023	
Drag Line	665, 674		Portable Key Seater	803		Mallets	1024	
Excavating	661, 665		Burring Reamers	61		Oakum	1024	
Fibre Pails	1016		Burrs—			Pitch	1024	
Fire	1016		Copper	267		Tools	558, 1023, 1024	
Galvanized Pails	1015, 1016		Swedes Iron	267		Calks—Toe	364	
Grab	663, 664		Bushings—			Cameron Steam Pumps—		
Coal, Hoisting	657		Derrick Sheave	621		Boiler Feed	708	
Concrete Hoist	651		Hose	493		Mine Sinking	708	
Contractors'	657		Pipe	550		Regular Pattern	707, 709	
Drag Line	665		Self-Lubricating	412		Removable Bushing Pattern	709	
Excavator	661 to 665		Sheave, Graphited Bronze	412		Camp Beds and Cots	1056	
Fire, Sanitary	1016		Busters, Rivet—			Camp—		
Elevator, Capacities of	465 to 469		Pneumatic	856		Chairs	1056, 1058	
Elevator, for Coal	467, 469		Sledge	316		Cook-Kits	1054	
Elevator, Continuous Steel	467		Butt—			Furniture	1056, 1058	
Elevator, Ear Corn, Heavy	466		Chisels	205		Stools	1058	
Elevator, Galvanized	466		Hinges	258		Campers'—		
Elevator, Malleable Iron	467		Buttons—Tool Makers', Star-			Bed Rolls	1059	
Elevator, Riveted, Grain	466		rett	107		Blankets	1059	
Elevator, Salem Steel	465		C			Bunks	1057	
Elevator, Sterling Riveted	466		"C" Clamps—Williams	168		Carbide Lamps	975	
Elevator, Stone and Ore	467 to 469		Cabinet—			Cook Stoves	1053, 1054	
Elevator, Tin Mill	466		Rasps	131		Packs and Bags	1060	
Locomotive, Coaling	657		Scrapers	200		Tents	1031 to 1049	
Mining	658		Cabinet Makers'—			Can Hooks	396	
Orange-Peel	661, 662		Benches	193		Candle Wicking	503	
Ore Hoisting	656		Clamps	169		Candles—Paraffine Wax	1024	
Ore, Clam Shell	664		Cabinets			Canoe—		
Self Dumping and Righting	657		First Aid	249		Engines, Evenrude, Gasoline	890	
Skips, Extra Heavy Stone	659		Lathe Tool	163		Paddles	1055	
Turn-over	656		Cable Chain—			Tents	1037	
Union Lock, Automatic	658		Fixtures	398		Canopies—Tent	1044	
Water	656		Cable Chains	398		Cans—		
Wooden	1016		Cable—			Ash	1010, 1011, 1012	
Buckeye Die Stocks	28		Ballast Unloader	382		Dope Pails	1012	
Buckeye—			Grease	1008		Filling, Auto	1014	
Kerosene and Carbide Lights	977		Lubricant	383		Garbage	1012	
Sand Blast	792		Reels	235		Gasoline	1013, 1014	
Buda—			Reel Jacks	235		Oil	1012, 1014	
Jacks	328		Sheath Splitting Knives	235		Oil, Non-Explosive	1012	
Heating Stoves	559		Stripper Knives	235		Oil, Wood Jacket	1011	
Builders'—			Wire Rope	377 to 383		Roofers', Pouring	1023	
Derricks, Steel	634		Cableman's Saws	235		Tallow Pots, Oval	1012	
Derricks, Wood	618, 619		Caboose Stoves	559		Waste, Clean	1011	
Hoists, Reversible Elevator	655		Calcimine Brushes	993		Waste, Oily	1010	
Levels	117		Cages—			Cant—		
Transits	117		Contractors', Elevator	653, 654		Hooks	321	
Building Paper	1020		Mine	602		Saw Files	130	
Buffalo Forges	371		Calisson—			Canvas—		
Buffers—			Blocks	660		Aprons, Mechanics'	1064	
Aerial	853		Buckets	660		Belt	476	
Beach, Electric	852		Bucket Hooks	660		Buffing Wheels	1050	
Blacksmith	360		Equipment, Hoisting	660		Cots	1056	
And Grinder	853		Rings	660		Duck	1070, 1071	
Buffing Wheels	1050		Rope	660		Oil, Brattice Cloth	1050	
Buggy—			Winch Heads	660		Pails, Collapsible	1069	
Elevators	695		Caldron Kettles	561		Patches, Auto	928	
Ladders	571		Calliper—			Paulins	1051	
Bulb Guards—Electric	973		Gauges, Wire	96		Wheels	1050	
Bulbs, Electric	972, 973		Gauges, B. & S.	89, 90, 96		Cap—		
Flash Light	972		Gauges, English Measure	89		Lamps, Miners'	975, 976	
Bull Dog—			Gauges, Rolling Mill, B. & S.	96		Lamps, Supplies for	976	
Die Stocks	26		Gauges, Starrett	101		Nuts	289	
Screw Plates	18		Rules, B. & S.	93		Roofing, Steel	1021	
Wrenches	176		Slide Rules, B. & S.	95		* Screw Wrenches	173, 174	
Bull Wheels—Derrick	635		Squares, B. & S.	92		Cap Screws—"Allen" Hollow	272	
Bulldozer—			Squares, Starrett	102		Screws, Fillister Head	270	
Pumps, for Pneumatic Wa-			Callipers—			Screws, Flat Head	270	
ter Systems	763		Automobile Tire	941		Screws, Hex Head	269	
Power Pumps	715		B. & S.	87, 88		Screws, Socket Head	272	
Bullock—			Fay	112		Capacities of—		
Anvils	359		Gear Tooth	82		Belt Conveyors	1097	
Bicycles	958, 959		Micrometer, B. & S.	79, 81, 87		Bucket Elevators	1097	
Double Acting Tank Pumps	743		Micrometer, Slocumb	77		Elevator Buckets	465 to 469	
Dredge Chain	392		Paper Gauge	80		Pumps	1086	
Heating Stoves	559		Pocket Slide, Starrett	102		Tanks and Cisterns	1087	
Hose	482		Starrett	102, 111, to 113		Capping—Roof, Corrugated	1022	
Rotary Force Pumps	733		Slide Rules, Starrett	102		Caps—		
Sling Chains	394		Thread	82		Blasting	334	
Wire Hoisting Rope	378		Vernier, B. & S.	82		Guy Derrick	639	
Bumpers—Automobile	946, 947		Vernier, Starrett	102		Hose	493	
Burks—			Yankee	111, 112		Pile Driver	681	
Campers'	1057		Calking—			Pipe	550	
Contractors'	1057		Chisels	226		Roofing	1020	
Burner Tiles	572		Cotton	1024		Capstans—		
Burners—			Furnaces, Roofers'	1023		Hand Power	611	
Garbage	906		Hammers, Pneumatic	856, 857		House Mover	699	
Kerosene	566		Irons	1024		Steam	611	
Oil	572					Stump Pulling	701, 702	
Burning Brands	251							

INDEX—Continued

C	Page	C	Page	C	Page
Car—		Ceiling—Cont'd		Chains—Cont'd	
Bits.....	212	Steel.....	1022	Hcdell Flat Link.....	398
Box Jacks.....	325	Cellar Box Cutters		Light, Twisted.....	398
Jack.....	324, 328	Celluloid Cleaner	931	Link Belting.....	460
Loading Spouts.....	413	Cement		Log Binding.....	394
Movers.....	378	Coated Nails.....	296	Machine.....	397
Oil Cans.....	1012	Coating Paint.....	981	Malleable and Steel Combin-	
Puller Sheaves.....	703	Floor Coating.....	991	ation.....	462
Pullers.....	703	Insulating.....	1029	Pintle.....	461
Pullers, Mundy Electric.....	594	Pails, Galvanized.....	1015	Plumbers.....	397
Replacers.....	317	Cementless Tire Patches	928	Roller.....	461
Screens.....	343	Cements—Directions for Ap-		Safety.....	397
Unloaders, Clark Shovel.....	704	plying.....	1029	Sash.....	397
Washer Brushes.....	994	Asbestos.....	1028, 1029	Sling.....	394
Wheels, Roller Bearing.....	607	Asbestos and Magnesia.....	1029	Small Riveted.....	398
Wrenches.....	177	Belt.....	478	Small Sizes.....	397, 398
Carbide—		Bicycle Rim.....	929	Standard Coil, Straight Link.....	393
For Lamps.....	976	Bicycle Rubber.....	929	Steel Roller, E. C. Class.....	461
Lamps.....	976	Pipe, Graphite.....	1008	Switch or Wrecking.....	394
Lamps, Miners' and Campers.....	975	Puncture.....	929	Tire, Wood.....	924
Light, Buckeye.....	977	Radiator.....	932	Trace, Repair Links.....	396
Carbo-Cide	930	Roofing.....	1020	"Triumph".....	397
Carbon—		Tire Vulcanizing.....	928	Twist Link.....	393
Remover.....	930, 931	Center—		Wire.....	397
Scrapers.....	238	Gauge Attachments.....	116	Chairs—	
Carburetor Tubing	486	Gauges, B. & S.....	97	Automobile Folding.....	954
Carburetors—		Gauges, Starrett.....	116	Camp.....	1058
Rayfield.....	937	Grinders, Electric.....	852	Folding, Lawn.....	1058
Sunderman.....	937	Keys or Drifts.....	61	Folding, Wood.....	1058
Carborundum—		Punches.....	227	Porch.....	1056, 1058
Grains.....	244	Punches, Blacksmiths.....	360	Challenge Ore Feeders	686
Wheels.....	243	Punches, B. & S.....	114	Chalk—	
Cards—For Cleaning Files	135	Punches, Starrett.....	92	Carpenters.....	238
Cargo Hoisters	409, 660	Squares, B. & S.....	107	Crayons.....	238
Carpenters—		Tester, Starrett.....	722 to 730	Lump.....	238
Chalk.....	238	Centrifugal Pumps	722 to 730	Railroad.....	238
Tool Chests and Kits.....	254	Directions for Setting Up and		School.....	238
Carriage—		Operating.....	729	Champion	
Bolts.....	277	Electric.....	724, 730	Blowers.....	779
Clamps.....	169	Evenrude Pumping Unit.....	727	Expanding Lathe Mandrels.....	58
Elevators.....	695	Gasoline Driven.....	725	Lathe Tool Holders.....	157
Carriage Makers' Wrenches	174	Mine Sinker.....	730	Post Drills.....	374, 375
Carriers—		"Pump" Portable Unit.....	677	Precision Drag Saws.....	865
Board Freight.....	950	Sand Dredge.....	723	Variable Speed Blowers.....	779
1 Beam Trolley.....	427	Sand and Gravel.....	730	X Spark Plugs.....	936
Stove.....	345	Sewage Ejectors.....	723	Changers Skins	989
Timber.....	321	Single Stage.....	724	Changers—Tire	923
Trolley.....	428 to 431	Special.....	725	Channels—Steel, Weights and	
Carry-All Bags	1061	Steam.....	725	Dimensions of.....	1112
Carrying Pails—Roofers	1023	"Vertical".....	725, 726, 727, 730	Channels—	
Cars—		"Zin-Ho" Outfit.....	728	Brass.....	309
Automatic, Ore, Dump.....	604	Chain—		Bronze.....	309
Ballast.....	605	Belting.....	460, 462	Steel, Weights and Dimen-	
Billet.....	602	Belting, Detachable.....	460	sions of.....	1112
Coal Mine.....	603	Belting, Malleable and.....	462	Charging Barrows	341
Dump.....	603 to 608	Steel, Combination.....	462	Chaser Taps	6
End Dump.....	603	Blocks, Chain Hoist.....	415 to 426	Check Valves	524 to 526
Ingot.....	602	Bolts.....	262	Checks—	
Ore.....	604	Cold Shuts.....	396	Aluminum.....	250
Quarry.....	603	Couplings, Links.....	396	Blank.....	250
Rail.....	610	Drills.....	215	Brass.....	250
Railroad, Hand.....	610	Fixtures, Cable and Sash.....	398	Key.....	250
Railroad, Inspection.....	609	Hoists (see "Hoists").....	415 to 426	Time.....	250
Railroad, Push.....	610	Hooks.....	395	Tool.....	250
Railroad, Track Laying.....	611	Hooks, for Sash Chain.....	398	Chemical—	
Railroad, Velocipede.....	609	Locks, Tire.....	925	Engine Hose.....	488
Rocker Dump.....	604	Pipe Wrenches.....	186, 187	Engines.....	498
Skip, Ore.....	605	Repair Links.....	395, 396	Fire Extinguishers.....	497
Two-Way, Dump.....	605	Shackle Hooks.....	395	Chests—Tool	226, 254
Carts—		Sling Fittings.....	394	Chicago—	
And Trucks.....	344 to 347	Slings.....	395, 396	Ejectors.....	523
Concrete.....	341	Split Links.....	395	Flange Blocks.....	404
Dump.....	336	Swivels.....	394	Tilting Steam Traps.....	538
Hand.....	347	Take-Ups.....	470	Water Heaters.....	906
Hose.....	496	Tighteners, Sprocket.....	470	Wire Grips.....	234
Case Hardened Nuts	283	Tire Repair Tool.....	230	Chime Whistles	517
Cases—Expansion See Ex-		Chain Wheels—		Clipping Hammers—Pneu-	
pansion Shields.....	282, 283, 284	Block, Cutters for Teeth.....	74	matic.....	856, 857
Casing Nails—Wire	298	Roller Cutters for Teeth.....	74	Chisel—	
Casings—Wall	546	Sprocket.....	463, 464	Cold, Sets.....	227
Cast Iron Washers	291	Chains		Mortiser, Hollow Tool.....	877
Castellated Nuts	288	A. A. Drill.....	397	Mortiser, Plain.....	867
Casters—Truck	348	B. B. B. and B. B. Coil.....	393	Chisels	
Casting Brushes	996	Brass and Iron Jack.....	398	All Steel, Wood.....	205
Castings—		Brown's, Wire.....	397	Brick.....	227
Shrinkage of.....	1105	Bullock, Straight Link Coil.....	393	Calking.....	226
Weights Figured from Patterns.....	1109	Cable.....	398	Cold.....	227
Castor Oil	1092	Coil.....	393, 397	Cold, Blacksmith.....	360
Castor Oil Compound	932	Common.....	393	Gasket.....	226
Catchers—Grass	971	Derrick.....	639	Hollow, Mortising, with Bit.....	877
Ceiling—		Double Jointed.....	398	Hot.....	360
Nipples, Pipe.....	338	Dredge.....	393	Mortising, Machine, Plain.....	877
Plates.....	527, 528	Flat Link.....	398	Plumbers.....	226

INDEX—Continued

C	Page	C	Page	C	Page
Chisels—Cont'd		Clamps—Cont'd		Coal—Cont'd	
Round Nose.....	227	Strap.....	168, 170	Picks.....	354
Socket Butt.....	205	Toolmakers.....	85	Shovels.....	351
Socket Framing.....	205	Toolmakers', Starrett.....	106	Tar.....	1024
Socket Firmer.....	205	Universal, for Grinding Ma-		Wedges.....	363
Socket Slicks.....	205	chines.....	824	Yard Screens.....	343
Track.....	315	Wire, "Haven's".....	234	Yard Scrapers, Power.....	704
Turning.....	205	Wire Rope.....	384		
Yarning.....	226			Coaling—	
Chuck—		Clark Shovels—		Barrows.....	341
Arbors.....	154	Automatic.....	704	Buckets, Locomotive.....	657
Jaws, Skinner Reversible		Repairs for.....	705	Coated Nails—Cement.	296
Face Plate.....	148			Coating—	
Chucking Reamers	54, 60	Classifications—Freight, L.		Brick.....	981
Chucks		C. L.....	1074, 1075	Cement.....	981
Almond Turret Head Tool.....	154	Classification Standards—		Cement Floor.....	991
Drill.....	152, 153, 154	Iron and Steel.....	304, 305	Roof.....	1020
Drill, Almond.....	152	Classifiers—Hydraulic Ore.	690		
Drill, Horton-Morrow.....	152	Claw Bars—Rail Road.	315	Cocks—	
Drill, Jacobs.....	152	Clay Picks.	354	Air.....	513
Drill, Little Giant.....	153	Cleaners—		Bibb.....	529
Drill, National.....	153	Auto Windshield.....	948	Cylinder.....	513
Drill, Positive Drive.....	153	Boiler.....	1007	Gauge.....	513
Drill, Skinner.....	152, 153	Boiler Tube.....	555, 556	Steam, Asbestos Packed.....	529
Drill, Standard.....	153	Celluloid.....	931	Steam, Miscellaneous.....	529
Drill, Star.....	154	Cement Bag.....	652	Weights of.....	1092
Drill, Weaver.....	154	Flue.....	554	Coe's Wrenches.	185
Independent Lathe.....	144, 145	Hand.....	931	Coll Chains.	393, 397
Lathe, Geared Scroll.....	144 to 147	Sidewalk.....	353	Coupling, Links.....	395, 396
Lathe, 2-Jaw Round and		Wall Paper.....	989	Coupling.....	394
Box Body.....	147	Window.....	994, 1026	Standard.....	393
Lathe, Universal.....	145	Clem Metal Band Saw	829	Switch or Wrecking.....	394
Lathe, Westcott.....	146	Clear-O-Scope Wind Shield		Twisted.....	393
Magic.....	151	Cleaner.....	948	Colling Machines—Helix	848
Skinner Planer.....	148	Cleats—		Coke—	
Tapping.....	12	Awning.....	1068	Forks.....	352
Wizard.....	150	Mast.....	644	Shovels.....	351
Church Bells	518	Climax Welding Compound.	361	Cold Chisels	227
Chutes—Concrete.	651	Climbers—		Blacksmith.....	360
Chutes—Coal Wagon (see		Lineman's.....	234	Brick.....	227
Discount Sheet).		Straps for Lineman's.....	234	Cape.....	227
Chutes—Sand and Gravel.	676	Clinker Hooks.	322	Diamond Point.....	227
Cincinnati Electric Grind-		Clippers—			
ers and Buffers.	853, 854	Bolt.....	229	Cutters.....	316
Circles—Areas and Circum-		Grass.....	969	Cutters, Blacksmiths.....	360
ferences of.	1103	Rivet.....	229	Rolled Shifting.....	438
Circular Measure—Table of.	1105	Clips—Wire Rope.	384	Saws, Metal, Circular.....	830, 834
Circular and Scroll Saws—		Clocks—		Shuts, Chain.....	396
Foot Power.....	879	Engine Room.....	540	Cold Water Paint.	981
Circular Saw—		Watchmen's, Portable.....	963	Collapsible Falls.	1060
Blades, Metal.....	66	Closets—Water, Enamel.	772	Collar Ball Bearings.	449
Blades, Wood.....	198	Cloth—		Collars—	
Sharpeners.....	866	Axide.....	239	Manhole, Boiler.....	902
Circular Saws—		Buffing Wheels.....	1050	Nail.....	296
Foot Power.....	879	Canvas.....	1070, 1071	Safety Set, Split and Solid.....	439
Hand Rip.....	880	Emery.....	239, 988	Collectors—Dust.	777
Metal.....	880, 831	Insertion Gaskets.....	500	Collet Blanks.	75
Speeds of.....	1102	Insertion Tubing.....	488	Collets	
Wood.....	863, 871 to 878	Wheels.....	1050	For Milling and Gear Cut-	
Wood, Electric Driven.....	873	Clothes Hangers—Union Sanitary	961	ting Machinery.....	74, 75
Circulating Pumps—Rotary		Clothing—		Wizard.....	150
Geared.....	734	Diving.....	796, 797, 798	Magic.....	151
Circumference Gauges—Sta-		Oiled.....	1052	Colors—	
rett.....	102	Cloths—		Automobile.....	988
Circumferences of Circles.	1103	Brattice.....	1050	Dry.....	988
Cisterns—Capacity of.	1087	Drop.....	989	Oil.....	988
Clam Shell Buckets.	663, 664	Filter.....	1050	Colts—Eccentric, Clamps.	169
Clamping—		Wiping.....	226	Column Grinders.	816 to 823
Plates for Milling Cutters.....	65	Wire Screen.....	965	Columns—	
Tools, Hose.....	494	Clout Nails.	299	Grinder.....	816
Clamps		Club Dollies.	316	Water.....	514
Band Saw.....	199	Clutch—		Combination—	
Belt.....	478	Couplings.....	443	Padlocks.....	257
Brick.....	358	Levers.....	454	Protractor Sets, B. & S.....	91
"C".....	168	Pulleys, Friction.....	453, 455	Protractor Sets, Starrett.....	103
Cabinet Makers'.....	169	Pulleys, Gasoline Engine.....	455	Squares, B. & S.....	91
Carriage.....	169	Shifter Yokes.....	454	Squares, Starrett.....	104
Colt's Eccentric.....	169	Clutches—		Common Chain.	393
Derrick, Beam.....	646	Friction.....	453 to 455	Common Flat Boxes.	440
Drill Block.....	85	Friction, Gasoline Engine.....	454	Compass Saws.	196
Hose.....	493, 494	Rigid, Spiral Jaw.....	443	Compounds—	
Key Seat, Starrett.....	104	Rigid, Square Jaw.....	443	Automobile Radiator Seal.....	930
Lathe Dog.....	167	Coach Screws.	282	Boiler.....	1007
Lineman's Sleeve.....	283	Coal—		Brazing.....	237
Machinists'.....	167, 168	Bags.....	1063, 1067	Soldering.....	236
Parallel, Starrett.....	106	Baskets (see Discount Sheet).	688	Thread Cutting.....	1002
Peerless, Adjustable.....	469	Crushers.....		Valve Grinding.....	929
Riveting, Bridgebuilders'.....	316	Chutes (see Discount Sheet).		Welding.....	361
Rule, Starrett.....	104	Dealers' Yard Screens.....	343	Compressed Air Data.	1090, 1091
Saw.....	200	Elevator Buckets.....	467, 469	Compressors—Air.	780 to 790
Splicing.....	233	Forks.....	352	Air, Divers' Outfits.....	794, 795
Steel Bar.....	169	Hoisting Blocks.....	409	Compression—Couplings.	439
		Hoisting Buckets.....	657	Compression Grease Cups.	
		Mine Cars.....	603	Lunkenhelmer.....	507
				Powell.....	507

INDEX—Continued

C		Page	C		Page	C		Page
Concentrating—			Cordage and Twine—Cont'd			Crank Pin Ollers		508
Machinery, Ore		686 to 691	Seine Twine		1070	Crays—		
Tables, Ore		690	Sisal Rope		1030	Lumber		238
Concentrators—Ore		690, 691	Tarred Hemp		1030	Metal Workers		238
Concession Tents		1040	Twine, Jute		1030	Railroad		238
Concrete—			Wrapping Twine		1030	School		238
Bag Balers		652	Corliss Steam Traps		537	Soapstone		238
Bag Cleaners		652	Corner Bit Braces		215	Creepers—Automobile, Steel		950
Bar Benders		847, 848	Cornic Hooks		1000	Creosote Oil		985, 1024
Bar Cutters, Hand Power		843	Corrugated Steel Roofing		1021	"Crescent"—		
Bucket Holsts		651	Cot Mattresses		1057	Hollow Chisel Mortiser		867
Buckets, Bottom Dump		658	Cots			"Universal", Woodworker		872
Buckets, Controllable		658	Double Deck		1057	Woodworking Machines, Motor Driven		873
Buckets, Stuebner		658	Canvas		1056	Crimped Sheet Roofing		1021
Carts		651	House		1056	Crochet Files		133
Chutes		651	Wire		1056	Cross Arm Bolts		281
Distributing Hoppers		651	Cotter Pin Extractors		228	Cross Bars—With Rollers, Painters' Stages		1000
Drills		286	Cotter Pins		263, 264	Cross Oil Filters		511
Holst Equipments		651	Cotter Pins—Cellar Box		263	Crossings—Railroad		313
Mixers		647 to 650	Cotton—			Crosses—Pipe		550
Reinforcing Bars		306	Belting		475, 477	Crowbar Brackets		358
Reinforcing Wire		342	Calking		1024	Crowbars		315, 320
Tampers		322	Drill		1070	Crown Fenders—Ford		948
Towers		651	Duck		401	Crushers—		
Concrete Mixers—			Hose, Rubber Lined		489, 490	Coal and Ores		688
Road Building		650	Mists		1025	Gyrating Rock		684
Street Paving		650	Rope		1030, 1070	Rock		684
Schaefer Power		649	Twine		1030	Roll		688
Slush Mixer		647	Counter—			Crushing Machinery—		
Condensation Feed Pumps		711	Bores		61	Stamp Mills		687
Conduit—			Curtains		1040	Crystalline Wheels		242, 243
Bench		142	Dusters		995	Cubic Measure—Table of		1105
Bender		849	Counter Shafts—			Cuff Expanders—Diving		798
Hickey		849	Bench Lathe		814	Cup Point Set Screws		269
Cones—Blacksmith		362	For St. Louis Grinder		818	Cup Grease		1005, 1007, 1008
Connecting Rod Wrench		178	For Western Grinding Machines		821	Cupolas—Foundry		570
Connecting Links (see Coupling Links)			Grinder		816	Cupolas—Tilting, Furnace		570
Construction Lights		887	Sim-Pull		447	Cups—		
Construction Wrenches		177	Coversinks		51	Grease Compression		507
Controllers—Electric		883	Bit Brace		61	Leather, Well		502
Drum		885	Double Lip, Starratt		110	Curb Pumps—Gasoline		758
Conveyor—			Counters—			Curtain Windows—Automobile		944
Belting		475 to 477	Job		124	Curtains—		
Take-Up Boxes		470	Veeder		124	Counter		1040
Conveyors—			Counting Machines		124	Porch		1064
Belt, Capacities of		1097	Couplers—Belt		480	Curtis Air Compressor		
Horse Power to Drive		1096, 1097	Coupling—			Units—Electric		782
Screw		471, 472	Bolts		274	Curtis Air Compressors—		
Screw, Hangers and Lining for		472	Expander, Hose		492	Belted		782
Conversion Tables—			Links, Chain Repair		395, 396	Curves—Irregular		120
Metric		1107	Links "Keystone", Chain		396	Cuspidor Brushes		994, 1025
Water		1082	Couplings—			Cushions—Life Preserver		1059
Cook—Steam Feed		908	Air		485	Cut Off Saws—Swing		876
Cooking—			Clutch, Square and Spiral			Cutters—		
Kits, Campers		948, 1054	Jaw		443	Blacksmiths' Cold		360
Ranges, Contractors' and Campers		1053, 1054	Compression		439	Blacksmiths' Hot		360
Cook's Lubricant		1005	Flanged		439	Belt		481
Copper—			Hose		492	Bolt, Bridge Builders		316
Burs		267	Keyless		439	Emery Wheel		244, 245
Funnels, Gasoline		1014	Pipe		548	For Lathe Tools		156, 158
Hose		486	Round Leather Belt		478	For Reamers		73
Paint		986	Shafting, Plate		439	For Spiral Mills		73
Plated Bosses and Rods		303	Solid Sleeve		746	Gasket		494
Plated Rivets		266	Sucker Rod, Pump		955	Gauge Glass		515
Rivets		267	Coveralls—Automobile		955	Gear Teeth		70, 72
Sheets, Weights of		1109	Covering—Hose		488	Glass		228
Slitting Saws		66	Pipe		1028	Milling, High Speed, Carbon Steel		62
Tacks		267	Steel, Ridge		1022	Milling, Bevel Gear		70, 72
Tubing		310	Covers—			Milling, Mitre Gear		70, 72
Wire		302	Automobile Seat		953	Reinforced Bar, Konga		843
Coppers—Soldering		236	Ford Radiator		954	Rivet		229
Coping Saws		196	Rain, Horse		1066	Rod		845
Core Box Planes		202	Oil Hole		508	Sprocket Wheel Teeth		74
Cord—Wire Sash		383	Tire		922	Steel, High Speed		163
Cordage and Twine—			Tripod		660	Stocking, for Gears		71, 72
Amber Twine		1030	Crabs			Tap, Grooving		72, 73
Cotton Rope		1030, 1070	Derrick, Winch		614	Tube		558
Cotton Twine		1030	Manhole Boiler		902	Twist Drill		72
Flax Twine		1030	Crane—			Washer		404
Hay Rope		1030	Gongs		517	Cutting Off Tools—		
Hemp, Tarred		1030	Scales		578	Agrippa		155
Hide Rope		1030	Cranes		432 to 437	Armstrong		159
India Hemp Twine		1030	Bridge		435, 436, 437	Champion		157
Jute Wrapping Twine		1030	Channon Portable		432	Cutting Torches—Oxy-Acetylene		568
Lath Yarn		1030	Duplex Portable		433	Cyclone Dust Collectors		777
Mattress Twine		1030	Jib		666			
Millers' Delight Twine		1030	Locomotive		666			
Sail Twine		1030	Pillar		433			
Sash Cord		1030	Shop, Hercules, Portable		432			
Sewing Twine		1030	Shop, Pull-U-Out, Portable		432			
Sail Twine		1070	Traveling		435 to 437			
			Crank Handles—Drop Forged		170			

INDEX—Continued

C	Page	D	Page	D	Page
Cylinder—		Derricks—Cont'd		Dividers—Cont'd	
Boring Bars, Portable.....	835	Steel.....	634	Wing.....	228
Cocks.....	513	Stiff Leg.....	619, 627 to 632	Yankee.....	112
Head Wrenches.....	178	Sulky.....	620	Diving Apparatus	793 to 798
Head Scrapers.....	238	Tripod.....	620	Air Hose.....	798
Hoists, Air.....	426	Detonators—Blasting	334	Air Pump.....	794, 795
Oil.....	1001, 1004	Detroit Lubricators	512	Clothing.....	796 to 798
Plungers, Pump.....	754	Dial Test Indicators	85, 107	Complete Outfits.....	795
Relief Valves.....	533	Diamond Grinding Tools	244	Cuff Expanders.....	798
Cylinders—		Diamonds—Black	244	Dresses.....	796
Contents of.....	1088	Diaphragm Pumping Out-		Helmet Cushions.....	798
Pump.....	752, 754	fits	737 to 739	Helmet.....	796
Well.....	753	Diaphragm Pumps—		Rubber Mittens.....	798
		Bilge Trench.....	735 to 738	Rubber Snap Tubing.....	798
D		Channon.....	735, 738, 739	Shoes.....	798
Dado Heads	877	Channon, Repairs.....	735	Sundries.....	798
Dake Swinging Engine	598	Edison, Repairs for.....	736	Telephones.....	797
Dart Pipe Unions	551	Edson.....	736	Trousers, Wading.....	797
Dash Board Lamps	979	Jacks for.....	748	Wading Suits.....	797
Davis		Manhole.....	736	Weights.....	797
Ring Oiling, Loose Pulleys.....	456	Portable Trench.....	736, 737	Dixon's Graphite Lubricants	1006
Steam Traps.....	537	Skids for.....	736	Dock Rods	281
Day Cell Batteries	940	Diaphragms—Pump	502	Dog Wrenches	167
Dead Plates—Boller	901	Die Holders—		Dogs—	
Deadening Felt	1020	Bit Brace.....	22	Saw Mill.....	865
Decarbonizing Outlets	568	Screw, Machine.....	22	Lathe.....	166, 167
Deck—		Die Stocks—		Lathes, Clamps for.....	167
Blocks.....	414	Armstrong.....	32	Doll Rack Tents	1041
Irons, Calking.....	1024	Bay State.....	22	"Dollar Junior" Packing	500
Putty.....	989	Beaver, Pipe.....	25	Dollies—	
Dehance Working Pump		"Buckeye".....	28	Club.....	316
Heads	764	"Bull Dog".....	26	Concave.....	347
Demonstration Lathes	812	Channon.....	29	Heel.....	316
Demountable—		"Duplex".....	28	Horse Shoe.....	347
Rim Tool.....	181	Elastic.....	22	Riveting.....	316
Rims, Automobile.....	949	Enterprise.....	29	Spring.....	316
Depth Gauges—B. & S.	83	"Matchless", Easy Cutting.....	26	Straight.....	316
Starrett.....	105, 106	Millers.....	29	Timber.....	347
Derrick—		"Nye".....	26	Domestic Science Tables	193
Beam Clamps.....	646	Oster.....	26	Domestic Water Supply	
Balls, Fall Line.....	645	Patent Elastic.....	22	Enamel Ware for.....	769 to 772
Boom Bands.....	641	Pump Makers.....	22	Hydro-Pneumatic Tanks.....	767
Boom End Sheaves.....	641	Sing.....	22	Pneumatic Systems.....	759 to 767
Boom Ends.....	641	Solid.....	22	Donkey Engines	612
Boom Fittings.....	682	Three-Way.....	30	Door—Hardware—	
Boom Points.....	644	Toledo, Pipe.....	24	Brackets, Parallel Door.....	260
Boom Seats.....	637	Die Threads—Standard Forms	10	Bolts, Chain.....	262
Boom Sheaves.....	644	Dies—		Bolts, Foot.....	262
Bullwheels.....	635	Adjustable, Split.....	13	Bolts, Thumb.....	262
Chains.....	639	Armstrong.....	30, 32	Fixtures.....	260
Cheek Plate Weights.....	645	Bay State.....	22	Garage.....	259 to 262
Counter Weight Hoisting		Beaver Pipe.....	25	Hangers, Track.....	259, 260
Drum.....	633	Grommet Setting, Sailmakers.....	167	Hangers, Trolley.....	259, 260
Engines.....	588	Hexagon, Solid.....	14	Latches.....	261, 262
Erectors' Hooks.....	645	Lettering and Numbering, Steel.....	251	Pulls.....	261
Excavators.....	672	Machine Screw.....	13	Rails, Barn Door.....	262
Fall Line Hooks.....	645	"Nye" Skip Tooth.....	30	Door Mats—Rubber	502
Foot Hooks.....	646	"Nye" Solid Square.....	30	Doors—Sidewalk	698
Grab Hooks.....	646	Pipe, Adjustable.....	13	Dope Pails	1013
Grabs, Stone Setters.....	646	Round, Split.....	14	Double Eye-Bolts	281
Guide Sheaves.....	635, 644	Solid Bolt.....	15	Double Headed Nails	296
Guy Caps.....	639	Spring Screw Threading.....	14	Double Jointed Chain	398
Guy Grippers.....	643	Toledo, Pipe.....	24	Dowel Pins	252, 299
Guy Shackles.....	643	Differential Hoists	417	Dowel Pins—Patternmakers	252
Guy Tighteners.....	643	Diggers—Post Hole.....	353	Doweling Jig	200
Irons.....	636 to 646	Dimmer Goggles—Automobile	934	Drag Line—	
Mast Bottoms.....	637, 642	Dimmers—Automobile Head-		Buckets.....	655 and 674
Mast Cleats.....	644	light.....	944	Excavators.....	654
Mast Sheaves.....	640	Dipper Dredges	673	Scraped Excavator.....	668
Mast Steps.....	642	Dippers—Roofers	1023	Drag Saws—Friction	865
Mast Tops.....	636, 639	Dipping Paint	982	Drag Scrapers—Contractors	337
Sheave Bushings.....	621	Direct Current Motors	883	Drain Spades	350
Sheave Pins.....	621	"Dirigo" Chain Hooks	395	Draw Knives	206
Sheaves.....	621	Dirt—		Drawers—Bench	255
Sheaves, Strapped.....	644	Picks.....	354	Drawing Instruments	
Skips.....	618	Scrapers.....	336, 337	.....	91 to 95, 118 to 121
Stone Sleds.....	646	Disc Grinders	824, 864	B. & S. Scales, Rules, etc.....	93, 95
Stone Tongs.....	646	Discharge Gates—Bin	686	Protractors.....	91, 120
Swing Engines.....	584	Disks—		Rules.....	118, 120, 121
Track Wheels.....	682	Jenkins Valve.....	526	Slide Rules.....	118
Truss Rods.....	643	Reference, B. & S.....	87	Squares, B. & S.....	91 to 93
Weights, Cheek Plate.....	645	Dispensers—Oil	1012	"T" Squares.....	120
Winches.....	614, 617	Distributing Spouts—Grain	473	Triangles.....	120
Derricks	618 to 640	Ditch Jacks	332	Drawing Materials—	
Builders.....	618, 619	Ditching Spades	350	Art Gum.....	119
Circle Swing.....	618	Dividers		Boards.....	120
Folding.....	629	All Types, Starrett.....	112, 113	Erasers.....	119
Full Circle, Stiff Leg.....	629	Caliper, B. & S.....	88	Inks.....	120
Grab Bucket.....	626, 632	Extension.....	113	Paper.....	119
Guy.....	622 to 640	"Fay".....	112	Pencils.....	119
Pole.....	619	Lock Joint.....	113	Thumb Tacks.....	120
Setters.....	619	Tool Makers.....	112	Dredge—	
		Universal.....	113	Chain.....	393

INDEX—Continued

	D	Page		D	Page		D	Page
Dredge—Cont'd			Drills, Hand—Cont'd			Duplex—		
Hose Sleeves.....	488		Post.....	374, 375		Chain Hoists, Yale and Towne.....	418	
Pumps, Sand and Gravel.....	677		Reciprocating.....	216		Repairs for.....	419	
Rope, Steel.....	381		Universal Bench.....	219		Die Stocks.....	28	
Dredges—Dipper	673		Yankee Universal.....	216		Power Pumps.....	715, 716	
Sand and Gravel.....	677		Yankee Hand.....	216		Portable Cranes.....	433	
Suction.....	677		Yankee Breast.....	218		Steam Piston Pumps.....	710	
Dressers—			Yankee Bench.....	219		Dureco Positive Pressure		
Emery Wheels.....	244, 245		Drills, Shop-Power—			Blowers	775	
Plumbers' Maple.....	226		Bench.....	800		Dust—		
Dresses—Diving	796		Bench.....	799, 800		Arrester.....	1026	
Dressing—			Ball Bearing, Post.....	373, 374, 376		Collectors.....	777	
Belt.....	478		Blacksmiths', Post.....	373 to 376		Dusters—		
Manila Rope.....	390		"Buffalo" Post.....	374		Automobile.....	931	
Wire Rope.....	383		"Channon" Post.....	373		Bench.....	995	
Drillers—Sand	560		Radial Portable.....	851		Counter.....	995	
Drift—			Radial, Post.....	800		Feather.....	995, 1026	
Bolts.....	280		Sensitive, Bench.....	800		Moulders.....	995	
Pins.....	316		Sensitive, Electric.....	852		Painters'.....	993	
Plugs.....	226		Upright, Floor.....	799, 800		Wire.....	996	
Drifting Picks	354		Drills, Miscellaneous—			Wood.....	995	
Drifts—			Concrete.....	255 to 258		Dutch Brand Products	929, 930	
Automatic Drill.....	61		Counter Sink.....	51		Dye—Auto Top	932	
Centre Key.....	61		Drift, Armstrong Automatic.....	61		Dynamite	333	
Drill—			Flat Ratchet.....	47		Dynamo Oil	1002	
Blocks and Clamps, B. & S.....	85		Phillips Hollow Hammer.....	286		Dynamo Oil Gauges	515	
Blocks and Clamps, Starrett.....	106		Phillips Overhead.....	286				
Braces.....	215		Phillips Spring Hammer.....	286				
Chuck Arbors.....	514		Phillips Star.....	286				
Chucks.....	152, 153, 154		Sand Pump.....	747				
Cotton.....	1070		Pneumatic.....	855, 857 to 861				
Files.....	133		Pump Expansion.....	747				
Gauges, B. & S.....	98		Track, High Speed.....	49				
Gauges, Starrett.....	109		Drills—Twist	42 to 50				
Grinders.....	823		Cutters for.....	72				
Heads.....	286		Bit Stock.....	46, 47				
Points, Fluted Shank.....	216		Blacksmiths'.....	48				
Presses.....	219		Bonding.....	47				
Rod, Square.....	302		Jewelers' Sets.....	46, 47				
Rod, Round.....	303		Sets in Stands.....	46				
Socket Reamers.....	52		Sizes for Taps.....	11				
Sharpeners.....	246		Speeds, Feeds and How to					
Sockets.....	52		Grind.....	40				
Sockets, Blacksmith.....	223		Track.....	49				
Speeders.....	12		Wood Boring.....	47, 50				
Drill-Press Vises	219		Drinking Fountains	770				
Drill—Ratchets—			Drip Valves	509				
Armstrong.....	221, 222		Drive Anchors	285				
Combination.....	220		Drive Well Jet Pumps	523				
Giant Track.....	223		Drivers—Pile	678 to 683				
Keystone.....	220		Drives—Right Angle	447				
Packer.....	220		Drop Cloths	989, 1000				
Renshaw.....	222		Painters'.....	1000				
Satco.....	223		Drop Hammers—Pile	681				
"Standard" Boiler.....	221		Drop Hammers—Shop	832, 833				
Universal.....	222		Drop Hangers					
Drill and Reamer Holder	162		B. & S.....	442, 443				
Drilling—			Four-Point Adjustment.....	442, 443				
Attachments, High Speed.....	12		Hyatt Roller Bearing.....	442, 443				
Hammers.....	363		Dry Colors	988				
Macalines, Track.....	314		Dry Grinding Machine	810 to 824				
Posts.....	223		Dry Measure—Table of	1105				
Rope, Hawser Sail.....	386		Drum Controllers—Electric	885				
Drilling and Grinding Out-			Drum Hoists—					
fits—Motor Flexible Shafting	445		Electric.....	592, 593				
Drilling and Punching Rails			Friction.....	598, 599				
Standards for.....	312		Drums—					
Drills, Air—			Derrick, Counter Weight.....	633				
"Jackhammer".....	858		Hoisting.....	633				
"Little David" Hammer.....	857		Yard Scraper.....	704				
"Little Giant" Hammer.....	855		Dry Paste—Asbestos	1029				
"Rock" Butterfly Hammer.....	859		Dryer—Japan	991				
Rock "Sergeant" Hammer.....	860		Drive Heads—Pump	746				
Rock "Sullivan" Hammer.....	861		Drive Shoes—Pump	746				
Rock, Air Consumption of.....	1090		Duck					
Drills, Electric			Colored.....	1070				
"Cincinnati" Portable.....	850		Cotton.....	1071				
Hammer Portable.....	855		Enamel.....	1070				
Post.....	376		Khaki.....	1070				
Radial Portable.....	851		Sail.....	1071				
"Scotch" Radial.....	851		Duff Jacks	329, 330				
Sensitive Bench.....	852		Duffie Bags	1060				
Sensitive Floor.....	852		Dumb Irons—Calking	1024				
Drills, Hand—			Dumb Walters	694				
Angular, Ratchet Bench.....	219		Dump—					
Bench Drill Presses.....	219		Boxes, Wagon.....	336				
Chain.....	215		Buckets.....	656 to 658				
Drill Ratchets, Machinists'.....	220 to 223		Cars.....	603, to 606				
Goodell Automatic.....	216		Carts.....	336				
Millers Falls Automatic.....	216		Wagons, Contractors'.....	336				
Millers Falls, Hand.....	217		Dunn-Trench Braces	332				
Millers Falls, Breast.....	217, 218		Dunnage Bags	1060				

E

E. C. Roller Chains	461
E-Z-Welding Compound	361
Ear Corn Elevator Buckets	
—Heavy.....	466
Eastern Climbers	234
Earth Augers	747
Eccentric Clamps	169
Eclipse Safety Water Columns	514
Economy Double Headed Nails	296
Edgers—	
Gang.....	864
Turf.....	353
Edges—	
Beveled, Starrett.....	116
Straight, B. & S.....	93
Straight, Starrett.....	116
Edson Diaphragm Pumps	736
Repairs for.....	736
Ejector—Strainers	523
Ejectors—	
Bilge Pump.....	523
Blakeslee Steam Jet Pumps.....	523
"Chicago".....	523
Drainwell Jet Pumps.....	523
Hancock.....	522
H. D.....	522
Sewage.....	730
Steam Jet, Pump.....	522
Steam Priming.....	739
X. L. 96.....	522
Elbows—Pipe	547
Electric Automatic Control	
Equipment	883
Electric Batteries—	
Flash Light.....	972
Storage, Dry Cell.....	940
Storage, Wet, Automobiles.....	939
Electric Bulbs	972, 973
Flash Light.....	972
Electric—	
Chain Hoists.....	424
Controllers.....	883
Controllers, Drum.....	885
Drills.....	850 to 852, 855
Fans, Ventilating.....	882
Fans, Propeller.....	777
Flash Lights.....	972
Forges.....	369
Generating Sets, Steam.....	886
Generators, Turbine.....	887
Grinders.....	852 to 854
Grinding Machines.....	824
Hammer Drills.....	855
Head Lights, Automobile.....	943
Heaters, Automobile.....	945
Heater, Auto Engine.....	945
Hoists, Drum.....	592, 593
Hoists, Sprague.....	425
House Pump.....	763
Lamps.....	972, 973
Light Guards.....	973
Lighting Generators, Turbine.....	887
Lights, Constructing and	
Wrecking.....	887

INDEX—Continued

E	Page
Electric—Cont'd	
Motors, Alternating.....	884, 885
Motors, Direct Current.....	883
Motors, Induction.....	885
Plants, Isolated Storage	
Battery.....	888
Pumps—Centrifugal.....	730
Side Lights, Automobile.....	943
Spot Lights, Automobile.....	942
Switches, Starting.....	884
Electrical	
Data, Miscellaneous.....	1094
Equivalents.....	1094
Electricians'	
Scissors.....	233
Steel Grips.....	254
Tool Bags.....	1063
Knives.....	233
Rubber Sleeves for Pliers.....	233
Scissors.....	233
Elevator	
Gages, Contractors'.....	653, 654
Belts, Grain, Speeds of.....	1095
Boots.....	470
Bolts.....	465 to 469
Buckets.....	380
Cable.....	468
Legs.....	473
Spouts and Turnheads.....	473
Take Up Boxes.....	470
Elevator Hoists—	
Contractors'.....	655
Mundy's Gasoline.....	654
Elevators—	
Automobile.....	695
Basement to Sidewalks.....	698
Box Stacking.....	692
Bucket.....	468
Bucket, Capacities of.....	1097
Bucket, Horse Powers to	
Drive.....	1097
Bucket, Portable, Stone and	
Ores.....	469
"Contractors' Materials.....	653
"Contractors", Portable.....	653
Dumb Waiter.....	694
Electric, Freight.....	695, 696
One-Man Inspection.....	693
Ore.....	469
Platform, Freight.....	692 to 697
Platform, Portable.....	692
Stone.....	469
Wagon.....	695
Ellis Chain Pipe Vise	140
Emerson Steam Pump	713, 714
Emery	
Cloth.....	239, 988
Grains or Powder.....	244
Glue.....	1027
Grades of.....	1102
Wheels.....	243
Wheel Dressers.....	244, 245
Wheels, Speeds of.....	1102
Enamel	
Aluminum.....	932
Stove Pipe.....	982
Auto, Fender.....	932
Engine.....	932
Paints.....	985, 986
Radiator.....	985
Valentines.....	986
Valspar.....	986
Enamel Ware—	
Bath Tubs.....	769
Drinking Fountains.....	770
House Fixtures.....	769 to 772
Kitchen Sinks.....	770
Laundry Tubs.....	770
Lavatories.....	769, 771
Urinals.....	772
Wash Sinks.....	771
Wash Stands.....	769 to 771
Water Closets.....	772
End Measuring Rods	100
End Mills	67 to 69
Center Cut.....	68
Shell.....	67 to 69
Spirals, High Speed.....	68
Straight and Taper Shank.....	69
Two-Lipped, Slotting.....	279
End Bolt	279
Engine	
Boilers, Hoisting.....	591
Clutches, Gasoline.....	454

E	Page
Engine—Cont'd	
Enamel.....	932
Governors.....	540
Indicators.....	536
Lathes.....	807, 808, 809
Oils.....	1001, 1004
Paint.....	930, 983
Starter.....	932
Tractor Oil Pump.....	510
Engine Room Clocks	540
Engineering Data—See Use-	
ful Information.	
Engineers'	
Hammers.....	207
Oil Fillers.....	505
Oilers.....	505, 506
Wrenches.....	173
Engines—Chemical	498
Engines—Gasoline—	
Anderson.....	889
"Evenrude" Canoe and Row	
Boat.....	890
Hopper Cooled.....	648
Improved "Ideal".....	892
Marine.....	889, 890
"Stover", Horizontal.....	891, 892
"Pormo", Portable Utility.....	728
"Universal" Utility.....	889
"T and M" Utility.....	890
Engines—Oil—	
Bessemer Horizontal.....	893
Venn-Severin Vertical.....	893
Engines—Steam—	
Brick Masons' Hoisting.....	655
Bridge Builders and Erectors.....	585
Duke Swinging.....	596
Derrick.....	584
Derrick, Swing.....	584
Donkey.....	612
Excavator.....	590
Locomotive.....	612
Logging.....	589
Mine Haulage.....	601
Hoisting.....	581 to 597
Horizontal.....	895 to 897
Mine "Hoisting".....	601
"Mundy" Swinging.....	596
Side Crank Heavy Duty.....	897
Horizontal.....	895, 896
Throttling.....	894, 895
Vertical.....	894, 895
Engines—Village, Fire	740
English Measure Caliper	
Gauges.....	89
Equalizers—Ford Light	948
Equalizing of Pipes—Table	1090
Equivalents—Mechanical, Elec-	
trical and Heat	1094
Erasers—Ink and Pencil	119
Escutcheon Pins	267
Evaporators—Farm Boilers	561
"Everlasting" Blow Off Valve	529
"Evenrude"—	
Centrifugal Pumping Unit.....	727
Gasoline Canoe and Row	
Boat Engines.....	890
Excavating Buckets—	
Buckets.....	661 to 665
Clam Shell.....	663, 664
Drag Line.....	665
Equipments.....	666 to 677
Orange Peel.....	661, 662
Excavator Engines	590
Excavators—	
Derrick.....	672
Drag Line.....	674
Scraper.....	668 to 671
Skid.....	667
"Excelsior" Bottom Dump	
Concrete Buckets	658
Exhaust Fans (see also Blow-	
ers and Exhaustors)	778
Electric.....	882
Exhaust Pipe Heads	539
Exhausters—	
Fan (see also Blowers and	
Exhaustors).....	778
Shavings.....	775
Expanders—	
Hose Coupling.....	492
Tube.....	557, 558

E	Page
Expansion—	
Bolts.....	283, 284
Cases.....	283, 284
Drills, Pump.....	747
Joints, Pipe.....	552
Joints, Weights of.....	1093
Rings, Hose Coupling.....	492
Expansion Shields—	
Lag Screw.....	282, 283, 284
Machine Bolt.....	283, 284, 285
Stove Bolts.....	283, 284
Van.....	284
Wood Screw.....	284
Expansive Bits	212
Expansion—	
Tanks.....	912
Express—	
Charges, Based on Rate.....	1081
Rates.....	1081
Package Scales.....	574
Wagons.....	345
Explosives and Blasting Sup-	
plies	333, 344
Extension	
Bit Holders.....	215
Bit Braces.....	181
Ladders.....	999
Planks, Painters.....	999
Spring Hammers.....	286
Extinguishers—Fire	497, 498, 955
Extractors—Cotter Pin	228
Eye	
Benders.....	847
Blocks.....	410
Bolts, Nut.....	400
Bolts, Screw.....	400
Protectors.....	249
Punches, Blacksmiths.....	360
Eyes—Screw	400
F	
Fabric-Breaker—Automobile	928
Face Plate Jaws	148
Factory—	
Brushes, "Capital".....	995
Oil Dispensers.....	1012
Stools.....	194
Trucks.....	345
Fall Line Derrick Balls	645
Falls—Painters	1000
Fan Belts—Automobile	951
Fans—	
Blower.....	776 to 778
Electric Ventilating.....	882
Exhaust.....	776, 778, 882
Propeller, Motor-Driven.....	777
Farm—	
Bells.....	518
Boilers.....	561
Farmers—	
Hammers.....	208
Pliers.....	361
Favorite Factory Trucks	345
Faucet Augers	1017
Faucets—	
Lock Lever.....	1017
Molasses Gates.....	1017
Oil Gates.....	1017
Petroleum.....	1011, 1017
Wooden.....	1017
Feather Dusters	995, 1026
Feed	
Bags.....	1067
Mills.....	964
Pump and Receiver.....	711
Pumps, Boiler.....	708, 710, 742
Feed Water—	
Heaters.....	907, 908
Heaters and Lime Extractor,	
"Springfield".....	907
Feeders—Ore	686
Felt—	
Deadening.....	1020
Roofing, Asphalt.....	1019
Roofing Nails.....	299
Roofing, Slate.....	1020
Tarred.....	1020
Fence—	
Gates, Welded Wire.....	967
Staples.....	300
Stretchers, Wire.....	968
Wire, Plain.....	300
Fencing—Wire	966, 967, 968

INDEX—Continued

F	Page
Fender —Enamel.....	932
Fenders —Ford, Crown.....	948
Ferrules —Boiler Tube.....	546
Ferry Travelers	409
Fibre —	
Brushes.....	1005, 1025
Grease.....	1005
Mallets.....	209
Pails.....	1016
Fids —	
Sailmakers', Hand.....	1073
Sailmakers', Standing.....	1073
Figures —Steel.....	251
File —	
Brushes.....	135
Cards for Cleaning.....	135
Handles.....	135
Holders, Surface.....	134
Files —	
Auger Bit.....	125, 134
Babbitt Float.....	130
Band Saw.....	131
Barrett.....	130
Cant Saw.....	132
Crochet.....	130
Cross Cut.....	133
Crossing.....	132
Die Sinkers.....	134
Double End Taper.....	130
Drill.....	133
Equaling.....	133
Flat.....	126
Hand.....	126, 132
Half Round.....	126, 132
Knife.....	128, 133
Mill.....	129
Needle.....	134
Oval.....	132
Pillar.....	132
Pippin.....	133
Planer Knife.....	128
Rasp.....	128, 131
Riffler.....	134
Round.....	127, 132
Round Edge, Joint.....	133
Slitting.....	133
Spark Brand Coll.....	134
Square.....	127, 133
Stub.....	134
Taper.....	129, 130
Vixen.....	131
Warding.....	127 to 133
X-F-Swiss Pattern.....	132 to 134
Files and Rasps —General description.....	125
Filler —	
Body.....	988
Iron.....	983
Tread.....	929
Wood.....	991
Filler and Gauge —Automobile, Gasoline.....	951
Fillers —	
Bag.....	964
Cans, Auto.....	1014
Oil, Engineers'.....	505
Rubber, Sheave.....	502
Filler —	
Gauges, Starrett.....	105
Tools.....	252
Fillers —Leather Pattern.....	252
Filling Station Pumps —	
Gasoline.....	756 to 758
Fillister Head Cap Screws	270
Fillometer —Gasoline, Automobile.....	951
Filter Cloths —Miners'.....	1050
Filters —Oil.....	511
Finish —Mission.....	985
Finishing Nails —Wire.....	298
Fire —	
Bells.....	518
Buckets, Lavatory.....	1016
Department Equipment.....	497, 498
Door Fixtures.....	260
Doors, Fusible Links for.....	262
Engines, Village.....	740
Extinguishers.....	497, 498
Extinguishers, Pyrene.....	955
Hose, Cotton.....	489
Hose, Rubber.....	488
Hose Hooks.....	1016
Pails.....	1016
Pots.....	562, 563, 566, 569

F	Page
Fire—Cont'd	
Proofing, Asbestos Board.....	1029
Proofing, Asbestos Corrugated Paper.....	1029
Streams, Pressures of.....	1088
Streams, General Data.....	1088
Fireman's Axes	210
Firing Tools	322
Firmer —	
Chisels.....	205
Gauges.....	205
First Aid Cabinets	249
Fisher —	
Pump Governors.....	541
Valves.....	535
Fitting-Up Wrenches, Rail-way	315
Fittings, Pipe —	
Spiral.....	545
Standard.....	547
Fixtures, Door —	
Barn.....	259 to 262
Fire.....	260
Flag Pole —	
Brackets and Holders.....	1065
Flag Poles	1065
Flaps	1065
Flake Graphite	1006
Flanged —	
Couplings.....	439
Wheels, Car.....	607
Flanges —	
Spiral Pipe.....	545
Flaps —Floating.....	921
Flashlight —	
Batteries.....	972
Bulbs.....	972
Flashlights —Electric.....	972
Flat Boxes —Babbitted.....	440
Flat Link Chains	397, 398
Flat Track Carrier Trolleys	430
Flat Wall Panel	984
Flatters —Anvil.....	360
Flax Packing	500
Flexible —	
Pipe Joints, Barco.....	552
Rules, Starrett.....	115
Shaft, Bench Arbors.....	446
Shaft Grinding Machinery.....	445, 446
Shafting Driving Drills and Grinders.....	445
Spouts, Grain.....	473
Steel Tubing.....	486
Flint Paper	239
Floater Valves	534, 535
Floating Flaps	921
Flogging Hammers	316
Floor —	
Brushes.....	995, 1025
Coating Cement.....	991
Oil.....	991
Paint.....	984
Plates.....	527, 528
Scrapers.....	200
Scrubbings.....	994, 1026
Varnish.....	991
Wax.....	987
Flooring —	
Brads.....	298
Saws.....	195
Floor Emery	244
Flow of Water through Nozzles	1089
Flue —	
Blowers.....	554
Plugs.....	546
Scrapers.....	554
Fluid —Tire.....	929
Flux —	
Aluminum.....	236
Brazing.....	237
Welding.....	361
Fluxers —Metal.....	569
Folding —	
Chairs, Automobile.....	954
Chairs, Wood.....	1056, 1058
Cots and Beds.....	1056, 1057
Settees.....	1058
Follow Rests —Lathes.....	814
Followers —Band, Pile Driver.....	681
Food Bags —Campers'.....	1060
Foot —	
Blowers.....	565
Bolts.....	262
Valves and Strainers.....	731

F	Page
Foot Power —	
Formers.....	880
Mortisers.....	880
Saws, Scroll and Circular.....	879 to 881
Force Feed Lubricators	510
Force Pumps (see also Pumps).....	436 to 441
Channon Diaphragm.....	736, 737, 739
Double-Acting.....	742
Gasoline.....	758
Hand Power.....	741
Hand, Rotary.....	742
Hand or Windmill.....	744
Hydro-Pneumatic.....	765
Jackson Double Cylinder.....	740
Manhole.....	736
Monarch Double and Single Lever.....	742
Plumbers', Brass.....	741
Rotary.....	733
Rotary, Gasoline.....	756
"Ford Bestos" , Brake Lining.....	951
Ford Car —	
Brake Lining.....	951
Bumpers.....	946
Commercial Bodies.....	949
Covers for Hood and Radiator.....	954
Crank Case Oil Gauge.....	940
Fan Belts.....	951
Freight Carriers', Detachable.....	950
Light Equalizer.....	948
Stabilizers or Steer Easiers.....	948
Timers.....	938
Vulcanizers.....	926
Wrench Sets.....	171, 180
Forge Blowers	367
Forges	368 to 371
Brass.....	364
Boilermakers.....	368
Buffalo.....	371
Electric.....	369
Horseshoers'.....	368
"Lancaster".....	370
Machinists'.....	368
Mildway.....	369
Rivet.....	368, 369, 371
Wagonmakers'.....	371
Fork Handles	352, 357
Forks	
Ballast.....	352
Coal.....	352
Coke.....	352
Manure.....	352
Rail.....	315
Raising, Lineman's.....	320
Spading.....	352
Stone.....	352
Formers —Foot Power.....	880
Foundation Washers —Boiler.....	902
Foundry —	
Brushes.....	996
Cupolas, Tilling.....	569
Ladies.....	571
Riddles.....	253
Scales.....	576
Sand Sifters.....	253
Fountain Brushes —Soldering.....	236
Fountains —Enamel—Drinking.....	770
Frames —	
Grindstone.....	247
Saw, Power.....	863
Framing Chisels	205
Freight —	
Carrier, Ford.....	950
Classifications, L. C. L.....	1074, 1075
Elevators.....	692 to 696
Elevators, Electric.....	696
Eates, L. C. L.....	1073 to 1078
Trucks.....	344 to 346
Friction Clutches	453 to 456
Gasoline Engine.....	454
Master Band.....	454
Style B.....	454
Style "D".....	456
Friction —	
Genrs, Paper.....	452
Hoists.....	598, 599
Tale, Tire.....	922
Of Water.....	1084, 1085
Frog Brooms	997
Frogs —	
Railroad Track.....	313
Railway Wrecking.....	317

INDEX—Continued

F	Page
Front Angle Plates—Boiler	901
Fronts—Boiler	901
"Frost" Wedges	363
Free Vanners	691
Fuelers, Anvil	360
Fuses—Safety	334
Funnels—	
Auto.....	1013, 1014
Copper.....	1014
Gasoline.....	1014
Tin.....	1001, 1014
Furnace	
Cement, Asbestos.....	1028
Oil Burners.....	572
Tiles, Oil Burner.....	572
Scoops.....	351
Furnaces—	
Cupola, Tilting.....	570
Lead Melting.....	566 to 569
Melting.....	562 to 569
Roofers, Calking.....	1023
Soldering.....	562, 563, 566 and 569
Furniture—	
Camp.....	1056 to 1058
Polish.....	989
Rubbing Brushes.....	994
Varnish.....	990
Fusible—	
Boiler Plugs.....	514
Links, for Fire Doors.....	262
Flax Twine	1030
Forbes Pipe Cutting and Threading Machines	35
G	
Gad Tongs	361
Galvanized	
Elevator Buckets.....	466
Pails.....	1015, 1016
Tanks.....	768
Gang Planer Tool—Armstrong	160
Gap Lathes—	
Foot Power.....	813
Sliding Extension.....	810
Garage—	
Brushes.....	995
Air Pumps Electric.....	780
Air Pumps, Portable, Electric.....	783
Door Hardware.....	259 to 262
Door Hangers.....	259, 260
Electric Air Compressor Sets.....	785
Jacks.....	923
Presses.....	837
Pumps, Gasoline.....	756 to 758
Screw Plates.....	18
Tents.....	1041
Vulcanizers.....	926
Wrench Sets.....	171
Garbage—	
Burners.....	906
Pails.....	1012
Garden—	
Hoes.....	353
Rakes.....	482
Rakes.....	353
Gardner—	
Air Compressors, Air Cooled.....	780
Air Compressors, Horizontal.....	789
Governors, Engine.....	540
Gardner-Rix Vertical Air Compressor	784
Garnet Paper	239
Gas Engine Lubricators	509
Gas Fitters' Bags	1063
Gasket	
Chisels.....	226
Cutters.....	494
Packing Jute.....	503
Shellac.....	930, 932
Gaskets—	
Asbestos.....	500
Cloth Insertion.....	500
Tubular.....	500
Gasoline—	
Cans.....	1013, 1014
Engine Clutches.....	454, 455
Engines.....	889 to 892
Engines, Hopper Cooled.....	648
Filling Station Pumps.....	758
Force Pumps.....	756, 758
Funnels.....	1014
Gauges, Ford Car.....	941
Hoists, Mundy.....	595
Hose.....	485

G	Page
Gasoline—Cont'd	
Lights, Portable.....	977
Measures, Auto.....	1014
Pumps, Garage.....	756, 757
Storage Outfits.....	757, 758
Systems, Automobile Vacuum.....	938
Tanks.....	757, 1011
Torches.....	564, 566, 978
Gas Pipe	542
Gate Sheaves	414
Gate Valves	524 to 526, 530
Gates	
Bin, Grain.....	473
Bin, Sand and Gravel.....	676
Bin Bottom, Stone and Ore.....	686
Bin Side, Stone and Ore.....	686
Blast, Champion.....	777
Hydrant.....	494
Molasses.....	1017
Oil.....	1017
Wire Fence, Pittsburgh Per- fect.....	967
Gang Edgers	804
Gauge—	
Centre Attachment.....	116
Cocks.....	513
Glasses.....	513
Height Attachment, Starrett.....	106
Siphons.....	513
Testers.....	536
Gauge Glass Cutters	515
Gauge Glass Washers	514
Gauges—	
Altitude.....	516 to 528
Automobile Pump.....	935
Automobile Tire.....	935
Beam-Trommel.....	87
Caliper, B. & S.....	89, 90, 96
Caliper Rolling Mill.....	96
Caliper, Starrett.....	101
Caliper, Williams Vulcan.....	90
Center, B. & S.....	97
Center, Starrett.....	116
Circumference, Starrett.....	102
Depth, B. & S.....	83
Depth, Starrett.....	105, 106
Drill, B. & S.....	98
Drill, Starrett.....	109
English Measure.....	89
Fillet, Starrett.....	105
Gasoline, Ford Auto.....	941
Gear Tooth, B. & S.....	96
Hack Saw Depth.....	189
Heating, Boiler.....	528
Height.....	81, 83
Hydraulic.....	516
Inside Micrometer.....	81
Inside, Starrett.....	101
Long, Screw and Wire.....	98
Lumber.....	123
Marking, Carpenters.....	203
Micrometer, Caliper.....	77 to 81
Mortise.....	203
Motor Oil.....	515
Music Wire, B. & S.....	98
Oil, Ford, Crank Case.....	940
Pressure.....	516
Radius, Starrett.....	105
Scratch, Starrett.....	108
Screw, B. & S.....	96
Screw Pitch, B. & S.....	86
Screw Pitch, Starrett.....	105
Screw Thread Tool.....	98
Steam and Hot Water Boiler.....	528
Surface, B. & S.....	98
Surface, Starrett.....	107, 108
Taper Wire and Thickness, Starrett.....	105
Thermometer, for Hot Water Heating.....	285
Thickness, B. & S.....	86 to 97
Thickness, Starrett.....	105
Track.....	315
Vacuum.....	516
Water.....	514
Water and Steam.....	514
Wire.....	96 to 98, 1109
Wire, Diagrams and Equiva- lents.....	300
Wire, Starrett.....	109
Gauntlet Gloves—Rubber	1068
Automobile.....	955
Gear	
Cutters.....	70, 72

G	Page
Gear—Cont'd	
Cutting Machines, Collets for.....	75
Grouse.....	1008
Spur Selection Chart.....	1100
Tooth Caliper, Vermeer.....	82
Gears—	
Bevel.....	458
Boom Swinging.....	594
Diameters and Speeds of.....	1096
Finding Pitch and Diameter.....	1099
Horse Powers of.....	459, 1096
Mitre.....	459
Paper and Iron Friction.....	452
Rack and Pinion.....	459
Sizing and Cutting of.....	1098
Spur.....	457
Worm.....	459
Generating—	
Plants, Electric Storage Bat- tery.....	888
Sets, Electric.....	886
Generators—Electric Turbine	887
German Machine Chain	397
Glass	
Hub Key Seater.....	804
Tongs.....	320
Track, Drill Ratchet.....	223
Gib Head Machine Keys	264
Gin or Ice Blocks	409
Glass—	
Cutters.....	228
Cutters, Gauge.....	515
Glass Body Oil Cups	508
Glasses—	
Gauge.....	515
Level.....	204
Oil Cup.....	515
Glaziers' Points	989
Gloss—	
Liquid.....	989
Liquid, Auto.....	930
Gloves—	
Automobile.....	955
Diving.....	798
Rubber Gauntlet.....	1068
Glue Brushes	994
Glue—	
Dry.....	1027
Emery.....	1027
Flake.....	1027
Heaters.....	1027
Liquid.....	1027
Pots.....	1027
Sizing.....	1027
Stands.....	1027
Grate Bars	902, 903
Grates, Boiler—"Kelly"	
Rocking and Dumping.....	904
Grabs—Stone Setters', Derrick	646
Goggles	
Automobile Dimmer.....	954
Industrial Safety.....	249
Gold—	
Concentrating Jigs.....	689
Concentrating Machinery.....	
686 to 691	
Medal Drill Rod, Square.....	302
Medal Music Wire.....	302
Mining Filter Cloths.....	1050
Stamp Mills.....	687
Golden Giant Spark Plugs	936
Golf Tents—Canopy	
Gongs	
Crane.....	517
Signal, Miners.....	974
Trip.....	517
Goodell Automatic Drills	216
Goose Neck Bars	315
Gauges—	
Handle.....	316
Plumbers'.....	226
Socket Firmer.....	205
Turning.....	205
Governors—	
Engine.....	540
Pump, Fisher.....	541
Grab Bucket—Derricks	626
Grab Buckets	663, 664
Grab Hooks—Derrick	646
Graham Drill Vise	149
Grain—	
Buckets, Elevator.....	465, 466
Elevators.....	768
Scoops.....	964

G	Page
Grain—Cont'd	
Shovels, Clark	704, 705
Spouts	473
Granite Surfaced Roofing	1019
Graphite	
Boiler	1008
Flake	1006
Grease	1006, 1007
Lesoyl	1003
Lubricating, Dixon's	1006
Lubricants, Mexican	1008
Paint	982, 983
Graphitoleo—Dixon's	1006
Grass	
Catchers	971
Clippers	969
Cutters, Lawn Mowers, etc.	969, 970
Grate Bars—Boiler	902, 904
Grates	
Boiler, Simplex Shaking and Dumping	904
Round Boiler	902, 904
Grave Tents	1043
Gravel	
Dredging Pumps, Centrifugal	723
Handling, Drag Line Ex- cavators	674
Screens	674
Washing Equipments	674 to 676
Washing Screens	675, 676
Grease	
Cups	507
Guns	1017
Pumps, Auto	940
Retainers, Automobile	938
Greases	
Automobile	1005
Automobile, Fibre	1005
Axle	1007
Cable	1008
Cup	1005, 1007, 1008
Graphite	1006, 1007
Gear	1008
Gredag	1005, 1007
Oil	1005
Transmission	1005
Tube	1005
Wood	1008
Gredag Grease	1005 to 1007
Green River Screw Plates	20
Parts for	21
Grinder	
Columns	816
Countershafts	816
Discs	824
Heads	816 to 821
Lathe Attachments	815
Wheel Guards	819 to 821
Grinders	
Aerial	853
Air Cooled, Electric Floor	854
Bench	816
Bench, Electric	852
Center	852
Column	816 to 821
Disc	824, 864
Drill	823
Electric	824, 852 to 854
Internal	853
Parallel	853
"St. Louis"	817 to 819
Tool Post, Electric	853
Tool Post	853
Universal	822
Universal, Clamps for "Western"	920, 821
Grinding	
Attachments, Drill Point Thinning	823
Compound, Value	929 to 931
Mills	964
Tools, Diamond	244
Wheels	242 to 248
Grinding and Drilling Out- fits—Flexible Shafting	445
Grindstone Frames	247
Grindstones	247, 248
Grip Nuts	311
Grippers—Derrick, Guy	643
Grips	
Firing Tool	322
McCaun, Rope Haulage	413
Pipe, for Vise	138
Samson, Wire	234

G	Page
Grips—Cont'd	
Steel, for Tools	254
Wire, Havens	234
Wire, Chicago	234
Gripwell	
Tires	918, 919, 920
Grizzly Screens	685
Grocers' Scales	573, 574
Grommet	
Punches	1072
Setting Dies	1072
Grommets	1072
Brass	1072
Groovers—Belt	481
Grub Hoe Handles	356
Grub Hoes	354
Grubbing Machines, Stump	999
Guard Rails—Painters'	999
Guards	
Electric Lamp	973
Grinder Wheel	819 to 821
Roller, Mine Haulage	413
Guide Sheaves	
Derrick	635, 644
Miscellaneous	414
Gum	
Art	119
Core Packing	501
Tire Repair	929
Vulcanizing	928
Gum Wood, Rollers	413
Guns	
Air	783
Grease	1017
Guy	
Derrick Caps	639
Derricks	622 to 640
Grippers, Derrick	643
Rods	281
Rope, Wire	380, 383
Shackles, Derrick	643
Tighteners, Derrick	643
Turnbuckles	392
Gyrary Rock Crushers	684
Gyrating Foundry Riddles	576
H	
Hack Saw	
Blades	189, 190
Depth Gauge	189
Fracts	191
Hack Saw Machines	826 to 878
Kwik-Kut Power	827
Marvel, Draw Cut	826
Marvel High Speed	826
Rapid Cut Power	830
Sterling Power	828
Hack Saws, Hand	189 to 191
Jewelers'	196
Rail	189
Halyard Blocks	414
Hammer	
Drills, Electric	855
Handles	355
Mills	688
Molds and Ladles, Lead	208
Stops, Pile Driver	682
Hammers	
Ball Pien	207
Bill Posters	208
Blacksmiths	207
Brass	208
Bricklayers	208
Calking, Pneumatic	856, 857
Copper	208
Copper Tip	208
Cross Pien	207
Drilling	363
Engineers	207
Farmers	208
Flogging	316
Helve, Power, Rochester	833
Hide Faced	209
Keating	208
Machinists'	208
Magnetic	208
Nail	207
Napping	316
Phillips Spring	286
Pile	678, 681, 683
Pile, Drop	681
Pneumatic, Chipping	856, 857
Pneumatic, Riveting	856, 857

H	Page
Hammers—Cont'd	
Power, "Boss"	833
Power, Kerrhead	832
Power, Little Giant	832
Rahwido	208
Ripping	208
Riveting	208, 316
Safety First, Machinists'	207
Safety First, Nail	207
Set, Blacksmiths'	360
Sledge	363
Spauling	363
Straight Pien	207
Striking	363
Vanadium	207
Hammocks	1065
Hatchet Saw Swages	866
Hancock Ejectors	522
Hand	
Books, Mechanical	76
Brushes, Janitors'	1025
Cars, Railroad, Velocipede	610
Carts	347
Chisels	227
Cleaner	931
Drills	216, 217
Saws	195 to 197
Screws, Wood	169
Power Mortisars	880
Power Saws, Circular Rip	880
Hand Rail Fittings—Pipe	548
Handles	
Adze	356
Auger	212
Axe	355
Cant Hook	321
Crank, Balanced	170
Crank, Drop Forged	170
"D" Top, Shovel	357
File	135
Grub Hoe	352, 356
Hatchets	355
Hammer	355
Knurl	165
Lug Hook	321
Machine, Drop Forged	170
Maul	356
Offset Socket Wrench	181
Peavy	321
Pick	356
Saw	197
Shovel	357
Sledge	356
Socket	178
Soldering Copper	236
Timber Carrier	321
Tool	355 to 357
Handy Flooring Saws	195
Handy	
Punches	842
Hangers	
Barn Door	259, 260, 262
Drop, Ball and Socket	440 to 443
Drop, 4-Point Adjustment	442, 443
Door Track, Channel	260
Door Track, Flat	262
Door Track, Round	259
Post, Ball and Socket	440 to 443
Post, 4-Point Adjustment	442, 443
Sanitary Clothes	961
Screw Conveyor	472
Trolley, Track, Flat Rail	430
Trolley, Track, I Beam	427
Wall Extension, Post	440
Handling Leaders—Pile Driver	682
Hardies—Blacksmiths'	360
"Hardings"—Watchman's	
Portable Clock	963
Harness	
Oil	1003
Pack	1060
Harrington Chain Hoist	
Repairs	420
Harrington Chain Hoists	418
Hartz Ore Jigs	680
Harvester Oil	1003
Hasps and Staples	258
Hatchet Handles	355
Hatchets	
Regular	210
Hunters	1069
"Hauk" Lead Melting Fur- naces	566

INDEX—Continued

H	Page	H	Page	H	Page
Haulage—		Hemp—Cont'd		Hoists, Chain—	
Engines, Mine.....	601	Twine, India.....	1030	Channon, Differential.....	417
Rope Grips.....	413	Henderson Conduit Pipe Vise.	142	General Description.....	415, 416
Rope, Wire.....	380	Henderson's Universal Boring Machine	213	"New Model" Worm Gear.....	417
Tail Rope, Appliances.....	413	Hercules—		Harrington Screw Geared.....	418
Haven's—		Portable Cranes.....	432	Harrington Screw Geared	
Wire Clamps.....	234	Trucks.....	344	Repairs.....	420
Wire Grips.....	234	Herz Spark Plugs	936	Yale and Towne Duplex.....	418, 419
Haversacks	1061	Hexagon Nuts	287, 288	Yale and Towne "Duplex"	
Hawser Laid Manila Rope	386	Hickies—Conduit	849	Repairs.....	419
Hawsing—		Hickory Mallets	209	Yale and Towne "Triplex" 421 to 423	
Beetles, Calking.....	1024	Hide Faced Hammers	209	Yale and Towne "Triplex",	
Irons, Calking.....	1024	Hide Rope	1030	Electric.....	424
Hay—		Hinges—		Yale and Towne "Triplex Re-	
Fork Pulleys.....	410	Butt.....	258	pairs.....	423
Rope.....	1030	Hasp.....	258	Holder-On Pneumatic Ham-	
"Hayward—"		Strap.....	258	mer.....	856
Clamshell Buckets.....	663, 664	Hob Taps	7	Holder Taps	7
Orange-Peel Buckets.....	661, 662	Hobs and Reamers	8	Holders—	
Head Blocks—Pile Driver	680	Hodell Flat Link Chain	398	Bag, Mosher.....	964
Head Pumps—Hydraulic	840	Hods—		Boring Tool.....	162
Heading Tools	360	Brick.....	358	Brush.....	1025
Headlight—		Mortar.....	358	Drill and Reamer.....	162
Dimmers, Automobile.....	944	Hoe Handles—Grub	356	Extension Bit.....	215
Lenses, Automobile.....	944	Hoes—		File.....	134
Headlights—Automobile	943	Boiler Room.....	322	Flag Pole.....	1065
Heads		Firing Tool.....	322	Mop.....	1025
Deep Well Pump.....	750, 751	Garden.....	353	Steel Rule, B. & S.....	95
Dado.....	877	Grub.....	354	Tool, "Agrippa".....	155 to 157
Drill.....	286	Mortar.....	353	Tool, Champion.....	157
Drive, Pump.....	746	Scuffle.....	353	Tool, Combination.....	206
Elevator, Turn.....	473	Hoisters—		Hollow Chisel Mortisers	867
Exhaust Pipe.....	539	Cargo.....	409, 660	Hollow—	
Grinder.....	816 to 821	Cassions.....	660	Drills, Phillips.....	286
Polishing.....	815	Hoisting—		Mills.....	68
Pumping.....	749, 750, 751	Blocks, Coal.....	409	Mortising Chisel with Bit.....	877
Toggle.....	278	Buckets (see Buckets),		Punches.....	228
Heat—		Drums, Counterweight, Der-		Set Screws, "Allen"	
Equivalents.....	1094	rick.....	633	Set Screws, "Mac-It"	
Radiation, Rules for Figuring		Equipment, Caisson.....	660	Homestead Blow Off Valves	531
Regulators.....	916, 917	Jacks.....	617	Hood Covers—Ford	954
Heaters—		Pails, Roofers.....	1023	Hood Farmers	361
Asphalt.....	1023	Pulleys.....	410	Hook—	
Automobile.....	954	Sheaves, Mine.....	414	And Eye Turnbuckles.....	400
Automobile, Engine.....	945	Winch Shafts.....	594	Bolts.....	281
Feed Water, Little Giant		Hoisting Engines—		On Boats.....	921
Cooker.....	908	Boilers for.....	591	Rules, B. & S.....	94
Feed Water, "New Water		Brick Masons.....	655	Rules, Starrett.....	115, 116
Tube".....	907	Bridge Builders' and Erec-		Hookaroos	320
Feed Water and Line Extrac-		tors.....	583, 585	Hooks—	
tors, "Springfield".....	907	Duke Swinging.....	588	Bale.....	396
Feed Water, Standard.....	907	Derrick.....	588	Barrel.....	396
Feed Water, Stillwell.....	907	Derrick Swing.....	584	Belt.....	480
Glue.....	1027	Double Cylinder Center-Gear.....	597	Bench.....	194
Soldering Copper.....	563	Double Cylinder, Double		Boat Snap.....	392
Tank, Geyser.....	912	Drum.....	583, 585, 586, 587, 589	Box.....	250
Tar, Roofers.....	1023	Double Cylinder Friction		Can.....	396
Tent.....	1046	Drum Hoist.....	601	Cant.....	321
Water, "Chicago".....	906	Double Cylinder Single Drum.....	583	Caisson Bucket.....	860
Water, "Penberthy".....	522	Double Cylinder Triple Tan-		Chain.....	395
Water, "Wilkes".....	905	dem Friction Drum.....	387, 388	Chain, Load Binder.....	396
Heating Appliances—		Excavator.....	590	Clinker.....	322
Radiators, Steam and Hot		Gasoline.....	595	Cornice.....	1000
Water.....	914 to 916	"Jackson" Single Drum, Re-		Derrick, Erectors.....	645
Radiator Valves, Steam and		versible.....	597	Derrick, Fall Line.....	645
Hot Water.....	917	Logging.....	589	Derrick, Foot.....	646
Salamanders.....	358	Mine Prospecting.....	600	Fire Pail.....	1016
Stoves, "Buda".....	559	Mundy Swinging.....	596	Firing Tool.....	322
Stoves, "Bullock".....	559	Railway Contractors and		Loading.....	320
Stoves, Tent.....	1046	Quarry.....	582	Lug.....	321
Thermostats.....	913	Without Boilers.....	583	M.....	391
Heating Boilers—		Hoists—		Oil Well.....	405
Hot Water.....	906, 909 to 912	Air.....	426	Rope, Wire and Manila.....	391
Steam.....	909 to 912	Basement.....	698	Rope, Sister.....	391
Heating Systems—		Builders' Reversible Ele-		Sail.....	1073
Data for Figuring Direct		vator.....	655	Screw.....	400
Radiation.....	916, 917	Chacon.....	415 to 424	Shackle Chain.....	395
Hot Water and Steam.....	906, 909 to 917	Concrete Tower.....	651	Shave.....	226
Heat-O-Meter—Automobile	941	Electric Drum.....	592, 593	Stone.....	353
Heel Drills	316	Electric Winch.....	594	Swamp.....	320
Height Gauges	81	Friction.....	598, 599	Swivel Rope.....	391
B. & S.....	83	Gasoline, Mundy.....	595	Well.....	405
Starrett.....	106	Hand Power, Windlass.....	600	Wire Rope.....	395
Helicoid Screw Conveyors	471	Horse Power, Mine.....	600	Hoppers—Concrete Distributing	651
Helix Colling Machine	848	"Little Tugger", Air or Steam.....	859	Horse	
"Helmer" Asphalt Roofing	1019	Mundy Gasoline, Elevator.....	654, 655	Blankets.....	1066
Helmets—Diving	796	Pneumatic.....	859	Feed Bags.....	1067
Helve Hammers—Rochester	833	Prospectors' Hand Power.....	600	Power Mine Hoists.....	600
Hemp—		Rope, "Star" Self locking.....	417	Rain Covers.....	1066
Cordage, Tarred.....	1030	Sprague, Electric.....	425	Horse Powers—	
Packing.....	503	Star, Self-Locking, Manila		To Drive Elevators.....	1097
Rope.....	350 to 380	Rope.....	417	To Drive Conveyors.....	1097
		Swing Gear Reversing.....	594	To Elevate Water.....	1098

INDEX—Continued

H	Page	H	Page	I	Page
Horse Powers—Cont'd		Hydrometer—Battery Syringes.	940	Jacks—Cont'd	
Of Gears.....	459, 1096	Hydro-Pneumatic—		Ball Bearing.....	329
Of Leather Belting.....	1096	Force Pumps.....	764, 765	Barret Auto Truck.....	957
Of Manila Rope Transmission.....	387	Tanks, for Water Systems.....	767	Barrett Lifting.....	323, 324
Of Shafting.....	1095			Barth.....	325
Horseshoe—				Bell Base Ratchet.....	325
Dollies.....	347			Bethlehem.....	330
Nails.....	364			Buda.....	328
Horseshoes.....	364			Cable Reel.....	235
Horseshoers—				Car.....	324, 328
Forges.....	368			Car Box.....	325
Horton-Morrow Drill Chucks.	352			Duff.....	329, 330
Hose—				Garage.....	837
Acid.....	485			High Speed.....	329
Air.....	485			Hoisting.....	617
Armored.....	486			House Raising.....	325
Bands.....	494, 935			Hydraulic.....	330, 331
Bushings.....	493			Hovey Automobile.....	923
Caps.....	493			Lifting.....	323 to 331, 957
Carts.....	496			Locomotive.....	325, 328
Chemical Engine.....	488			Machinery.....	327
Clamp Tools.....	494			Mine.....	328
Clamps.....	493, 494			Norton, Bridge.....	329
Cotton, Fire.....	489			Planer.....	153
Cotton, Rubber Lined.....	489, 490			Post Bridge.....	328
Connections.....	494, 935			Pulling and Pushing.....	326
Connections, "Siamese".....	494			Pump, Diaphragm.....	748
Copper.....	486			Pump, Windmill or Hand.....	748
Couplings.....	492			Screw, Starrett.....	106
Coupling, Expanders.....	492			Sewer.....	332
Coverings.....	488			Steamboat Ratchet.....	326
Dredging Sleeve.....	488			Stone.....	327
Fire, Rubber.....	488			Stone, Repairs for.....	327
Garden.....	482			Telescopic.....	326
Gasoline.....	485			Track.....	323
Linen.....	490			Twin Automobile.....	837
Mender.....	493			Wagon.....	957
Mill, Cotton, Rubber Lined.....	490			Wilmington.....	331
Nipples.....	492, 493, 935				
Nipples, Suction.....	492			"Jackson"—	
Nozzles, Play Pipes.....	491			Double Cylinder Force Pumps.....	740
Pipe Brackets.....	358			Single Drum Reversible.....	
Pneumatic Tool.....	485			Hoisting Engines.....	597
Racks.....	495			Jam Nuts.....	288
Rope Cops.....	493			Janitors—	
Reels.....	495, 496			Brush Holders.....	1025
Rubber.....	482 to 484			Brushes, Cuspidor.....	1025
Sand Blast.....	488			Brushes, Floor.....	1025
Spanners.....	493			Brushes, Hand.....	1025
Steam.....	484, 486			Brushes, Lavatory.....	1025, 1026
Steel.....	486			Brushes, Scrub.....	1025
Strainers, Suction.....	731			Brushes, Window Wash.....	1025
Suction.....	487			Dusters, Feather.....	1026
Valves.....	494			Floor Scrubbers.....	1026
Hot—				Lye.....	1026
Chisels.....	360			Mop, Cotton.....	1025
Cutters, Blacksmiths.....	360			Mop Holders.....	1025
House Pulleys.....	410			Mop Sticks.....	1025
Hot Water Heating—				Mop Wringers.....	1025
Boilers.....	905, 906, 909 to 912			Polish, Metal.....	1026
Gauges and Thermometers.....	528			Soap, Pumice.....	1026
Radiator Valves.....	528, 917			Squeeze Floor Scrubber.....	1026
Radiators.....	914 to 916			Squeeze Window Cleaner.....	1026
Storage Tanks.....	906			Washing Powder, Kirkoline.....	1026
Thermometers.....	528			Window Cleaners.....	1026
Hot—				Window Wash Brushes.....	1026
Brooms.....	997			Japan—	
Cots.....	1056			Black.....	982
Pumps, Electric Units.....	763, 766			Dryer.....	991
Raising Jacks.....	325			Jarecki Patent Pipe Vise.....	141
House Moving—				Jaw Clutch Couplings.....	443
Capstans.....	699			Jaws—	
Equipments.....	699, 700			Face Plate.....	148
Trucks.....	700			Vise.....	138
Household Lubricating Oils.....	1003			Hose Coupling, Vise.....	493
Hunters—				Jenkins Valves.....	525, 526, 531
Axes.....	1069			Jet Pumps—Steam.....	522, 523
Hatchets.....	1069			Jewelers—	
Hyatt Roller Bearing—				Saw Blades.....	196
Car Wheels.....	607			Pin Vises.....	143
I Beam Trolleys.....	429			Hack Saws.....	196
Shaft Bearings.....	441, 442			Jib Cranes.....	434
Hyde Capstans—Steam and				Jigs—	
Hand Power.....	611			Doweling.....	200
Hydraulic—				Hartz, Ore.....	689
Gauges.....	516			Job Counters.....	124
Jack.....	330, 331			Joint Runners.....	226
Ore Classifiers.....	690			Jointers.....	868
Packing.....	500, 501			Jointers—Motor Driven.....	873
Presses, Portable.....	834			Joints, Pipe—	
Punches.....	844			Barco, Flexible.....	552
Rams.....	755			Expansion.....	553
Hydrant Gates.....	494			Swing.....	552

INDEX—Continued

J	Page	L	Page	L	Page
Joist Boring—		Lacing—		Lathe—Cont'd	
Machines.....	213	Belt.....	478 to 480	Tool Posts.....	158
Tool.....	215	Belt, Alligator.....	479	Tools.....	158, 163, 164, 815
Journal Bearings	440 to 444	Belt, Wire.....	478	Tools, Extra Cutters.....	158
Jumpers—Saw	300	Leather Belt.....	479	Tools, Armstrong Sets.....	163
"Junior" Hand Punch	841	Machines, Belt.....	479	Tools.....	807 to 815
Jute—		Tools, Belt.....	481	Amateur Bench	815
Gaskets, Packing.....	503	Lacquer—		Barnes Gap.....	810
Twines.....	1030	Anti-Rust.....	983	Bench.....	814, 815
		Blue.....	983	Demonstration.....	812
		Brass.....	932	Engine, Lancaster.....	807
		Ladder—		Engine, Screw Cutting.....	808, 809
K		Extension Planks, Painters'.....	999	Foot Power Screw Cutting.....	813
Kalsize Wall Finish	987	Guard Rails.....	999	Gap Foot Power.....	813
Kalsomine—Hygenic	987	Ladders—		Gap Sliding Extension.....	810
Keating Hammers	208	Common.....	999	Polishing and Finishing.....	806
Kelly Rocking and Dump-		Extension.....	999	Screw Machines.....	805 to 809
ing Grates—Boiler	904	Rope.....	1000	Single Handles Control.....	811, 812
Kerosene—		Painters.....	999	Speed.....	811, 812
Burners.....	566	Step.....	999	Under Drive.....	811, 812
Lanterns.....	978, 979	Window Cleaners'.....	999	Laundry Tubs—Enamel	770
Lights.....	977	Ladies—		Lavatories—Enamel	769, 771
Tanks.....	1011	Babbitt.....	563, 569	Lavatory—	
Torches.....	566	Bottom Pour.....	569	Brushes.....	994, 1025
Kettles—		Foundry.....	571	Supplies.....	769 to 772
Asphalt, Roofers'.....	1023	Melting.....	563, 569	Lawn—	
Calclron.....	561	Moulds and, Hammer.....	208	Chairs.....	1058
Lard.....	908	Pouring.....	563, 569	Fencing, Wire.....	966 to 968
Sugar.....	561	Roofers' Calking.....	1023	Grass Catchers.....	972
Steam Jacketed.....	562, 908	Self skimming.....	569	Hose.....	482
Wash.....	561	Lag Screw		Rollers.....	969
Key Checks	250	Expansion Shields.....	282 to 284	Settee.....	1058
Key Seat—		Wrenches.....	182, 234	Sprinklers.....	494
Clamps, Starrett.....	104	Lag Screws	282	Tents.....	1038
Milling Machines.....	803	Lamp Guards—Electric	973	Lawn Mowers—	
Rules, B. & S.....	95	Lamps—		Channon.....	969
Rules, Starrett.....	104	Automobile.....	942, 943	Horse Power.....	970
Key Seats—		Automobile Head.....	943	Motor Driven.....	970
Shafting, Portable.....	438	Automobile, Side.....	943	Philadelphia.....	970
Key Seating Machines—		Automobile, Tail.....	943	Lead Melting—	
Hub.....	804	Bicycle.....	960	Furnaces.....	562, 563, 566, 569
Shafting.....	803	Carbide, Campers'.....	975	Furnaces, Bottom Draw.....	549
Key Seats—Standard Sizes	438	Carbide for.....	976	Machines.....	555
Keys—		Carbide, Miners'.....	975	Lead—	
Cotter Pin.....	263, 264	Dash Board.....	979	Rope Packing.....	503
Flat Riveted.....	264	Driving.....	979	Red.....	987
Flat Spring.....	264	Incandescent.....	973	Sheet and Pig.....	237
Gib Head Machine.....	264	Kerosene, Driving.....	979	White.....	987
Shafting.....	438	Kerosene, Platform.....	979	Washers.....	1022
Taper Pin.....	265	Mazda.....	973	Leaders—Pile Driver Hanging	682
Woodruff.....	265	Mine Superintendents'.....	975	Leather—	
Keyways—		Miners' Cap.....	975, 976	Belt Lace.....	479
Drill Ratchets.....	220	Supplies for.....	976	Belting, Flat.....	474 to 478
Repair Links.....	396	Miners' Carbide.....	975	Belting, Round.....	478
Water Meters.....	553	Miners' Safety.....	974 to 976	Fillets, Pattern.....	502
Keyway Cutters Burr	438, 803	Oil.....	978	Fillets, Pattern.....	252
Keyway Cutters, "Woodruff"	69	Platform.....	979	Washers.....	502
Keyways, Standard, for Mill-		Side Wall Reflector.....	978	Leathers—Pump	502
ing Cutters	65	Steel Jacket.....	505	Legs—	
Khaki, Duck	1070	Wagon.....	979	Bench.....	194
Kiely Steam Traps	538	Lamps and Torches—Light-		Elevator.....	468
Kiln Lugs	292	ing	974 to 979	Letter Carriers' Satchels	1062
Kitchen Sinks—Enameled	770	Lancaster—		Lenses—Automobile Head-	
Kits		13-inch Engine Lathe.....	807	light, "Prismolite".....	944
Auto Tool.....	956	Forges.....	371	Lesoyl	1003
Steel, Tool.....	254	Lanterns—		Letters—	
Tool, Boy Scouts'.....	1069	Acetylene.....	975	Pattern.....	252
Knife Files	133	Carbide.....	975	Steel.....	251
Knights "New Ideal" Saw	865	Kerosene.....	978, 979	Stencil.....	251
Mill Dogs	865	Lap Links—Chain	396	Level Glasses	204
Knives—		Lard—		Leveling Blocks	362
Blacksmiths' Toe.....	360	Kettles, Steam Jacketed.....	908	Leveling Putty	983
Cable Sheath Splitting.....	235	Oil.....	1002	Levels—	
Cable Stripper.....	235	Latches—Door	261, 262	Architects'.....	117
Draw.....	206	Lath		Builders'.....	117
Electricians'.....	233	Metal.....	1022	Carpenters'.....	204
Putty.....	989	Nails.....	299	Engineers' and Plumbers'.....	109
Sloyd.....	205	Yarn.....	1030	Iron.....	204
Scraping.....	989	Lathe—		Pocket, Starrett.....	469
Scripping.....	206	Boring Tools, Armstrong.....	161, 162	Shafting, Starrett's.....	109
Knurl Handles	165	Chucks.....	144 to 147	Starrett's.....	109
Knurled Pipe Cutter Wheels	38	Dogs.....	166, 167	Track.....	315
Knurling—		Dog Clamps, Armstrong.....	167	Lever Snips	229
Tool Holders, Agrippa.....	157	Dogs, Adjustable Centre.....	167	Levers—Clutch Shifting	454
Tools, Revolving Head.....	165	Combination.....	167	Life Preserver Cushions	1059
Knurls—		Dogs, with Swivel Jaws.....	167	Life Preservers	1055
For Armstrong Tools.....	165	Mandrels.....	58	Litters—Pump Pipe	746
Milling Wheels for.....	165	Mills.....	68	Lifting—	
"Kook-Kits"—Campers'	948, 1054	Rests.....	814	Jacks.....	323 to 331, 957
"Kwik-Kut" Power Hack		Test Indicator, B. & S.....	87	Tongs, Pump.....	746
Saws	827	Tool Cabinet.....	163	Trucks.....	346
		Tool Holders.....	155 to 160	Lifts (see Elevators).	
		Tool Tongs.....	361		
L					
Lace Cutter—Belt	481				
Lace-On Boots—Auto	921, 922				

INDEX—Continued

L		L		M	
	Page		Page		Page
Light—		Locomotive—Cont'd		Machine—	
Equalizer, Ford.....	948	Switch Rope, Wire.....	382	Screws, all Types.....	273
Guards, Electric.....	973	Torches.....	505	Tools (see Tools, Machine).....	
Lighting Generators—Elec-		Tools, Wrenches, etc.....	177	Taps.....	6
tric, Turbine.....	887	Locomotives—		Machinery—	
Lighting Lamps and Torches		Industrial.....	612	Lubricants.....	1008
Lightning Screw Plates	974 to 979	Logging.....	612	Paint.....	983
Parts for.....	21	Porter.....	612	Jacks.....	327
Lights—		Log—		Machines—Miscellaneous (for	
Automobile Head.....	943	Binders.....	347	others see individual refer-	
Automobile Side.....	943	Binding Chains.....	394	ences).....	
Automobile Spot.....	942	Chain Hooks.....	395	Belt, Lacing.....	479
Automobile Tail.....	943	Marking Stamps.....	251	Blasting.....	334
Carbide, Buckeye.....	977	Logging—		Counting.....	124
Electric Construction and		Engines.....	589	Spraying.....	980, 998
Wrecking.....	887	Locomotives.....	612	Track Drilling.....	314
Flash.....	972	Loose—		Machinists—	
Kerosene Buckeye.....	977	Hook Blocks.....	410	Clamps.....	167, 168
Kerosene Search.....	978	Pin Butts.....	258	Forges.....	368
Lamps and Torches.....	974 to 979	Pulley Oilers.....	508	Tool Chests.....	254
Portable Gasoline.....	977	Pulleys, Davis Ring Oiling.....	456	Vises.....	136, 137
Line Shaft Bearings	441 to 444	"Lowell" Ratchet Wrenches	182	Mail—	
Lineal Measure—Table of	1105	Lubricants—		Bags.....	1061
Linemen's—		Automobile Spring.....	931	Pouches.....	1061
Climber Straps.....	234	Cook's.....	1005	Sacks.....	1061
Climbers.....	234	Graphite.....	1008	Mail Bags—Parcel Post	1062
Reels, Pay-out and Take-up.....	235	Grease.....	1005 to 1008	Magic Chucks and Collets	151
Shovels and Spades.....	349 to 351	Household.....	1003	Magnesia—	
Spoons.....	350	Machinery.....	1001 to 1007	Cement.....	1029
Tool Bags.....	1062, 1063	Oil.....	1001 to 1007	Pipe Covering.....	1028
Torches.....	235	Wire Rope.....	383	Magnetic Hammers	208
Wrenches.....	177	Lubricators—		Magnolia Rope Dressing	390
Liner Plates—Boiler	901	Air Compressor.....	509	Magnolia Rabbit	237
Lines—Automobile Tow	952	Automobile Spring.....	925	Malleable Iron—	
Linen Hose	490	Detroit.....	512	Elevator Buckets.....	467
Lining—		Engine Sight Feed.....	515	Washers.....	291
Automobile Brake.....	951	Force Feed.....	510	Mallets—	
Bars, Track.....	315	Gas Engine.....	509	Calling.....	1024
Screw Conveyor Box.....	472	"Lunkenheimer".....	509	Fibre.....	209
Link Belting	460, 462	"Manzel".....	510	Hickory.....	209
Links—		"Michigan".....	512	Rawhide.....	209
Chain Coupling.....	395, 396	Sight Feed.....	509	Rubber.....	209, 502
Chain Lap.....	396	Steam.....	512	Tinners'.....	209
Chain Repair.....	395, 396	Lufkin Measuring Tapes	122	Manholes—	
Fusible, for Fire Doors.....	262	Lug Hooks	321	Blacksmiths.....	362
Sling Chain.....	395	Handles for.....	321	Expanding Lathe.....	58
Linters—Pile Driver	680	Lugs—		Ground Steel.....	58
Liquid—		Band.....	292	Manhole—	
Bronzing.....	986	Boiler.....	902	Crabs, Boiler.....	902
Gloss.....	989	Kiln.....	292	Diaphragm Pumps.....	736
Gloss, Automobile.....	930	Tank.....	292	Manifold Locks—Automobile	940
Measure, Table of.....	1105	Lumber—		Manilla Rope	385 to 389
"Lisk" Oil Cans and Funnels	1013	Crayons.....	238	Blocks, Steel.....	404, 405
Litharge	987	Gauges.....	123	Blocks, Wood.....	401 to 403, 406
Litters—U. S. Army	1057	Lumberman's—		Dressing.....	390
"Little Giant"—		Cant Hook and Peavies.....	321	Hooks.....	391
Air Drills.....	855	Hookaroos.....	320	Sheaves.....	411
Power Hammers.....	832	Loading Block.....	410	Slims.....	390
Punch and Shear.....	846	Locomotives, Logging.....	612	Splicing of.....	1101
Steam Feed Cooker.....	908	Log Binding Chains.....	394	Thimbles.....	384
Screw Plates.....	19	Log Binders.....	347	Manual Training—	
Screw Plates, Parts for.....	21	Log Chain Hooks.....	395	Benches.....	192, 193
Tank Pumps.....	743	Pickaroos.....	320	Lathes.....	811 to 815
"Little Tugger" Pneumatic		Tents.....	1035	Vises.....	139
Hoists—		Timber Carriers.....	321	Manure Forks	352
Load Binder Chain Hooks.....	396	Tools, Miscellaneous.....	321	Many-Use Screws	279
Loading—		Luncheon Cases Automobile	948	"Manzel" Lubricators	510
Blocks, Lumberman's.....	410	Lunkenheimer—		Maple Rollers	319
Hooks.....	320	Cylinder Cocks.....	513	Marine—	
Spouts Car.....	473	Grease Cups.....	507	Engines, Gasoline.....	889, 890
Lock Nuts	311	Lubricators.....	509	Paint.....	984, 986
Pipe.....	550	Lye	988, 1026	"Mark" Pipe Unions	551
Pump.....	746	M		Markers—Belt	481
Lock Washers	290, 291	Machine Bits	212, 213	Mark Wire	301
Lockers—Sanitary Clothes		Machine Bolts	275, 276	Marking	
Hangers.....	961	Expansion Shields for.....	283 to 285	Brushes.....	993
Locks—		Weights of.....	275	Gauges, Carpenters'.....	203
Automobile Manifold.....	940	Machine—		Marlin Spikes	392, 1073
Nut.....	290	Chains, German.....	397	"Marvel"—	
Car.....	1065	Handles, Drop Forged.....	170	Drill Press Vises.....	149
Pad.....	256, 257	Keys, Gib Head.....	264	Hack Saw Machines.....	826
Switch, Automobile.....	940	Keys, "Woodruff".....	265	Multiple Punches.....	842
Tire.....	925	Oils.....	1002	Portable Punches.....	841
Locomotive—		Machine Screw—		Rot Cutters.....	845
Boilers, Horizontal Fire Box.....	899	Expansion Shields.....	282, 284	Socket Wrenches.....	183
Coaling Barrows.....	341	Nuts.....	289	Masons' Tool Bags	
Coaling Buckets.....	657	Taps.....	7	Massey—	
Cranes.....	666	Threads, Standard Forms.....	10	Machinery Vises or Clutches.....	184
Jack Screws.....	325			Vises, Lightning Grip.....	139
Jacks, Buda.....	328			Mast—	
Oilers.....	506			Bottoms, Derrick.....	642, 643
Rod Reamers.....	59				

INDEX—Continued

M		M		M	
	Page		Page		Page
Mast—Cont'd		Micrometers—		Mine Signal—	
Cleats.....	644	Almons.....	77	Gongs.....	974
Sheaves, Derrick.....	640	Brown & Sharp.....	78 to 81	Systems.....	974
Steps, Derrick.....	642	Inside Gauge.....	81	Whistles.....	974
Tops, Derrick.....	636, 639	Metric Measure.....	77 to 81	Mine Sinking Pumps	708, 730
Master Taps	7	Paper Gauge, B. & S.....	80	Mineral Wool	1029
Match Hooks—Rope	391	Slocumb.....	77	Miners' Inch—Water	1082
Matchers and Planers	870	Starrett's.....	99, 100	Miners' Lamps—Cap.	975, 976
Mastic Boilers—Roofers	1023	Midway Forges	371	Carbide.....	975
Mats—		Milk Pumps—Sanitary	741	Safety.....	974, 975, 976
Automobile Running Board.....	938	Mill Files	129	Miners' Tents	1036
Rubber.....	502	Mill—		Mining—	
Mattocks	354	Brooms.....	997	Buckets.....	656
Asphalt.....	354	Hose, Cotton Rubber-Lined.....	490	Shovels.....	350
Pick.....	354	White Paint.....	981	Minneapolis Heat Regulators	913
Poll.....	354	Millboard—Asbestos Sheet	1029	Mittors—Automobile	942
Mattresses—Cot	1057	Millers Falls		"Missing Link" Chain Couplings	395, 396
Mattress Twines	1030	Automatic Drills.....	216, 217	Mission Finish Stain	985
Maul Handles	356	Breast Drills.....	217, 218	"Misto-Kleen"	930
Mauls—		Milling		"Misto-Kloth"	930
Iron Bound.....	209	Tools or Hand Files.....	131	Mitre—	
Rawhide.....	209	Wheels.....	165	Boxes.....	199
Sewer Builders'.....	209, 681	Milling Attachments—Plain and Universal	802	Saws.....	198
Ship.....	363	Milling Cutters—		Try Squares.....	203
Track.....	315	Angular.....	73	Mitre Gears	459
Mazda Lamps	973	Clamping Plates for.....	65	Cutters for.....	70, 72
Adjustable Reamers.....	57	Coarse Tooth.....	64	Horse Powers of.....	459
Shell Reamers.....	57	Collets for.....	74, 75	Mittors—Diving	795
Measures—		Concave.....	74	Mixers Concrete	647 to 650
Gasoline Automobile.....	1014	Convex.....	74	"Schaefer", Power.....	649
Tables of Weights and.....	1105	End Mills.....	67, 68	Slush.....	647
Tape.....	122, 123	Face.....	658	"Berlin".....	647, 648
Measuring—		Fluting Reamer.....	73	Metal.....	569
Rods, B. & S.....	87	Gear Tooth.....	70, 72	Mixing Valves	937
Tools, Brown & Sharp.....	77 to 96	Grooving Reamer.....	72, 73	Molasses Gates	1017
Tools, Miscellaneous.....	120 to 122	Grooving Tap.....	72, 73	Monkey Wrenches	183 to 185
Tools, Starrett.....	99 to 108, 115, 116	High Speed.....	62	Map, Chicago Package Car Systems	1079
Mechanical—		Hollow Mills.....	68	Mop	
Books.....	76	Inserted Teeth.....	63, 65	Holders.....	1025
Equivalents.....	1094	Involute Gear.....	70, 72	Pails, Roofers'.....	1023
Mechanics—		Metal Slitting Saws.....	66	Sticks.....	1025
Aprons, Canvas.....	1064	Mitre Gear.....	71	Wringers.....	1025
Tool Bags.....	1062, 1063	Nicked Tooth.....	63	Mops—	
Megaphones	1069	Rounding Corner.....	74	Cotton.....	1025
Melting—		Screw Slotting.....	66	Roofing.....	1023
Ladies.....	562, 563, 566, 569	Shell End Mills.....	69	Roofers' Pitch.....	1023
Machines, Lead.....	565	Side Cutters.....	63	"Morse" Diving Apparatus	793 to 798
Points of Metals.....	1113	Sprocket Wheel.....	74	Mortar—	
Pots.....	562, 563, 566, 569	Standard Keyway.....	65	Hods.....	358
Melting Furnaces	562, 566, 569	"T" Slot.....	65	Hoes.....	353
Bottom Draw.....	569	Twist Drill.....	72	Mortise Gauges—Carpenters	203
Tilting Cupolas.....	570	Two-Lipped, Slotting End.....	69	Mortars	
Menders—Hose	493	Mills.....	69	Foot Power.....	880
Messengers' Bags and Satchels	1061	"Woodruff".....	69	Hollow Chisel.....	867
Metal—		Milling Machine—		Mortising Chisels—Machine	877
Fluxes.....	569	Attachments, Plain.....	802	Motor Oil Gauges	515
Glue.....	1026	Attachments, Universal.....	802	"Mossberg" Wrenches	178
Lath.....	1022	Vises.....	148, 149	Most Arm Wire Rope	383
Mixers.....	569	Milling Machines—		Motion Picture Tents—Black	1042
Paint.....	985	Plain.....	801	"Motorbikes"	958
Polish.....	931, 1026	Shaft Key Seaters.....	803	Motor—	
Saw Blades.....	66	Universal.....	801	Cars, Railroad Velocipede.....	609
Shears (or Snaps).....	229	U. S. Hand.....	802	Meters, Boyce, Automobile.....	941
Slitting Saws.....	66	Mills—		Truck Scales.....	580
Workers' Crayons.....	238	End.....	67, 69	Motorcycle Oil	1003
Metals—		Feed.....	964	Motors	
Anti-Friction.....	237	Grinding.....	964	Electric, Alternating, Current.....	884, 885
Babbitt.....	237	Hollow.....	68	Electric, Direct Current.....	883
Melting Points of.....	1113	Lathe.....	68	Slip Ring Induction.....	885
Meters—		Saw.....	862, 863	Moulders—	
Automobile Heat-Ometers.....	941	Spiral Cutters for.....	73	Bristle Dusters.....	995
Automobile, Motor.....	941	Stamp.....	687	Shovels.....	350
Battery.....	941	Woodworking.....	868 to 876	Movers—Car	318
Water.....	553	Mine—		Moving Equipments—House	699, 700
Metla-Cota Boiler Cleaner	1007	Brattice Cloths.....	1050	Moving Picture Tents—Black	1042
Metric—		Cages.....	602	Mowers, Lawn—	
Conversion Table.....	1107	Car Wheels.....	607	Channon.....	969
Micrometers and Gauges.....	78, 83	Car Trucks.....	607	Horse Power.....	970
System and Equivalents.....	1106	Cars.....	603 to 605	Motor Driven.....	97
Mica—Fire	922	Filter Cloths.....	1050	Philadelphia.....	970
Michigan Lubricators	512	Hoisting Sheaves.....	414	Mud Plug Taps	9
Micrometer—		Haulage Equipments.....	413, 601	Mule Shoes	364
Calipers, Brown & Sharp.....	78, 79, 81	Haulage Rollers.....	413	Mule-Stands—Pulley	452
Calipers, Starrett.....	102	Jacks, Buda.....	328	Mundy—	
Cases.....	77	Rope Haulage Appliances.....	413	Electric Car Pullers.....	594
Gauges, B. & S.....	80, 81	Mine Hoists		Electric Hoists, Drum.....	593
Heads, Brown & Sharp.....	81	Double.....		Elevator Cage Hoists.....	655
Heads, Starrett's.....	99	Drum.....	601	Friction Drum Hoists.....	599
Stands, Starrett's.....	100	Horse Power.....	600		
Sets, Brown & Sharp.....	80	Prospectors' Hand Power.....	600		
Sets, Slocumb.....	77	Steam Prospecting.....	600		
Sets, Starrett's.....	100				

INDEX—Cont'ued

M	Page
Mundy—Elevat'd	
Gasoline Elevator Hoists	654
Gasoline Hoists	595
Mine Haulage Engines	601
Mine Hoist, Friction Drum	601
Swinging Engines	596
Music Wire	302
Gauges	98

N	Page
Nail—	
Collars	296
Cutting Nippers	361
Hammers	207
Pullers	250
Sets	114, 227
Sets, Starrett	114

Nails—	
Barbed	298, 299
Box	296, 298
Casting	296
Cement-Coated	296
Clout	299
Common Wire	295, 296
Double-Headed	296
Finishing	298
Flooring Brads (see also Brads)	298
Horseshoe	364
Lath	299
Plaster Board	299
Roofing	299, 1020, 1022
Shingle	299
Special Fine	299
Napping Hammers	317
"Nasen" Steam Traps	537
Neatsfoot Oil	931, 1003
Needles—	
Packing	1073
Sack	1073
Sail	1073

Netting—	
Poultry	968
Staples for	300
Newman Grille Watchman's	
Clocks	963
Neway Melting Furnaces	569
New Yankee Drill Grinders	823
Nipples	
Hose	493
Pipe, Hex Centers	548
Suction Hose	492

Nippers—	
Adjustable Jaw Cut, Starrett	110
Nail Cutting	361
Tile Cut, Starrett	110
Wire	231, 232

Noiseless Blowers—Positive	
Pressure	774

Non-Corrosive Pumps	740
----------------------------	-----

Non-Explosive Oil Cans	1012
-------------------------------	------

"Northfield" Slush Mixers	647
----------------------------------	-----

"Norton" Jacks	329
-----------------------	-----

Nozzles—	
Flow of Water through	1089
Hose	491
Spray	745

"Nugent's" Oil Filters	511
-------------------------------	-----

Numbering—	
Stamps, Steel	251
Stencils	250

Nut—	
Augers	213
Locks, Washer	232
Pliers	232
Splitters	229
Taps	229

Nuts—	
Assorted	288
Brass Cap	289
Case-Hardened	288
Castellated	288
Cold Punched	287
Grip	311
Hexagon	287
Hot Pressed	287
Jam	288
Lock, Track	311
Lock, Pump	746
Machine Screw	289
Planer Head	274
Semi-Finished Brass	288
Semi-Finished Iron	288

N	Page
Nuts—Cont'd	
Semi-Finished S. A. E.	288
Square	287
Thumb	289
Wing	289
"Nye"	
Double Cylinder Steam Pumps	712
Vises	143
O & P Wiping Cloths	226

O	Page
Oakum, Calking	1024
Oar Locks	1055
Oars	1055
"Occidental" Boiler Com-pound	1005

Oil—	
Burners	572
Burner Tiles	572
Cans	1012 to 1014
Car Cans	1012
Colors	988
Compound, Castor	932
Cup Glasses	515
Dispensers	1012
Filters	511
Gates	1017
Gauges, Ford Crank Case	940
Gauges, Motor and Dynamo	515
Hol covers	508
Pumps	515
Pumps, Traction Engine	510
Pumps, Transfer	1011
Separators	1002
Syringes	1017
Tanks	1012
Oil Cups	508
Brass	508
Crank Pin	508
Glass Body	508
Loose Pulley	508
Powder	508
Sight Feed	508

Oil Engines	
Bessemer Horizontal	893
Venn-Severn Vertical	893
Oiled Clothing	1052
Oil Sets	505
Oilers	504 to 513
Auto Pump	506
Auto Spring	925
Engineers' Sets	505
Locomotive	506
Loose Pulley	508
Malleable Iron	504
Pyramid	506
Railroad	506
"Wall's" Bench	504
Zinc	504

Oils—	
Automobile	1003
Automobile Signal	931
Black	1002
Castor	1002
Cresote	985, 1024
Cylinder	1001
"Durable Lac"	991
Dynamo	1002
Engine	1001
Filler, Engineers	505
Floor	991
Harness	1003
Harvester	1003
Household	1003
Lard	1002
Machine	1001
Miscellaneous	1001
Motorcycle	1003
Neatsfoot	931, 1003
Signal	1003
Soap	931
Thread Cutting	1003
Three in One	1003
Tioline Motor	1004
Varnish	991
Worm Gear	1002
Oil Stone Mountings	240
Oil Stones	240
Oil Well Hooks	405
"Old Man" Drilling Posts	223
"Old Man" Stand Drills	851
One-Man Saws	197
Onoko Babbitt	237

O	Page
Openings—Sidewalk	698
Optical Shock Absorbers—	
Automobile	954
Orange Peel Buckets	661, 662

Ore—	
Bin Gates	686
Buckets, Clam Shell	664
Buckets, Elevator	467, 688
Buckets, Miscellaneous	656 to 665
Buckets, Turn Over Mine	656
Cars	604
Classifiers Hydraulic	690
Concentrating Machinery	686 to 691
Crushing Machinery	684, 687, 688
Feeders	686
Jigs, Hartz	689
Shovels	351
Skips	605

Ornaments—Automobile	
Radiator	945

"Oster"	
Adjustable Screw Plates	20
Bull Dog Pipe Die Stock	26
Power Pipe and Nipple	34
Threader and Bolt Cutter	27
Pipe Threading Machines	27

Outfits—Blacksmiths	365, 366
----------------------------	----------

Overalls—	
Automobile	955

Overhead Drills—Phillips	286
---------------------------------	-----

"Overstrom" Concentrators	690
----------------------------------	-----

Ox Shovels—Contractors' Dirt	337
-------------------------------------	-----

Oxy-Acetylene	
Brazing and Welding Out-fits	567, 568

Decarbonizing Outfits	568
Pressure Regulators	568
Supplies	567, 568

P	Page
---	------

Pack Harness	1060
---------------------	------

Package Cars—Map of Chi-cago Systems	1079
---------------------------------------------	------

Package Elevators—Stacking	692
-----------------------------------	-----

Packer Drill Ratchets	220
------------------------------	-----

Packing	499 to 503
----------------	------------

Asbestos Wick	503
Asbestos Rope	503
Braided	503
Daniels P. P. P.	503
Diagonal Rod	503
Dollar, Jr.	501
Flax	500
Gum Core	501
Hemp	503
Hydraulic	500, 501
Jute Gasket	503
"Metalbestos"	501
Needles	1073
Piston Rod	501
Rawhide	501
Shears	481
Sheet	499
Tools, "Pileys"	503
Valve Stem	503

Pack Sacks	1060
-------------------	------

Paddles—Canoe	1055
----------------------	------

Padlocks	256, 257
-----------------	----------

Automobile	256
Motorcycle	256
Switch	256
Yale	256

Page Excavator Buckets	645
-------------------------------	-----

Pail Hooks—Fire	1016
------------------------	------

Pails—	
Cement	1015
Collapsible	1069
Contractors'	1015
Dope	1012
Fibre	1016
Fire	1016
Galvanized	1015, 1016
Garbage	1012
Mop, Roofers	1023
Roofers' Carrying	1023
Roofers' Hoisting	1023
Roofers' Pay Off	1023
Round Bottom	1016
Sand	1016
Wooden	1016
Paine Toggles	283

INDEX—Continued

P	Page
Paint—	
Brushes.....	992
Spraying Machines.....	980
Painters—	
Cornice Hooks.....	1000
Drop Cloths.....	989, 1000
Dusters.....	993
Extension Planks.....	999
Falls.....	1000
Guard Rails.....	999
Ladders and Trestles.....	999
Rope Ladders.....	1000
Stage Cross Bars.....	1000
Stages and Trestles.....	999
Stirrups.....	1000
Straps.....	1000
Paints—	
Aluminum.....	930, 986
Anti-Corrosive.....	986
Anti-Fouling.....	986
Anti-Rust, Lacquer.....	983
Asphalt.....	982
Automobile Colors.....	988
Barn.....	985
Blue Lacquer.....	988
Body Filler.....	985
Boughton Brand.....	980 to 985
Brick Coating.....	981
Bronzite.....	986
Cement Coating.....	981
Cold Water.....	980
Copper.....	986
Damp Proofing.....	985
Dipping.....	982
Dry Colors.....	
Enamel, Radiator.....	985
Enamels.....	985
Engine.....	930, 985
Flat Black.....	983
Flat Wall.....	984
Floor.....	984
Graphite.....	982, 983
Implement.....	985
Iron.....	982
Iron Filler.....	
Japan, Black.....	982
Lacquer, Anti-Rust.....	983
Lead Oil.....	987
Lead, Red.....	987
Lead White.....	987
Litharge.....	984
Marine.....	986
Marine Anti-Fouling.....	985
Metal.....	985
Mission Finish.....	985
Mill White.....	981
Oil Colors.....	988
Porch.....	984
Primer, Galvanized Iron.....	982
Primer, Mill White.....	981
Reducer.....	981
Roof.....	985
Rough Stuff.....	988
Screen.....	985
Smoke Stack.....	982
Stove Pipe Enamel.....	983
Structural.....	982
Wagon.....	985
Yacht White.....	986
Zinc White, in Oil.....	987
Palmetto Tents.....	1038
Palms—Sailors'.....	1073
Pans—Shop.....	255
Paper—	
Asbestos.....	1029
Balers.....	962
Building.....	1020
Cleaner, Wall.....	989
Drawing.....	118
Flint.....	239
Friction Gears.....	452
Garnet.....	239
Gauge Micrometer.....	80
Galleys.....	451
Sand.....	239
Sand.....	988
Sheathing, Rosin Sized.....	1020
Paraffin Wax Candles.....	1024
Parallel—	
Clamps, Starrett.....	106
Door Brackets.....	260
Grinders.....	553
Parallels—Adjustable, Starrett.....	107

P	Page
Parcel Post—	
Mailing Bags.....	1003
Scales.....	573
Zones and Rates from Chicago.....	1080
Parers—Hoof.....	361
Paris—Plaster of.....	987
Parker's—	
Machinists' Vises.....	137
Pat. Pipe Vises.....	140
Parting Tools.....	205
Paste—Dry Asbestos.....	236
Soldering.....	236
Patch Bolt Taps.....	8
Patch Bolts—Boiler.....	274
Patches—	
Automobile Tire.....	921, 922
Automobile Top.....	944
Automobile Tube.....	921, 922, 928
Canvas.....	928
Pattern—	
Fillets.....	252
Letters.....	252
Pattern Makers'—Vises.....	139
Supplies.....	252
Paulins—Canvas.....	1051
Pay Off Pails—Roofers.....	1023
Pay-Out Reels—Rope.....	235
Pearson Jacks.....	326
Peavies.....	321
"Peerless" Adjustable Clamps.....	169
"Penberthy"—Injectors.....	516
Water Heaters.....	522
Pencils—Drawing.....	119
Peter Wright Anvils.....	359
Phillips—	
Hollow Drills.....	286
Slide Rules.....	118
Spring Hammers.....	286
Star Drills.....	286
Photographers' Tents.....	1039, 1042
Pickaroons.....	320
Pick—	
Handles.....	356
Mattocks.....	354
Pick-Up Tongs.....	361
Picks—	
Clay.....	354
Coal.....	354
Drift.....	354
Drifting.....	354
Poil.....	354
Railroad.....	354
Tamping.....	354
Wrecking.....	354
Piercing Saws.....	196
Pig Lead.....	237
Pike Poles.....	320
Pile—	
Bands.....	681
Hammers.....	681
Points.....	680
Pullers.....	681
Saw Arbors.....	685
Straighteners.....	681
Pile Driver—	
Bands.....	681
Boom Fittings.....	682
Caps.....	681
Follower Bands.....	681
Hammers.....	681
Hammer Stops.....	682
Hanging Leaders.....	682
Head Blocks.....	680
Linters.....	680
Nippers.....	680
Points.....	680
Roller Bearings.....	683
Roller Spools.....	683
Sheaves.....	680
Supplies.....	680 to 683
Toggle Irons.....	680
Trips.....	680
Pile Drivers—	678 to 683
Horse Power.....	679
Steam.....	679
Pillar—	
Cranes.....	433
Files.....	132
Pillow Blocks—	
Ball and Socket.....	440, 442
Hyatt Roller Bearing.....	442
4-Point Adjustment.....	442, 443
Rigid.....	440

P	Page
Pin Vises—Starrett.....	108
Pincers—	
Blacksmith.....	361
Farriers.....	361
Pinch Bars.....	318
Pine Tar.....	1024
Pins—	
Cotter.....	263, 264
Cotter, Sheave.....	644
Drift.....	252, 299
Drift.....	316
Escutcheon, Brass.....	267
Steel Bending.....	226
Taper.....	265
Turn.....	226
Pintle Chains—400 Class.....	461
Pipe—	
Areas of.....	1082
Brass.....	310
Cement, Graphite.....	1008
Compressed Air Data.....	1091
Heads, Exhaust.....	539
Lock Nuts.....	1006
Locks, Compound.....	550
Screws, Long.....	548
Shields, Tent Stove.....	1049
Spiral, Reinforced.....	543
Spiral Rivetted.....	544, 545
Wrought Iron, Standard.....	542
Wrought Iron, Special Lengths.....	546
Pipe Covering—	
Asbestos and Magnesia.....	1028, 1029
Accessories.....	1029
Pipe Fittings.....	547, 552
Bends.....	548, 549
Bushings.....	550
Caps.....	550
Couplings.....	548
Crosses.....	550
Elbows.....	547
Joints.....	552
Joints, Weights of.....	1093
Nipples.....	548
Nipples, Hose.....	492
Plugs.....	550
Railway.....	548
Reducers.....	550
Spiral Rivetted.....	545
Tees.....	547
Tees, Branch.....	549
Weights of.....	1092, 1093
Unions.....	551
Pipe Tools—	
Benders.....	849
Die Stocks, "Trio and Duo".....	38
Die Stocks, "Beaver".....	32
Die Stocks, "Oster".....	26
Dies, Adjustable.....	14
Cutters, "Armstrong".....	33
Cutters, "Beaver" Square End.....	37
Cutters, Knurled Wheel.....	38
Cutters, "Strickler".....	38
Cutters, Three-Wheel.....	39
Cutters, "Toledo".....	37
Cutters, "Vosper".....	37
Kits, "Armstrong".....	33
Lifters, Pump.....	746
Reamers.....	61
Stocks and Dies.....	24 to 32
Tap and Drill Combined.....	8
Threading.....	27, 32 to 36
Threading, Armstrong.....	33
Threading, "Bard" Adjust- able Bushing.....	32
Threading, Beaver.....	25
Threading, Hand.....	24, 32
Threading, "Oster".....	27
Threading, Pipe and Nipple.....	34
Threading, Ratchet Ceiling Screws.....	33
Threading, "Toledo".....	31
Threading and Cutting.....	31
Vise, Grips.....	138
Vises.....	138, 140, 141
Vises, "Armstrong".....	141
Vises, Malleable, Hinged.....	141
Vises, Nye Chain.....	143
Wrenches, adjustable Chain.....	186
Wrenches, Agrippa.....	187
Wrenches, Chain.....	186, 187
Wrenches, Gripwell Chain.....	186
Wrenches, "Ideal" Chain.....	186
Wrenches, "Parmelee".....	188

INDEX—Continued

P	Page
Pipe Tools—Cont'd	
Wrenches, "Perfect Handle".....	188
Wrenches, "Stillson".....	188
Wrenches, Tap.....	23
Wrenches, "Trimo".....	188
Wrenches, "Vulcan Bijaw".....	187
Wrenches, "Walco" Adjustable.....	188
Pipes	
Brazing, Blow.....	565
Equalizing of Table.....	1090
Play.....	491
Piston	
Rings, Automobile.....	949
Rod, Packing.....	502
Pitch	
Calking.....	1024
Mops, Roofers.....	1023
Roofing.....	1024
Pittsburgh Perfect Fence	
Welded Wire.....	966, 967
Gates.....	967
Planting Mill Blowers and Exhausters	776
Planer	
Jacks.....	163
Planer Head	
Bolts.....	274
Nuts.....	274
Washers.....	274
Planer Tools	156, 164
"Armstrong".....	160
"Agrippa".....	156
Planers	
Bench, Wood.....	867
Floor, Wood.....	869, 870, 873
Motor Driven, Wood.....	873
Planes	
Circular.....	201
Combination.....	202
Core Box.....	202
Duplex.....	202
Fillister.....	202
Low Angle.....	202
Rabbit.....	202
Scrapper.....	200, 201
Wooden.....	202
Planet Force Pumps	765
Plan Unit Flexible Shafting	445
Plaster Board Nails	299
Plaster of Paris	987
Plasterers' Trowels	206
Plastic Surfacer	987
Plate Washers	280
Plates	
Automobile Step.....	955
Belt.....	480
Boiler Liner.....	901
Celling.....	527, 528
Floor.....	527, 528
Lug, Boiler.....	902
Manhole, Boiler.....	902
Screw.....	16 to 20
Platform	
Elevators.....	692 to 697
Lamps.....	979
Scales.....	574 to 578
Platforms—Freight Elevator	697
Play Pipes—Hose Nozzle	491
Pliers	231 to 233
Belt.....	481
Combination.....	230
Pipe.....	230, 232
Side Cutting.....	232
Slot Cutting.....	232
Flow Bolts	277
Flow Steel Rope	378 to 381
Flows	335
Plugs	
Boiler.....	514
Drift.....	226
Pipe.....	550
Spark.....	936
Plumb Bobs	89, 110, 206
Mercury, B. & S.....	89
Mercury, Starrett.....	110
Plumbers'	
Chain.....	397
Chisels.....	226
Gauges.....	226
Levels, Starrett.....	109
Scrapers.....	226
Tool Bags.....	226, 1063
Tool Chests.....	226

P	Page
Plumbers'—Cont'd	
Tool Rolls.....	1063
Tools.....	226
Plumbs and Levels, 89, 110, 204, 206	
Plungers—Pump Cylinder	754
Pneumatic	
Drills.....	855, 857 to 861
Hammers.....	856 to 858
Hoists.....	859
Plants, Portable.....	782, 786, 787
Rivet Busters.....	856
Tool Hose.....	485
Tools.....	855, 856
Water Supply Systems.....	759 to 767
Pocket	
Levels, Starrett.....	109
Rules, Starrett.....	116
Scribers, Starrett.....	108
Point Thinning Attachments	
Drill.....	823
Points	
Ball, Starrett.....	114
Drill.....	216
Drive Well.....	753
Glaziers.....	989
Pile.....	680
Trammel, Starrett.....	114
Porch	
Chairs.....	1058
Curtains.....	1064
Paint.....	984
Pokers—Boiler Room	322
Pole	
Derricks.....	619
Supports, Lineman's.....	235
Poles	
Flag.....	1065
Pike.....	320
Tent.....	1049
Polish	
Automobile Body.....	930
Furniture.....	989
Metal.....	931, 1026
Polishing	
Heads.....	815
Leaves.....	806, 807, 815
Machines, St. Louis.....	825
Poll	
Mattocks.....	354
Picks.....	354
Pop Safety Valves	532
"Pormo"	
Pumping Unit, Portable.....	727
Utility Engine.....	728
Porter Locomotives	612
Portfolios—Leather	1062
Positive Pressure Blowers	
—Noiseless.....	774
Post Boxes—Rigid	440
Post Drills	373 to 376, 800
Post Hangers	
Ball and Socket.....	440 to 443
"Hyatt" Roller Bearing.....	442, 443
Four-Point Adjustment.....	442, 443
Post Hole	
Augers.....	353
Diggers.....	354
"Postop" Bridge Jacks	328
Posts	
Drilling.....	223
Lathe Tool.....	158
Pots	
Fire.....	562, 563, 566, 569
Glue.....	1027
Melting.....	562, 563, 566, 569
Pouring.....	563
Soldering.....	563
Tallow.....	505, 1012
"Potstada"—Metal Shears	846
Pouches—Mail	1061
Poultry Netting	968
Staples.....	300
Pouring	
Cans, Roofers.....	1023
Pots.....	563
Ladies.....	563, 569, 571
Powder	
Blasting.....	333
Bronze.....	986
Emery.....	244
Tire.....	922
Powell	
Compression Grease Cups.....	507

P	Page
Powell—Contd	
Oil Cups, Glass Body.....	508
Valves.....	530, 531
Power Hammers	
"Boss".....	833
"Little Giant".....	832
"Kerrihard".....	832
Power Shovels, "Clark"	704, 705
Power Transmission, Machinery	438 to 461
Prentiss	
Combination Pipe Vises.....	140
Machinists' Vises.....	137
Preservatives	
Belt.....	478
Tire.....	922, 932
Preservers—Life	1055
Preservo—Tent Waterproofing	1049
Press Jack and Pump—Hydraulic	834
Presses—Arbor	836
Garage.....	837
Hydraulic, Portable.....	834
Straightening.....	836
Pressure	
Blowers.....	773, 775, 778
Gauges.....	516
Pumps, Hydraulic Test.....	741
Regulator Valves.....	534
Water, Tables of.....	1083, 1085
Pressures	
Water Reduced by Friction.....	1085
Preventive—Rust	1003
Prickers	
Sailmakers.....	1073
Primer—Mill White	981
Primers	
Galvanized Iron.....	982
Pump.....	729
"Prismolite" Auto Headlight Lenses	944
Pritchels—Blacksmith	360
"Proft" Farm Bolters	561
Propeller Fans—Motor Driven	777
Prospectors	
Mine Hoists.....	600
Packs and Trail Equipment.....	1060
Sinking Pumps, Mine.....	708
Protectors	
Boot.....	353
Eye.....	249
Protractors—Bevel	
Brass.....	120
Brown & Sharp.....	84, 91
Draughtsmen's.....	84
"Starrett".....	101, 103
Pruning Tools	234
Prun Bars	250
"Pull-Easy" Nail Collars	296
"Pull-U-Out" Portable Automobile Cranes	432
Pullers	
Pile.....	681
Car, Belted.....	703
Car, "Mundy" Electric.....	594
Nail.....	250
Spike.....	315
Stamp.....	701, 702
Pulley Taps	6
Pulleys	
Cast Iron Solid.....	448
Cast Iron Split.....	449
Clutch, Gasoline Engine.....	454, 455
Diameters and Speeds of.....	1096
Friction Clutch.....	453 to 456
Hay Fork.....	410
Hoisting.....	410
Hot House.....	410
Loose, "Davis" Ring Oiling.....	456
Lumberman's Loading Block.....	410
Mule Stand.....	452
Paper.....	451
Steel Split.....	449
Wood Split.....	450
Pulling Machines—Stamp	701, 702
Pulls—Door	261
Pulsometer Pumps	714
Pulverizers—Swing Hammer	688

P	Page
Pumice —Hand.....	1026
Pump —	
Auto, Oilers.....	506
Connections, Automobile.....	935
Cylinder Plungers.....	754
Cylinders.....	754
Diaphragms.....	502
Drive Heads.....	746
Drive Shoes.....	746
Drums and Controls, Triplex.....	721
Earth Augers.....	747
Expansion Drills.....	747
Fittings and Supplies.....	746
Flap Valves.....	729
Flexible Pipe Joints.....	729
Gauges, Automobile.....	935
Governors, "Fisher".....	541
Heads.....	749 to 751
Jacks, Diaphragm.....	748
Jacks, Windmill.....	748
Leathers.....	502
Lifting Tongs.....	746
Lock Nuts.....	746
Pipe Joints, Flexible.....	729
Pipe Lifters.....	748
Primers, Hand.....	729
Primers, Steam.....	734
Relief Valves.....	734
Rod Couplings.....	746
Rods.....	746
Skids, Diaphragm.....	736
Sliding Tongs.....	746
Spray Nozzles.....	745
Strainers.....	731, 734
Sucker Rod Couplings.....	746
Suction Strainers.....	746
Tubing, Automobile.....	935
Valves.....	502, 729, 731
Valves, 7 Birch—Metal.....	710
Valves, Flap.....	729
Valves, Foot.....	729, 731
Valves, Straightway.....	729
Well Cylinders.....	752
Well Drive Points.....	752
Well Screws.....	746
Working Barrels.....	754
Working Head, "Defiance".....	764
Pumping Heads —	
Allrite.....	749
Deep Well.....	750, 751
Pumping Units —	
Centrifugal, Electric.....	724, 730
Centrifugal, Gasoline.....	725
Centrifugal, Steam.....	725
Diaphragm.....	737 to 739
Domestic Water Supply.....	760 to 766
Plunger, Triplex Electric.....	720, 721
"Pormo", Portable.....	727
"Zin-Ho" Centrifugal, Gasoline.....	728
Pumps—Cameron —	
Boiler Feed.....	708
Mine Sinking.....	708
Plunger.....	709
Prospectors Sinking.....	708
Regular Steam.....	707
Removable Bushing, Steam.....	709
Pumps, Centrifugal	722 to 730
Directions for Setting up and Operating.....	729
Electric Driven.....	724, 730
"Evenrude".....	727
Gasoline Driven.....	725
Gravel Dredging.....	723
Mine Sinker.....	730
Single Stage.....	722
Special.....	724
Steam Driven.....	725
Vertical.....	725 to 727, 730
Pumps, Diaphragm —	
Channon.....	735, 737 to 739
"Edson".....	736
Force.....	736, 737, 739
Manhole.....	736
Portable Trench.....	736, 737
Pumps, Electric —	
Air.....	783
Boiler Feed.....	730
Centrifugal.....	724, 730
House.....	763
Plunger.....	720, 721
Pumps, Force —	
Channon Diaphragm.....	739
Hand Rotary.....	742

P	Page
Pumps, Force—Cont'd	
Hand or Windmill.....	744
"Jackson" Double Cylinder.....	740
Manhole.....	736
"Planet".....	765
Plumbers' Brass.....	741
Pumps, Gasoline —	
Curb.....	758
Filling Station.....	758
Force.....	758
Garage.....	756, 758
Pumps, Rotary —	
Blackmer.....	732
Force, Vicking.....	732
Gasoline Force.....	756
Geared Circulating.....	473
Power Force.....	732, 733
Vacuum.....	774
Pumps, Tire —	
Automobile and Bicycle, Hand.....	933
"Bink's" Electric.....	783
Running Board.....	934
Spark Plug.....	934
Stewart.....	934
Pumps, Miscellaneous —	
Air, Diving.....	794
American Test.....	536
Automatic Boiler Feed.....	711
Automobile Grease.....	940
Barrel.....	741
Barrel Spray.....	745
Bilge Trench, Channon Diaphragm.....	738
Boiler Feed.....	708, 710, 730, 742
Boiler Feed, Automatic.....	730
Boiler Test.....	741
Bulldozer Power.....	715
Bulldozer, for Pneumatic Systems.....	763
"Bullock" Rotary Force.....	733
Capacities of.....	1086
Capacities of, at varying altitudes.....	1107
Centre Packed Plunger.....	711
Channon Plunger.....	717
Circulating, Rotary Geared.....	734
Condensation Drying and Feeding.....	711
Condensation Feed and Receiver.....	730
Deep Well.....	750, 751
Divers, Air.....	794
Domestic Water Systems.....	760 to 767
Double Acting Force.....	742
Double Acting Tank.....	743
Dredge, Sand and Gravel.....	677
Dredge Horizontal.....	715
Duplex Vertical Plunger.....	716
Electric House Unit.....	766
Elevations of Water in Feet.....	1084
Hand and Power, Piston.....	704
Hand Power Force.....	741
Hand Power Rotary.....	742
Hydro-Pneumatic Cylinder.....	764
Hydro-Pneumatic Force.....	765
Hydraulic Rams.....	755
Jet "Drainwell".....	523
"Little Giant" Tank.....	743
"Midget" Air.....	780
Milk, Sanitary.....	741
Mine Sinker.....	794
Mine Sinker.....	708
Miscellaneous Data.....	1082
Noncorrosive, "Colco".....	749
"Nye" Double Cylinder, Steam.....	713
Oil, Bullock.....	743
Oil Cased, Suction.....	762, 763
Oil Lubricator.....	515
Oil, Traction Engine Lubricator.....	510
Pitcher Spout.....	745
Pulsometer.....	714
Rockford Single Lever Force.....	742
Sand "Nye".....	742
Sewage Ejectors, Centrifugal.....	730
Simplex Plunger Power.....	716
Single Acting Triplex Plunger.....	718 to 721
Spiral Bilge.....	706
Spray.....	745
Standard, Hand Lift.....	745
Steam Jet.....	522, 523

P	Page
Pumps, Miscellaneous—Cont'd	
Steam Syphon.....	706, 712
Suction Lift at Different Altitudes.....	1107
Test, Hydraulic Pressure.....	741
Transfer, Tin.....	1011
Trench.....	735, 739
Triplex Plunger.....	718 to 721
Triplex, Electric.....	721
"Triumph" Water Lift.....	706
Valvesless Bucket, Automobile.....	940
Windmill.....	744
Punch and Riveter —Pneumatic, Portable.....	843
Punch and Shear —Belled.....	838
Punches, Hand —	
Ball Bearing.....	841
Beam.....	840
Boiler Makers.....	840, 842
Handy.....	842
"Junior" Portable.....	841
"Marvel" Multiple.....	842
"Marvel" Portable.....	841, 842
Screw.....	840
Tinners'.....	844
Whitney.....	842
Punches, Power —	
Boiler Makers.....	839
Hydraulic Beam.....	840
Hydraulic Head.....	840
Pneumatic Portable.....	843
Rapid Action.....	839
Punches and Shears Combined —Hand.....	842 to 846
Punches, Small Tool —	
Backing Out.....	316
Ball Centering.....	288
Belt.....	481
Blacksmiths' Center.....	360
Blacksmiths' Round Eye.....	360
Center.....	227
Center, Brown and Sharp.....	89
Center, Starrett.....	114
Grommet.....	1072
Solid Drive.....	228
Tinners' Hollow.....	228
Track.....	315
Puncture Cement—Tire	929
Push Brooms	907
Push Cars—Railroad	610
Pushers—Car	318
Putty	989
Knives.....	989
Levelers.....	983
Pyramid —	
Oilers.....	506
Torches.....	505
Pyrene Fire Extinguishers	955
Q	
Quarry Cars	603
R	
Rabbit Planes	202
Racine High Speed Metal Saw	829
Racks —	
Auto Tire.....	923
Hose.....	495
Racks and Pinions	459
Radial Ball Bearings	444
Radial Drills	800, 851
Radiation—Heat, Rules for Figuring	916, 917
Radiator —	
Air Valves.....	528
Bronzing Brushes.....	993
Cement.....	932
Covers, Automobile.....	954
Enamel.....	985
Ornaments, Automobile.....	945
Seal Compound, Automobile.....	930
Shields, Automobile.....	950
Valves.....	527, 917
Radiators—Steam and Hot Water Heating	914 to 916
Radius Gauges—Starrett	105
Rag Wipers	1009
Rail —	
Benders.....	317
Cars.....	610
Forks.....	315

INDEX—Continued

	R	Page		R	Page		R	Page
Rail—Cont'd			Reamers—Cont'd			Rivet—Cont'd		
Saws, Hack.....	189	to 191	Bit Stock, Taper.....	60		Clippers.....	229	
Saws, Circular, Portable.....	331		Broaches, Five-Sided.....	55		Extracting Tools.....	480	
Tongs.....	315		Burring.....	61		Forges.....	368, 369, 371	
Track Drills.....	314		Centre.....	61		Sets.....	294	
Railway Fittings—Pipe	548		Chucking.....	54, 60		Sets, Bridge Builders.....	316	
Railroad—			Counterbore.....	61		Snap.....	316	
Adze.....	322		Cutters for Grooving.....	73		Tongs.....	316	
Cant Hooks.....	321		Drill Socket.....	52		Riveted Keys—Flat	264	
Claw Bars.....	315		Eccentric Flute, Hand.....	53		Riveter and Punch—Pneu-		
Crayons.....	238		Enterprise Pipe.....	29		matic.....	843	
Crossings.....	313		Finishing, Adjustable Machine.....	58		Riveters—Stake and Punch	839	
Frogs.....	313		Jobbers, Taper Shank.....	53		Riveting—		
Hand Cars.....	610		"McCrosky" Adjustable.....	57		Clamps, Bridge Builders.....	316	
Lanterns.....	978		Rod, for Locomotives.....	59		Dollies.....	316	
Oilers.....	506		Shell.....	55		Hammers.....	208, 316, 856, 857	
Picks.....	354		Speeds and Feeds of.....	11		Hammers, Bridge Builders.....	316	
Push Cars.....	610		Standard Taper Pin.....	60		Hammers, Pneumatic.....	856, 857	
Rail Cars.....	610		Taper Bridge.....	59		Machines, Belted.....	839	
Scales.....	577 to 579		Taper Pin Sets.....	60		Machines, Hand.....	266	
Scuffle Hoes.....	353		Rebuilding Tire Fabric	928		Machines, Pneumatic.....	843	
Shovels.....	349		Receivers—Air	791		Rivets—		
Spikes.....	311		Reciprocating Drills	216		Miscellaneous.....	266, 293, 294	
Splice Bars.....	312		Recording—			Belt.....	267, 480	
Switch or Wrecking Chains.....	313		Beams, Scales.....	579		Bifurcated.....	266	
Switches.....	313		Scale Tickets.....	579		Bolter.....	293	
Tacks.....	267		Red Cross Cabinets	249		Brake Band.....	266	
Track.....	312, 313		Red Lead	987		Copper.....	267	
Track Bolts.....	311		Reducer—Paint	981		Copper Plated.....	266	
Track Equipment, Data.....	1108		Reducers—			Diameters and Weights for		
Track Drills, Ratchet.....	223		Hose.....	493		Plates.....	1105	
Track Laying Cars.....	610		Pipe.....	550		Iron.....	293, 294	
Trucks.....	344		Reducing Valves—Fisher	535		Shearing and Bearing Values		
Velocipedes.....	610		Reel Jacks	235		of.....	1103	
Rails—			Reels—			Slotted.....	266	
Barn Door.....	262		Cable.....	235		Structural.....	293	
Painters' Guard.....	391		Hose.....	495, 496		Tinners.....	294	
Steel Track.....	312		Take Up.....	235		Tubular.....	266	
Track Drilling and Punching.....	312		Wire or Rope Pay Out.....	235		Weights of.....	293	
Rain Covers—Horse	1066		Reference Disks—E. & S.	247		Riveted Chains—Small Sizes	398	
Rainproof Clothing—Oiled	1052		Refreshment Tents	1040		Rochester Helve Hammers	833	
Raising Forks	320		Registers—Tally	124		Rock Crushers	684	
Rakes—			Reinforcing Bars—Weights of	306		Rock Drills—		
Asphalt.....	352		Reinforcing Wire—Concrete	342		Air.....	858 to 861	
Garden.....	353		Regulators—			Air, Consumption of.....	1090	
Steel.....	352, 353		Acetylene.....	568		Air, Multiplication Factors		
Stone Hop, or Hooks.....	353		Heat.....	913		for Altitude.....	1090	
Tar.....	352		Oxygen.....	568		"Butterfly".....	859	
Two-Man.....	352		Pressure.....	534, 535		"Sergeant".....	860	
Rams—Hydraulic	755		Reinforcing—			"Sullivan".....	861	
Ranges—Contractors' and			Bar Cutters.....	843		Rock Surfaced Shingles	1019	
Campers' Cooking.....	1053, 1054		Bar Benders.....	847, 848		Rocker Dump Cars	604	
Rapid Acting Vises	139		Bars, Concrete.....	306		Rocking and Dumping		
Rapid Action Power Punch	839		Wire, Concrete.....	342		Grates, Bolter—Kelly.....	904	
Rasps and Files	125 to 131		Relief Valves	533, 734		Rockwell Oil Burners	372	
Ratchet—			Reliners—Tire	921		Rod—		
Braces.....	214, 215		Remover—			Couplings, Pump.....	746	
Drills, "Armstrong's".....	220 to 223		Carbon.....	930, 931		Cutters and Shears.....	845	
Jacks, Bell Base.....	325		Varnish.....	991		Turnbuckles.....	399	
Punches.....	841		"Renshaw" Ratchet	222		Rods—		
Screw Drivers.....	225		Replacers—Car	317		Bessemer, Copper Plated.....	303	
Tap Wrenches.....	23		Reseating Tools—Valve	527		Brass.....	308	
Wrenches.....	178, 180, 182		Respirators	249		Bridge.....	280	
Ratchets—			Rests—Lathe	814, 815		Bronze.....	308	
"Armstrong" Drill.....	221, 222		Retainers—Automobile Grease	938		Dock.....	281	
Boiler Drill.....	220, 221		Retort Cement—Asbestos	1028		Drill, Round.....	303	
Combination Drill.....	220		Return Bends—Pipe	549		Drill, Square.....	302	
"Giant" Track.....	223		Revolver—Automobile Top	932		Guy.....	281	
"Keystone" Drill.....	220		Revolving Screens—Rock	685		Measuring, B. & S.....	87	
"Packer" Drill.....	220		Rex Spark Plugs	936		Pump.....	746	
"Renshaw" Drill.....	222		Ribbed Compression Couplings	439		Roof.....	280	
"Satco" Drill.....	223		Riddles—Foundry	253		Weights of.....	1103	
Sleeve.....	220		Ridge—			Turnbuckles.....	280	
Steamboat.....	326		Capping, Steel.....	1022		Roll Crushers	688	
"Universal" Drill.....	222		Coverings, Steel.....	1022		Roller Bearing—		
Rates—			Rolls, Steel.....	1022		Car Wheels.....	607	
Express.....	1081		Riffers—Belt	134		Drop Hangers.....	442	
Freight.....	1075 to 1078		Right Angle Drives	447		Pillow Blocks.....	442	
Parcel Post.....	1080		Rim Cement—Bicycle	929		Post Hangers.....	442	
Rattan Brooms	997		Rim Tools—Automobile	922		Turnbuckles.....	608	
Rawhide—			Rims—Demountable Auto-			Roller Bearings—		
Belt Lace, Leather.....	479		mobile.....	949		Pile Driver.....	683	
Mallets.....	209		Ring Bolts	400		Roller Chains—E. C. Class	461	
Mauls.....	209		Ring Screws	400		Roller Spools—Pile Driver	683	
Packing.....	501		Rings—			Rollers—		
Rayfield Carburetors	937		Awning.....	1068		Barn Door Stay.....	262	
Reamer—			Caisson.....	660		"Boggie".....	347	
Bits.....	228		Piston, Automobile.....	949		End.....	347	
Drill Holders.....	162		Rip Saws	195		Gum Wood.....	470	
Reamers—			Ripping Hammers	208		Idler.....	960	
Arbors for.....	55		Rivet—			Lawn.....	960	
Automobile Cylinder.....	56		Busters, Pneumatic.....	316, 856		Maple.....	319	
Bit Stock Sets.....	60							

INDEX—Continued

R	Page
Rollers—Cont'd	
Mine Haulage	413
Rope Haulage	413
Side Rubbing	347
Track, Chilled Face	413
Rolls	
Bed	1059
Crushing	688
Plumbers' Tool	1063
Ridge, Steel	1022
Steel Roofing	1021
Romort Tire Testers	922
Rope	
Coating	1020
Paint	985
Rods	280
Roofers	
Asphalt Heaters	1023
Asphalt Kettles	1023
Brushes	994, 1020
Calking Furnaces	1023
Calking Ladders	1023
Calking Tools	1023
Carrying Pails	1023
Dippers	1023
Hoisting Pails	1023
Mastic Boilers	1023
Mop Pails	1023
Mops	1023
Pay Off Pails	1023
Tar Heaters	1023
Roofing	
Asphalt	1018, 1019
Caps	1020
Cement	1020
Crimped Sheet	1021
Granite Surfaced	1019
Materials	1018 to 1022, 1024
Nails	299, 1020, 1024
Pitch	1024
Rock Surfaced	1019
Steel	1021
Steel Cap	1021
Standing Seam	1021
Steel Roll	1021
Tins	1020
Tools	1023, 1024
Washers, Lead	1022
Rooter Plows	335
Rope	
Ajax Manila, Specifications	
Prices	385 to 389
Blocks, Cargo Hoisters	409
Blocks, Tackle	401 to 406
Caisson	660
Clamps, Wire	384
Clips, Wire	384
Cotton	1030, 1070
Dressing, Manila	390
Dressing, Wire	383
Grips, Haulage	413
Hay	1030
Hide	1030
Hoists, Star Self-Locking	417
Hooks, Sister or Match	391
Hooks, Swivel	391
Hooks, Wire	391, 395
Hooks, Manila	391
Hawser Laid, Drilling	386
Ladders	1000
Lead	503
Manilla	385 to 389
Manilla, Splicing of	1101
Manilla, Wrecking	390
Packing, Asbestos	503
Reels, Pay-Out	235
Reels, Take-Up	235
Sheaves	411
Sheaves, Diameters and	
Speeds of	1096
Shackles	392
Slings, Manila	390
Slings, Wire	382
Splicing	387
Sockets	391
Switches	387
Swivels, Wire	392
Thimbles, Manila	384
Thimbles, Wire	1073
Well Drilling	386
Wire	377 to 383
Wire, Guy	383

R	Page
Rope—Cont'd	
Wire, Marlin Spikes	392
Wire Turnbuckles	392
Wrecking	387
Wire Switch	382
Rosin	1024
Rotary Pumps	732 to 734
Blackmer	732
Force, Hand	742
Force, Power	732, 733
Gasoline	736, 738
Vacuum	774
Round Leather Belting	478
Rough Stuff	988
Rubber	
Aprons	1068
Belting	476
Boots	1052
Cement, Bicycle	929
Diaphragms, Pump	502, 735
Diving Mittens	1026
Floor Scrubbers	1026
Gaskets	500
Gloves, Gauntlet	1068
Goods, Special Moulded	502
Hose	482 to 488
Mallets	209, 502
Mats, Door	502
Matting	502
Pump Valves	502
Seal, Tire Repair Gum	929
Sheave Filling	502
Sleeves, for Pliers	233
Step Plates, Automobile	955
Tires, Automobile	918 to 920
Tires, Bicycle	960
Tubing	488
Tubing, Automobile Pump	935
Tubing, Snap	798
Tubes, Automobile, Inner	920
Window Cleaners	1026
Rubber Lined Sheaves for	
Wire Rope	414
Rubbing	
Brushes, Furniture	994
Bricks	244
Rule	
Clamps, Starrett	104
Holders	95
Rules	
Board	123
Blacksmith, Starrett	116
Boxwood	121
Brass, Starrett	116
Caliper, Brown & Sharp	93, 95
Caliper, Starrett	116
Combination	123
Flexible, Brown & Sharp	94
Flexible, Starrett	115
Hook, Brown & Sharp	94
Hook, Starrett	115, 116
Johnson's	123
Key Seat, Brown & Sharp	95
Key Seat, Starrett	104
Phillips' Slide	118
Pocket, Starrett	116
Rustless	123
Shrink, Brown & Sharp	95
Shrink, Starrett	115
Shrinkage	121
Slide, Brown & Sharp	95
Steel, Brown & Sharp	94, 95
Steel, Starrett	115, 116
Thumb Slide	116
Zig-Zag	121, 122
Runners—Joint	226
Running Board Mats—Au-	
tomobile	938
Rust Preventive	1003
Rustless Rule	123
S	
Sack Needles	1073
Sacks (see also Bags)—	
Mall	1061
Pack	1060
Safety	
Belts, Window Washers	1068
Chain	397
Hasps	258
Lamps, Miners	974
Set Collars	439

S	Page
Safety—Cont'd	
Set Screws, "Allen"	272
Set Screws, "Mac-It"	271
Straps	234
Valves	532
"Safety-First"—	
Nail Hammers	207
Machineists' Hammers	207
Sail	
Tack	1071
Hooks	1073
Needles	1073
Twine	1070
Sailmakers	
Dies, Grommet Setting	1072
Fids, Hand	1073
Fids, Standing	1073
Grommets, Brass	1072
Marlin Spikes	1073
Needles	1073
Palms	1073
Prickers	1073
Punches, Grommet	1072
Round Thimbles	1073
Sail Hooks	
Salamanders	358
Salem Steel Elevator Buckets	465
Salts—Soldering	236
Sampson	
Spark Plugs	936
Wagon Jacks	957
Wire Grips	234
Sand Blast	
Hose	488
Outfits	792
Sand Dredges—Suction	677
Sand	
Driers	560
Drills, Pump	747
Excavators, Drag Line	674
Pails	1016
Paper	239, 988
Pump Parts	747
Pumps	677, 712, 723, 747
Screens, Yard	343
Separators, Conical	676
Sifters	253
Washing Screens	675, 676
Sand and Gravel	
Pumps, Centrifugal	677, 723
Pumps, Dredge	677
Screens	675
Washing Equipments	674 to 676
"Sarco" Steam Traps	538
Sash	
Brushes	993
Chain	397
Chain Fixtures	398
Chain Hooks	398
Cord, Hemp	1030
Cord, Wire	383
Satchels	
Letter Carriers	1062
Messengers	1061
"Sateco" Ratchets	223
Saw	
Arbors, Pile	683
Brazing Outfits	199
Clamps	199, 200
Frames, Hack	191
Frames, Power	863
Handles	197
Mill Dogs	865
Mitre Boxes	199
Sets	199
Sharpeners, Automatic	866
Solder	199
Swages	866
Taps, Combination	873, 874
Tools with Guard	873
Tools	200
Upset or Swage Jumper	200
Vises	200
Saw Blades	
Band	199
Circular	198
Hack	189, 190
Jewelers	196
Scroll	877
Saw Mill Dogs	865
Saw Mills	
American	862, 863
Friction Feed, Drag	862, 865

INDEX—Continued

S	Page	S	Page	S	Page
Sawing Timber, Power re- quired for......1102		Scrapers—Cont'd		Screws—Cont'd	
Saws—		Contractors' Flat Board.....336		Cap, Filler Head.....270	
Back.....195		Contractors' Tongue.....336		Cap, Flat Head.....270	
Band, Metal.....829		Contractors' Wheeled.....336		Cap, Hex. Head.....269	
Band, Motor Driven.....873		Cylinder Head.....238		Cap, S. A. E.....269	
Band, Belted.....878		Floor and Cabinet.....200		Cap, Socket Head.....272	
Cableman's.....235		Flue.....554		Coach.....282	
Carpenters.....195, 196		Plumbers.....226		Hanger.....279	
Circular, Foot Power, Wood.....879		Sidewalk.....353		Jack.....106, 325	
Circular, Hand Rip.....880		Universal, Starrett.....114		Jack, "Little Giant", Starrett.....106	
Circular, Speeds of.....1102		Wood.....200		Lag.....282	
Compress.....196		Yard, Power.....704		Machine.....273	
Coping.....196				"Many-Use".....279	
Copper, Slitting.....66		Scraping Knives......989		Pipe, Long.....548	
Flooring.....193		Scratch—		Ring.....400	
Friction Drag.....865		Brushes.....996		Set.....269 to 272	
Hack, Hand.....180 to 191		Gauges, Starrett.....108		Thin.....270	
Hack, High Speed Power 826 to 829		Screen Cloth—		Wood, Brass and Iron.....268	
Hack, "Marvel" Power.....826		Brass.....965		Wood, Hand.....169	
Hack, Q. & C. Power.....827		Steel.....965			
Hack, "Rapid Cut", Power.....830		Window.....965		Scribers—	
Hack, "Racine", Power.....829		Screen—		Brown & Sharp.....89	
Hack, "Sterling", Power.....828		Paint.....985		Starrett.....108	
Hand, "Wood Worker's".....195 to 197		Screens—		Scroll Chucks......147	
Handy.....195		Bar.....685		Scroll and Circular Saws—	
Metal, Band.....829		Coal Yard.....343		Foot Power.....879	
Metal, Hand, Circular.....831		Grizzly.....685		Scroll Saw Blades......877	
Metal, Power, Circular.....830, 831		Gravel Yard.....343		Scroll Saws—	
Metal, Sharpeners for.....866		Revolving Ore, Trommel.....689		Hand.....196	
Mitre.....198		Rock.....685		Foot Power.....881	
Nests of.....196		Sand and Gravel Washing.....675, 676		Scrub Brushes......994, 996, 1026	
Piercing.....196		Sand Yard.....343		Scrubbers—Floor......994, 1026	
Rail, Portable Q. & C.....831		Stone.....675		Scuffle Hoes......353	
Rip.....195		Well Pump.....746		Searchlights—	
Scroll, Foot Power.....881		Screw—		Automobile Spot.....942	
Scroll, Hand.....196		Anchors.....283		Construction and Wrecking.....887	
Skew Back, One-Man.....197		Blanks, Thumb.....270		Kerosene.....978	
Swing.....873, 876		Conveyors, Steel.....471, 472		Seat Covers—Automobile......953	
Turnip, Hand.....196		Conveyor Hangers.....472		Sectional Pipe Covering—	
Cross Cut, Two-Man.....197		Eyes.....400		Accessories.....1029	
Scale—		Gauges.....96, 98		Asbestos and Magnesia.....1028, 1029	
Recording Tickets.....579		Holder Bits.....225		Seine Twine.....1071	
Weights.....579		Hooks.....400		"Self-Lubricating" Bushings......412	
Scales......573 to 580		Machine Die Holders.....22		"Senior" Portable Pneumatic Plant......787	
Automatic Dial.....580		Machines.....805, 806		Sensitive Drills—Electric......852	
Boxwood Drafting.....120		Pitch Gauges, Brown & Sharp.....86		Separators—	
Dairy.....575		Pitch Gauges, Starrett.....105		Oil.....1002	
Express Packages.....574		Punches.....840		Sand.....676	
Foundry.....573		Slotting, Cutters.....66		Water, for Air Line.....791	
Groceries.....573, 574		Slotting, Hack Saw Blades.....190		Sergeant Air Drills......858 to 860	
Motor Truck.....577, 580		Thread, Tool Gauges.....98		Set Collars......439	
Parcel Post.....573		Screw Cutting Lathes—		Set Hammers......360	
Pitless, Transportation.....578		Belted.....808, 809		Set Screw Wrenches......175	
Platform Counting.....574		Foot Power.....813		Set Screws......269 to 272	
Platform Portable.....574, 575		Screw Driver—		Blind.....271	
Railroad Track.....579		Bits.....228		Cup Points.....269	
Railway.....577		Sets.....224		Safety, Hollow.....271, 272	
Recording Beam, Railway.....579		Screw Drivers—		Setting Dies—Grommet......1072	
Scoop.....579		All Steel.....225		Sets—	
Suspension, Crane.....573		Benjamin.....224		Nail.....114, 227	
Triangular, B. & S.....93		Boughton.....224		Rivet.....294, 316	
Wagon.....577, 578		Champion.....224		Slide.....316	
Warehouse Dormant.....576		Combination Hammer.....225		Sets' Derricks......619	
Warehouse, Portable.....576		Friction Drive.....224		Settees—Lawn......1058	
Warehouse, Track.....577		Magazine, Starrett.....110		Sewage—Ejectors Centrifugal......730	
Wheelbarrow.....576		Perfect Handle.....224		Sewer—	
Wool.....575		Pocket, Starrett.....110		Mauls.....209, 681	
Schaefer Concrete Mixer......649		Ratchet.....225		Shovels.....349, 351	
School—		Rubber Covered.....224		Trench Braces.....332	
Cravens.....238		Three-Bit.....225		Shackle—	
Bells.....518		"Yankee".....225		Blocks, Bullock.....403	
Work Benches.....192, 193		Screw Holder Bits......225		Blocks, Rope.....404 to 408	
Scissors—Electricians......233		Screw Plates......16 to 20		Hooks, Chain.....395	
Scoop Handles......357		Adjustable.....20		Shackles	
Scoops—		Automobile.....18, 20		Anchor.....392	
Grain.....964		Boiler Maker's.....19		Derrick, Guy.....643	
Shovel, Hand.....351		"Bull Dog".....18		Shades—Sun, Wagon......1068	
Shovel, Power.....704		Extra Parts for.....22		Shapers—Single Spindle......870	
Scout—		Full Mounted.....17 to 19		Shaft Couplings—	
Axes.....1069		Garage Use.....18		Flanged.....439	
Kits, Tool.....1069		"Green River".....20		Ribbed Compression.....439	
Tents.....1036		"Green River", Parts for.....21		Sleeve.....439	
Scrapper—		Leather Rolls.....18		Shafting—	
Drums.....704		"Lightning".....19		Cold Rolled.....438	
Excavators.....668 to 671		"Lightning", Parts for.....21		Flexible.....445, 446	
Planes.....200		"Little Giant".....19		Keys.....438, 403	
Scrapers—		"Little Giant", Parts for.....21		Keyseaters.....438, 803	
Bending.....238		"Oster", Adjustable.....20		Levels, Starrett's.....109	
Carbon.....238		Screw Threading Dies......15		Key Seats for, Standard.....438	
Contractors' Buck.....337		Screws—		Horse Powers of.....1095	
Contractors' Drag.....337		Allen Safety Set.....272		Shafts—Winch.....594	
		Bench.....194		Shaking and Dumping	
		Cap.....269, 272		Grates—Simplex.....904	
		Cap, Allen Hollow.....272		"Shaler" Vulcanizers......926	

INDEX—Continued

S	Page	S	Page	S	Page
Shaper Tools	164	Shoes—Cont'd		Skid Cars	605
Shapes of Cutter Tool—		Horse.....	364	Ships	
Steel	163	Inner Tire, Auto.....	921, 922	Derrick.....	659
Sharpeners for Metal Cut-		Mule.....	364	Ore.....	605
ting Saws	866	Pump Drive.....	746	Stone, Pressed Steel.....	659
"Sharpeners" Cold Chisels	227	Shop		Slater's Felt	1020
Shave Hooks	226	Crane, Portable.....	432, 433	Sleds—Stone Derrick	646
Shaves—Spike	204	Pans.....	255	Sledge	
Shavings Exhausters	775	Shovel	357	Hammers.....	363
Shearing and Bearing Values		Handles.....	357	Handles.....	356
of Rivets	1103	Parts, Clark Power.....	705	Sledges	
Shears		Shovels		Blacksmiths'.....	363
Bar and Rod, Hand.....	843, 845	"Ames".....	351	Stone.....	363
Belting and Packing.....	481	Brick.....	349, 351	Sleeping Bags	1059
Bench, Hand.....	229	Clark Automatic Power.....	704	Sheets—Bed, Stockmen's	1059
Bolt Clipping.....	229	Coal.....	351	Sleeve	
Concrete Bar Hand.....	843	Coke.....	351	Clamps, Lineman's.....	233
Metal Snips.....	229	Contractors' Hand.....	349	Couplings.....	439
Nut Splitting.....	229	Contractors' Scraper.....	337	Drill Ratchets.....	220
Plate Cutting, Hand.....		Hand.....	349 to 351	Sleeves	
Power.....	843, 844 to 846	Irrigating.....	350	Hose Dredging.....	488
Sheathing Paper—Rosin Sized	1020	Mining.....	350	Rubber, for Insulating Pliers.....	233
Shave		Moulders'.....	350	Slice Bar Filing Tool	322
Blocks, Cargo Hoisters.....	660	Ore.....	351	Slicks—Socket	205
Boom Ends.....	641	Railroad.....	349	Slickers	1052
Bushings, Graphited Bronze.....	412	Sewer.....	349, 351	Slide Rests, Lathe	815
Filling Rubber.....	502	Snow.....	351	Slide Rule Callipers—Starrett	102
Pins, Derrick.....	644	Steam.....	673	Slide Rules	
Stands.....	414	Telegraph.....	350	B. & S.....	95
Sheaves		Shrink Rules		Phillips.....	118
Car Puller.....	703	Starrett.....	115	Sildes—Tent	1049, 1073
Caisson.....	660	Shrinkage of Castings	1105	Sliding Door Latches	262
Derrick.....	621	Shrinkers		Sliding Tongs—Pump	746
Derrick, Boom.....	643	Axel.....	372	Siling	
Derrick Guide.....	635, 644	Tire.....	372	Chain Fittings.....	394
Derrick, Mast.....	640	"Slamers" Hose Connections	494	Chain Links.....	395
Derrick, Strapped.....	644	"Sibley" Tents	1034	Chains.....	394
Gate.....	414	Side		Slings—Manila Rope	390
Idler.....	414	Lamps, Automobile.....	943	Wire Rope	382
Manila Rope.....	411	Milling Cutters, Inserted Teeth.....	63	Sitting	
Mine Haulage.....	413	Milling Cutters, Plain.....	63	Files.....	133
Mine Hoisting.....	414	Pulleys.....	410	Saws, Metal.....	66
Miscellaneous.....	414	Sets.....	316	Slocum Micrometers	77
Pile Driver.....	680	Tools, Armstrong.....	159	Slotted Rivets	266
Rope, Diameters and Speeds		Sidewalk		Slotted Tools	162
of.....	1096	Cleaners.....	353	Slotting Cutters—Metal	66
Rope Guide.....	414	Doors.....	698	Sloyd Knives	205
Rubber Filling for.....	502	Elevators, Basement.....	698	Slush Mixers—Concrete	647
Wire Rope.....	411, 414	Siding—Steel	1021, 1022	Smith's Patent Pipe Vise	140
Wire Rope, Rubber Filled.....	414	Sifters—Sand	253	Smolenski Check Valves	524
Sheet		Sight Feeds	509, 510	Smoke Stack Paint	982
Brass.....	309	Lubricators.....	509, 510	Smoke Stacks—Capacities of	1103
Bronze.....	309	Oil Pumps.....	215	Snap Hooks—Boat	392
Packing.....	499	Oilers.....	508	Snap Rivet	316
Shell Bags	1062	Valves.....	509	Snaps	
Shell Reamers	55	Sight Feeds—Independent Oil	515	Compound Lever.....	229
Shellac		Signal		Telephone Wire.....	229
Gasket.....	930, 932	Gongs, Miners'.....	974	Tinners'.....	229
Gums.....	991	Oil.....	1003	Snatch Blocks	406 to 409
Varnish.....	932, 991	Oil, Automobile.....	931	Jackson.....	409
Shells		System, Miners'.....	974	Manila Rope, Wood.....	406
Expansion.....	282 to 284	Whistles, Miners'.....	974	Manila Rope, Steel.....	406
Shelter Tents	1036	Sil Bore	215	Producers' Steel.....	405, 408
Shields		Silo, Ratchet Wrenches	182	Wire Rope, Steel.....	406 to 409
Automobile Radiator.....	950	Silver Saw Solder	199	Snow	
Expansion, for Bolts and		"Silm-Pull" Countershafts	447	Brooms.....	997
Screws.....	282 to 284	"Simplex"		Shovels.....	351
Shifter Yokes	454	Plunger Power Pump.....	716	Soap	
Shingle Nails—Wire	299	Shaking and Dumping Grates.....		"Crystall" Scouring.....	1026
Shingle Stains	985	Boiler.....	904	Oil.....	931
Shingles—Rock Surface Roof-		Sinks—Kitchen, Enamel	770	"Savon Imperial".....	1026
ing	1019	Siphon Pumps—Steam Jet	522	"White Cloud" Floating.....	1026
Ship		Siphons		Soapstone Crayons	238
Adze.....	322	Steam Gauge.....	513	Socket	
Adze Handles.....	356	Skid Rope	1030	Sicks.....	205
Augers.....	212	Sisal Hooks for Rope	391	Wrench Sets.....	179, 181
Chisels.....	363	Sizing		Wrenches.....	179, 181
Seam Brushes.....	994	Glue.....	1027	Socket But Chisels	205
Shipping Data		Wall.....	987	Socket Firmer	
Express Charges based on		Skeleton Arches, Boilers	903	Chisels.....	205
Rates.....	1081	Skid Excavators	667	Gauges.....	205
Express Rates.....	1081	Skidder Tackle Blocks	409	Socket Framing Chisels	205
Freight Classifications.....	1074, 1075	Skidding Tongs	320	Socket Handles	178
Freight Rates.....	1075 to 1078	Skids		Offset.....	181
Package Car, Map of Chi-		Barrel and Box.....	344	Socket Head Cap Screws	272
cago System.....	1079	Diaphragm Pumps.....	736	Sockets	
Parcel Post Rates and Zones.....	1080	Skinner		Drill.....	52
Table of Measures.....	1105	Drill Chucks.....	152	Blacksmith Drill.....	223
Shock Absorbers		Drill Press Vises.....	148	Pressed Steel, Wrench.....	181
Automobile.....	937	Planer Chucks.....	148	Wire Rope.....	391
Optical.....	954	Valve Reseating Tool.....	527	Solder	
Shoe		Skinner's—Wire	234	Band Saw.....	199
Diving.....	793	Skins—Chamois	989	Bar.....	237
				Wire.....	237

INDEX—Continued

S	Page	S	Page	S	Page
Soldering—		Spouts, Grain—Cont'd		Standard—Cont'd	
Brushes, Fountain.....	236	Distributing.....	473	Spiral Pipe, Reinforced.....	543
Compounds.....	236	Flexible.....	473	Stands—	
Copper, Handles.....	236	Sprague Electric Hoists	425	Glue.....	1027
Coppers.....	236	Spray—		Mule.....	452
Flux, Aluminum.....	236	Nozzles.....	491, 745	Stanley—	
Furnaces.....	562, 563, 569	Pumps.....	745	Beiting.....	477
Irons.....	236	Spraying Machines—		Planes.....	200, 201
Liquids.....	236	Barrel.....	745	Staples—	
Pastes.....	236	Disinfecting.....	998	Poultry Netting.....	300
Pots.....	563	Pail.....	745	Wire Fence.....	300
Salts.....	236	Paint.....	980, 998	Wire Hoop.....	300
Sticks.....	236	Tree.....	998	Staples and Hasps—	
Supplies.....	236	White Wash.....	998	"Star"—	
Solid Drive Punches	228	Spring—		Drill Chucks.....	154
Solid Journal Boxes	440	Bumpers—Automobile.....	946, 947	Drills.....	286
Spades—		Cotters.....	263, 264	Hoists.....	417
Concrete, "Bullock's".....	350	Dollies.....	316	Starrett's Tools.....	99 to 116, 231
Ditching.....	350	Hammers, "Phillips".....	264	Anvil Micrometers.....	99
Drain.....	350	Keys, Flat.....	286	Ball Points.....	114
Spading Forks	352	Lubricants, Automobile.....	931	Bevels, Combination.....	101
Spanners		Lubricators, Automobile.....	925	Buttons, Toolmakers.....	107
Adjustable.....	178	Washers.....	290	Calipers, Crank Shaft.....	111
Face.....	178	Wire, Brass and Steel.....	302	Calipers, Firm Joint.....	111
Hook.....	178	Springfield Feed Water		Calipers, "Hermaphrodite".....	111
Hose.....	493	Heaters and Lime Extrac-		Calipers, Lock-Joint.....	111, 113
Pin.....	178	tors.....	907	Calipers, Micrometer.....	99, 100
Spar Varnish	991	Springs—		Calipers, Slide.....	102
Spark Plug—		Automobile.....	925	Calipers, Spring.....	111, 112
Carbon Scrapers.....	238	Bending.....	220	Caliper Squares.....	102
Intensifiers.....	924	Sprinklers—Lawn	494	Calipers, Vernier.....	102
Wrenches.....	181	Sprocket		Centre Punches.....	114
Spark Plugs—		Chain Tightener.....	470	Centre Testers.....	107
Spauling Hammers.....	363	Idlers.....	470	Clamps, Toolmakers.....	106
Special Bolts.....	281	Wheels.....	463, 464	Cross Test Levels.....	109
Spectacles—Safety.....	249	Milling Cutters for.....	74	Countersinks.....	110
Speed Counters—"Veeder"	124	Spur Gear—		Dividers.....	112, 113
Speed Indicators—		Milling Cutters.....	70, 72	Drill Blocks and Clamps.....	106
B. & S.....	87, 124	Selection Chart.....	1100	End Measuring Rods.....	100
"Lightning".....	124	Spur Gears	457	Gauges, Centre.....	116
Starrett.....	108	Horse Powers of.....	459	Gauges, Depth.....	105, 106
Speed Lathes	812	Rack and Pinion.....	459	Gauges, Drill, Tap and Wire.....	109
Speeders—Drill	12	Square		Gauges, English Metal.....	99
Speeds of—		Measure, Table of.....	1105	Gauges, Fillet.....	105
Circular Saws.....	1102	Squares—		Gauges, Height.....	106
Emery Wheels.....	1102	Bevel.....	203	Gauges, Inside.....	100, 101
Speeds and Feeds of—		Caliper, B. & S.....	92	Gauges, Radius.....	105
Reamers.....	11	Caliper, Starrett.....	102	Gauges, Scratch.....	108
Taps.....	11	Centre, B. & S.....	92	Gauges, Screw Pitch.....	105
Spelter—Brazing	237	Combination, B. & S.....	91	Gauges, Surface.....	107, 108
Spike Pullers	315	Combination, Starrett.....	104	Gauges, Thickness.....	105
Spikes—		Double, Starrett.....	103	Gauges, Wire.....	105, 109
Boat.....	297	Standard, Starrett.....	104	Indicators, Dial Test.....	107
Railroad Track.....	311	Steel, B. & S.....	92	Indicators, Speed.....	108
Wire.....	297	Steel, Miscellaneous.....	203	Indicators, Universal Test.....	107
Marline.....	392, 1073	Steel, Starrett.....	102, 103	Jack Screws.....	106
Spindle Stay Bolt Taps	9	"T".....	120	Key Seat Clamps.....	104
Spiral—		Takedown, Steel.....	203	Key Seat Rules.....	104
Bilge Pumps.....	706	Try, B. & S.....	92, 93	Levels.....	109
Conveyors.....	471, 472	Try, Miscellaneous.....	203	Micrometer Calipers and	
Jaw Clutches.....	443	Try, Starrett.....	102, 103	Gauges.....	99, 100
Mills, Cutters for.....	73	Universal Centre.....	92	Micrometer Heads.....	99
Spiral Pipe—		Squeeze—		Micrometer Sets.....	100
Fittings.....	545	Floor Cleaners.....	994, 1026	Micrometer Stands.....	100
Flanges.....	545	Window Cleaners.....	994, 1026	Nail Sets.....	114
Rivets.....	544, 545	St. Louis		Nippers.....	110
"Standard" Reinforced.....	543	Grinding Machines.....	817 to 819	Parallels, Adjustable.....	107
Spirit Levels	117	Polishing Machines.....	825	Plumb Bobs, Mercury.....	110
Splice Bars	312	Tapping Chucks.....	12	Protractors' Bevel.....	101, 103
Splicing—		Tapping Machines.....	12	Rules.....	104, 115, 116
Clamps.....	233	Stabilizers—Ford Car	948	Registers, Speed.....	108
Manila Rope.....	387, 1101	Stable Tents	1046	Rule Clamps.....	104
Tools, Belt.....	481	Stacking Elevators—Package	692	Rules, Caliper.....	116
Split—		Stacks—Smoke, Capacities of	1102	Rules, Folding.....	115, 116
Collars, Safety.....	395, 396	Stages—Painters'	999	Rules, Hook.....	115, 116
Links, Chain.....	395, 396	Stains		Rules, Steel.....	115, 116
Pins, Cotter.....	263, 264	Crescote Oil.....	985	Rules, Thumb Slide.....	116
Pulleys, Cast Iron.....	449	Mission Finish.....	985	Scrapers, "Universal".....	114
Pulleys, Steel.....	449	Shingle.....	985	Screw Drivers.....	110
Pulleys, Wood.....	450	Varnish.....	984	Scriber.....	108
Washers.....	290	Stake Rivet and Punch	839	Squares.....	102 to 104
Splitters—Nut	229	Stakes—Tent	1049	Straight Edges.....	116
Splitting—		Stamp—		Tool Sets in Cases.....	109
Knives.....	235	Batteries.....	687	Trammels.....	114
Shears.....	845	Mills.....	687	Wrenches, Tap.....	110
Spoke Shaves	204	Stamps		Vises, Pin.....	108
Sponges	989	Log Marking.....	251	Starters—Engine	932
Spools—Roller, File Driver	683	Steel Lettering.....	251	Starting Switches	884
Spools, of Wire	302	Standard—		Stay Bolt Taps	8
Spoons—Telegraph	350	Classifications, Iron and		Stay Rollers—Barn Door	262
Spot Lights—Automobile	942	Steel.....	304, 305	Steam—	
Spouts, Grain—		Forms of Threads.....	10	Exhaust Pipe Heads.....	539
Bifurcated.....	473	Feed Water Heaters.....	907	Gauge Siphons.....	513
Car Loading.....	473	Horizontal Tubular Boilers.....	899	Hose.....	484, 486

INDEX—Continued

S	Page	S	Page	S	Page
Steam—Cont'd		Stone—		Sunderman Vacuum Car-	
Jacket Kettles.....	562	Crushers.....	684	buretors.....	937
Jet Pumps.....	522	Elevator Buckets.....	467, 469	Sunshades—Wagon.....	1068
Miscellaneous Information.....	1082	Forks.....	352	Superior Gas Furnaces.....	563
Pipe.....	542	Hooks.....	353	Surface Gauges—	
Regulator Valves.....	534	Jacks.....	327	B. & S.....	97
Shovels.....	673	Screens.....	675	Starrett.....	107, 108
Traps.....	537, 538	Skips, Extra Heavy Steel.....	659	Surfacer—Plastic	987
Whistles.....	517	Sleds, Derrick.....	646	Surfacers	869, 870, 873
Steam Boilers—		Slidges.....	363	Swage—	
Heating.....	905 to 912	Tongs, Derrick.....	646	Blocks.....	362
Power.....	898 to 904	Wire.....	300	Jumpers.....	200
Steam Cocks—Standard	529	Setters, Derrick Grabs.....	646	Upsets.....	360
Steam Engines—Horizontal		Stones—Oil	240, 241	Swages—Anvil	866
Heavy Duty.....	897	Stools		Saw.....	866
Horizontal, Throttling.....	895 to 897	Camp.....	1058	Swamp Hooks	320
Vertical.....	894	Factory.....	194	Swedes Iron—	
Vertical, with Boiler.....	895	Stops		Burrs.....	267
Steam and Water Gauges	514	Bench.....	194	Wire Rope.....	380
Steamboat Ratchets	326	Pile Hammer.....	682	Sweeping Compounds	1026
Steel—		Storage Batteries—		Swing Hammer Pulverizers	688
Armstrong Cutter.....	163	Automobile.....	939	Swing Pipe Joints	552
Balls for Bearings.....	444	Dry Cell.....	940	Swing Saws—	
Ceiling.....	1022	Storage Battery—		Cut Off, Belted.....	876
Cutter, Tool, High Speed.....	163	Electric Plants.....	888	Electric.....	873
Cutter, Tool, Shapes.....	163	Meters.....	941	Swinging Engines—	
Letters and Figures.....	251	Storage Tanks—		Mundy.....	596
Rails.....	312	Air.....	791	Dake.....	598
Ridge Capping.....	1022	Galvanized, Water.....	768	Swinging Gears—Reversing	594
Ridge Rolls.....	1022	Stove		Switch—	
Roofing.....	1021	Carriers.....	345	Brooms.....	997
Shafting, Cold Rolled.....	438	Pipe Enamel.....	982	Chains.....	394
Sheets, Weights of.....	1109	Stove Bolt—		Padlocks.....	256
Siding.....	1021, 1022	Expansion Shields.....	283, 284	Ropes.....	382, 387
Space Cloth.....	965	Taps.....	7	Switches	
Standard Classification.....	304	Stove Bolts	278	1 Beam Trolley Track.....	431
Tool.....	307	Stove Pipe Shields—Tent	1049	Electric Starting.....	884
Tubing.....	486	Stover Gasoline Engines	891, 892	Flat Rail Trolley Track.....	430
Wire.....	302	Stoves—Camp Cook Kits	948	Railroad.....	313
Wire Gauges, Diagrams of		Caboose.....	559	Swivel Hooks—Rope	391
Thickness.....	965	Camp and Cooking.....	1053, 1054	Swivels—	
Weights of Round, Square		Contractors' Ranges.....	1053, 1054	Chain or Rope.....	394
and Flat.....	1110	Heating.....	559	Wire Rope.....	392
Steel and Malleable Com-		Salamander.....	358	Syphon Pumps—Steam	706, 712
bination Chain	462	Tent.....	1046	Syphon Steam Jet Pumps	522
Steel Rules—		Straight Dollies	316	Syphons—Steam Gauge	513
B. & S.....	94, 95	Straight Edges—		Syringes—Oil	1017
Starrett.....	115, 116	B. & S.....	93		
Steel Squares—Starrett	102, 103	Starrett.....	1163	T	
Steel Wool	988	Straight Link Coil Chain	393	T Squares	120
Steel Yoke Carriers' Trolleys	429	Straight Lip Tongs	361	Tables, Saw	876
"Steer-Easters" for Ford Cars	948	Straighteners—Pile	681	Tables—	
Steering Wheels—Automobile	924	Straightening Presses	836, 837	Concentrating.....	690
Stencil		Strainers—		Domestic Science.....	193
Brushes.....	903	Foot Valve.....	731	Turn.....	608
Ink.....	250	Injector and Ejector.....	563	Tackle Blocks	402 to 410
Letters.....	251	Pump.....	734	Cargo Hoisters.....	660
Stencils	250	Straightaway.....	523	Tacks	
Step—		Suction Hose.....	731	Bill Posters.....	267
Bolts.....	429	Suction Pump.....	746	Copper.....	267
Ladders.....	999	Strap—		Railroad.....	267
Plates, Automobile.....	955	Clamps.....	168, 170	Thumb.....	120
Steps—Derrick Mast	642	Hinges.....	258	Upholsterers.....	267
Sterling—		Straps—Climber, Lineman's	234	Tail Rope Haulage Appliances	413
Hack Saw Blades.....	189, 190	Painters'.....	1000	Take-Up—	
Hack Saws, Hand.....	195	Safety.....	234	Boxes.....	470
Hack Saws, Power.....	826	Strengths of Bolts and Rods	1103	Reels.....	235
Sand Blast Hose.....	466	Stretchers—		T. & M. Gasoline Engines	890
Steel Buckets.....	466	Wire Fence.....	968	Talc—Tire	922
Sticks—Mop	1025	Bed.....	1057	Tallow	1024
Still Leg Derrick Irons	638	Strickler Hatchet Pipe Cutters	38	Pots.....	505
Still Leg Derricks	619, 627 to 632	Striking Hammers	363	Pots, Oval.....	1012
"Stik-Tite" Automobile Cur-		Stripper Knives—		Tally Registers	124
tain Windows	944	Cable.....	235	Tampers—	
Stillson—		Stripping Knives—		Concrete.....	322
Pipe Vises.....	142	Carpenters.....	206	Curb.....	322
Wrenches.....	188	"Strong" Steam Traps	538	"Tampico" Fibre Floor	
"Stillwell" Feed Water Heater	907	Stucco Wall Brushes	992	Brushes.....	995
Stirrups—Painters	1000	Students' Work Benches	192, 193	Tamping—	
Stocking Cutters for Gears	71, 72	Studs—		Bars.....	315, 320
Stocks and Dies—		Belts.....	480	Picks.....	354
Armstrong's Adjustable.....	32	Milled Iron.....	274	Tank	
"Beaver" Pipe Die Stock.....	28	Stuebner Concrete Buckets	658	Controllers.....	535
"Buckeye".....	298	Stump Pullers	701, 702	Gauges and Filler.....	951
Channon.....	298	Sucker Rod Couplings Pump	746	Heaters, Geyser.....	912
"Duplex".....	28	Suction—		Lugs.....	292
"Enterprise" Pipe.....	29	Dredges, Sand and Gravel.....	677	Tank Pumps	
Miscellaneous.....	22, 25 to 32, 38	Hose.....	487	"Bullock" Double Acting.....	743
"Nye".....	30	Strainers, Pump.....	746	"Little Giant".....	743
"Oster".....	26, 27	Sugar Kettles	561	Tanks—	
Pump Makers.....	22	Suits—Divers', Wading	797	Air Receiver.....	791
Ratchet Attachment for.....	32	Sulky Derricks	620	Air Storage.....	791
Toledo Pipe Threading Tool.....	94			Capacities of.....	1087

INDEX—Continued

	T	Page		T	Page		T	Page
Tanks—Cont'd			Tent—Cont'd			Throttling Engines		895, 896
Expansion		912	Poles		1049	Thumb—		
Galvanized Steel		768	Slides	1073,	1049	Bolts, Door		262
Gasoline		1011	Stakes		1049	Nuts		289
Gasoline Storage		757	Stove Pipe Shields		1049	Screw Blanks		270
Hot Water		906	Stoves		1046	Screws		270
Hydro-Pneumatic, for Water			Waterproofing Liquid		1049	Tacks		120
Systems		767	Windows		1049	Tickets—Recording Scale		579
Kerosene		1011	Tents	1031 to	1048	Tie Tongs		315
Oil	1011,	1012	Advice in Selection of		1031	Tighteners		
Round, Water, Galvanized Steel		768	"Amazon"		1035	Derrick Guy		643
Storage, Galvanized, Water		768	A or Wedge		1034	For Flat Belts		452
Storage, Hot Water		767	Automobile		1037	Sprocket Chain		470
Varnish		1012	Black, Moving Picture		1042	Tie Cut Nippers—Starrett		110
Wagon, Galvanized Steel		768	Bally-Ho		1040	Tiles—Special Oil Burner		572
Tap			Camping		1045	Tiller Rope—Wire		380
Borers		226	Canoe		1037	Tilting Cupola Furnaces		570
Wrenches, Miscellaneous		23	Canopy		1044	Timber		
Wrenches, Starrett		110	Compartment		1039	Carriers		321
Tape Measures	122,	123	Concession		1040	Dollies		347
Tape, Tire		921	Doll Rack		1041	Trucks		347
Taper			Garage		1041	Time Checks		250
Files	129,	130	Golf		1044	Timers—Ford Car		938
Boxes		255	Graders		1035	Tin		
Pins		265	Lawn		1038	Black		237
Tapes			Lumberman's		1035	Mill Buckets		466
Ass Skin		123	Miners		1036	Tinners		
Linen		123	Moving Picture		1048	Mallets		209
Luffkin		122	Oblong, Round Ends		1047	Punches		842
Metallic		123	Oblong, Square Ends		1038	Punches, Hollow		228
Steel	122,	123	Palmetto		1039	Rivets		294
Tapper Taps		6	Photographers		1037	Rivet Sets		294
Tapping			Protean		1037	Snips		229
Attachments		151	Pyramid		1040	Tins—Roofing		1020
Chucks		12	Refreshment		1040	"Tioline" Motor Oil		1004
Machines, Bench		12	Round		1044	Trippers—Pile Driver		680
Machines, St. Louis		12	Scout		1036	Tire		
Taps			Shelter		1036	Boots, Automobile		921
Bremmen & Smith, Holder		7	Sibley		1034	Benders		372
Chaser		6	Silk, Wall		1033	Bolts		278
Boiler, Straight and Taper		8	Somerset Silk		1033	Calipers, Automobile		941
Forms of Thread		10	Square, Hip Roof		1038	Chain, Repair Tool		230
Hob, or Master		7	Stable		1046	Chains, Weed		924
Information for Ordering		5	U. S. Army		1033	Changers		923
Machine or Nut		6	Wall	1032,	1037	Covers		922
Machine Screw		7	Wedge		1037	Fluid		929
Machinists' Hand		6	Wigwags		1036	Gauges, Automobile		935
Mud Plug		6	Test			Holders, Automobile		925
Nut, Machine Screw		7	Indicators, B. & S.	85,	87	Locks, Automobile		925
Patch Bolt		8	Indicators, Starrett		107	Mica, Automobile		921
Pipe		8	Pumps, American		536	Patches, Blow Out		921
Pipe, Combined Tap and Drill		8	Pumps, Boiler		741	Preservative, Automobile		922
Pipe, Hob and Reamer		8	Pumps, Hydraulic Pressure		741	Pumps, Bicycle and Automobile, Hand		933
Pulley		6	Testers			Pumps, Running Board		934
Speeds and Feeds of		11	Automobile Tire		935	Pumps, Spark Plug		934
Spindle Stay Bolt		9	Center, Starrett		107	Pumps, Stewart		934
Stove Bolt		6	Gauge		536	Racks, Automobile		923
Tapper		11	Testing Outfits—Inspectors		536	Reliners, Automobile		921
Twist Drill, Sizes for		11	Thermometer and Gauge for Hot Water Heating		528	Savers, Automobile		957
Washout		9	Thermometers—Hot Water		528	Shoes, Automobile		921
Taps and Dies—Standard		10	Thermostats—Heating		913	Shrinkers		372
Form of Threads			Thickness Gauges			Talc, Automobile		922
Tar			B. & S.	86,	97	Tape		921
Coal		1024	Starrett		105	Tester Attachment		922
Heaters, Roofing		1023	Thimbles			"Tie-It" Preservative		922, 923
Pine		1024	Mulla Rope		384	Tires—Automobile		918 to 921
Reakes		352	Rope, Sailors		1073	Air Pressure in Pounds		920
Tarpaulins		1031	Wire Rope		384	Safe Weight in Load Carried		920
Tarred Felt		1020	T Hinges		258	Tires—Bicycle		960
Teaster			Thread Calipers Vernier		82	Tires—Inner "Interlock"		921
Food Bags		1067	Thread Cutting Compound		1003	Toe		
Horse Blankets		1067	Thread Cutting Oil		1003	Calks		364
Oil Clothing		1052	Threading Machines			Knives, Blacksmiths		360
Sunshades and Umbrellas		1068	Armstrong		33	Toggle		
Technical Books		76	Channon		21	Bolts, Ajax		278
Technical School Instruments		119	Pipe	27,	33 to 36	Bolts, Paine		283
Tees			Pipe and Bolt		36	Bolts, Wrigley		278
Pipe, Branch		549	Pipe and Nipple	"Oster"	34	Heads		278
Pipe		547	Threading Tools			Irons, Pile Driver		680
Tees			Agrippa		156	Toledo		
Steel, Weights and Dimensions of		1111	Armstrong		160	Pipe Cutters		37
Telephone Wire Snips		229	Square		160	Pipe Threading Tools		24
Telephones—Divers'		797	Extra Cutters for		160	Pipe Vises		141
Telegraph			Pipe, Ratchet Ceiling Nipple		33	Tongs		
Shovels		350	Toledo		24	Blacksmith		361
Spoons		350	Taps and Dies		5 to 38	Chain, Pipe		186, 187
Temperature Regulators			Threads			Gad		361
Heating Systems		913	Acme		281	Giant		320
Tenoning Machines—Hand			Standard for Bolts		1093	Horseshoers		361
Power		880	Standard, Forms of		10	Lathe Tool		361
Ten			Three in One Oil		1003	Lifting, Pump		746
Counter Curtains		1040	Throttle Valves		530			
Heaters		1046						

INDEX—Continued

	T	Page		T	Page		T	Page
Tongs—Cont'd			Tools—Lumbermen's—Cont'd			Tools, Machine—Metal—		
Pick Up.....	361		Log Binding Chains.....	394		Working—Cont'd		
Pump, Sliding.....	746		Log Binders.....	347		Saw Sharpeners for Metal		
Rail.....	315		Log Chain Hooks.....	395		and Wood.....	866	
Rivet.....	316		Pickarons.....	320		Screw Cutting.....	805 to 809	
Slidding.....	320		Timber Carriers.....	321		Shears, Belt Driven.....	838	
Stone.....	346		Miscellaneous.....	321		Shears, Hand Power.....	842 to 846	
Straight Lip.....	361		Tools—Packing.....	503		Tapping Machines.....	12	
Tie.....	315		Tools, Machine—Metal			Wood Working.....	862 to 881	
Tool—			Working—			Tools, Machinists' Sup-		
Bags.....	226, 1062, 1063		Boring Bars, Cylinder.....	835		plies—See Drills, Taps,		
Bags, Electricians.....	1063		Boring Bars, Valve Seat.....	835		Dies, Reamers, etc.....		
Bags, Gasfitters.....	1063		Balancing.....	836		Tools—Plumbers'.....	226	
Bags, Plumbers.....	226, 1063		Buffers, Bench.....	852, 853		Tools—Roofing.....	1023, 1024	
Belts.....	234		Buffers, Electric.....	852, 853		Tools, Starrett.....	99 to 116, 131	
Boxes, Automobile.....	951		Buffers, Portable.....	853		Tools—Track Layers.....	314 to 317	
Boxes, Steel.....	255		Coiling Machines.....	848		Tools, Williams—		
Checks.....	250		Drills, Bench.....	799, 800		"Agrippa" Pipe Wrenches.....	187	
Cabinets, Lathe.....	163		Drills, Blacksmiths.....	373 to 376		Clamps.....	170	
Chests.....	250, 254		Drills, Floor.....	799, 800		Demountable Rim Tool.....	181	
Chests, Steel.....	226, 254		Drills, Electric.....	850 to 852		Handles, Drop Forged, Ma-		
Grinders.....	246		Drills, Pneumatic, Wood			chine.....	170	
Handles.....	355 to 357		Boring.....	855		Vulcan Calipers, Standard		
Tool Holders—			Drills, Post.....	373 to 376, 799, 800		Gauge.....	90	
"Agrippa" Boring.....	155		Drills, Radial.....	800		Vulcan Tool Post Fittings.....	90	
"Agrippa" Cutting Off.....	155		Grinder Columns.....	816		Vulcan Tool Post Rings.....	90	
"Agrippa" Special Tool.....	156		Grinder Heads.....	816		Vulcan Tool Post Wedges.....	90	
"Armstrong".....	158 to 162		Grinders and Buffers, Aerial.....	853		Wrench Sets.....	171, 172	
"Champion".....	157		Grinders, Bench.....	815		Wrenches.....	171 to 177	
"Combination".....	206		Grinders, Disk.....	824, 864		Tools, Woodworkers'—See		
Drop Head.....	158		Grinders, Drill.....	823		Individual References.		
Tool Kits—			Grinders, Electric Air Cooled.....	854		Torches—		
Boy Scouts.....	1069		Grinders, Electric, Portable.....	853		Banjo.....	978	
Automobile.....	956		Grinders, Electric Bench.....	852, 853		Blow.....	564, 568	
Tool Post—			Grinders, Internal Electric.....	853		Gasoline.....	564, 566, 978	
Electric Grinders.....	853		Grinders, Motor Driven.....	824		Lighting.....	977	
Fittings, Williams.....	90		Grinders, St. Louis.....	817 to 819		Linemen's.....	235	
Rings.....	90		Grinders, Tool Post, Electric.....	853		Locomotive.....	505	
Wedges.....	90		Grinders, "Universal".....	822		Oxy-Acetylene.....	567, 568	
Wrenches.....	175		Grinders, "Western".....	820, 821		Pyramid.....	505	
Tool Posts—Lathe			Grinders, with Lathe At-			Tallow Pot.....	505	
Tool Rolls—Plumbers'			tachment.....	815		Torches and Lamps—Light-		
Tool Sets—			Hammers, Drop.....	832, 833		ing.....	974 to 979	
Lathe.....	163		Hammers, Helve Power.....	833		Tools—		
"Starrett".....	109		Hammers, Rivet Buster,			Auto Box.....	235	
Tool Steel.....	307		Pneumatic.....	856		Tool Lines—Automobile.....	953	
High Speed Cutter.....	163		Hammers, Pneumatic, Riv-			Towers—Concrete Hoisting.....	651	
Toolmakers'—			etting.....	856, 857		Towing Devices—Automobile.....	837	
Buttons, Starrett.....	107		Hammers, Pneumatic, Chip-			Trace Chain Repair Links.....	396	
Clamps, B. & S.....	85		ping.....	856, 857		Track—		
Clamps, Starrett.....	106		Hammers, Pneumatic, Calk-			Bits.....	314	
Vises, B. & S.....	85		ing.....	856, 857		Bolts.....	311	
Tools—Armstrong—			Keyseaters, Hub.....	804		Chisels.....	315	
Boring.....	162		Keyseaters, Shafting.....	803		Crossings.....	313	
Boring Tool Holders.....	161, 162		Lathes, Foot Power Gap.....	813		Drill Ratchets.....	223	
Clamps, Machinists.....	167		Lathes, Bench.....	814, 815		Drilling Machines.....	314	
Cutting Off.....	159		Lathes, Demonstration.....	812		Drills and Bits.....	49	
Drill Drifts, Automatic.....	61		Lathes, Gap, Sliding Ex-			Frogs, Railway.....	313	
Drill Press Vises.....	148		tension.....	810		Gauges.....	315	
Drill Ratchets.....	221, 222		Lathes, "Lancaster" Engine.....	807		Hangers, Door Trolley.....	259, 240	
Drill and Reamer Holders.....	162		Lathes, Polishing and Finishing.....	806		Hangers, I Beam Trolley.....	427	
Knurling.....	165		Lathes, Screw Cutting En-			Jacks.....	323	
Lathe.....	163, 164		gine.....	808, 809		Levels.....	315	
Lathe Dogs.....	166, 167		Lathes, Screw Cutting, Foot			Mauls.....	315	
Pipe Kits.....	33		Power.....	813		Punches.....	315	
Pipe Threading and Cut-			Lathes, Speed.....	812		Railroad.....	312, 313	
ting Machines.....	33		Lathes, Under Drive.....	811, 812		Rails, Drilling and Punch-		
Planer Jacks.....	163		Milling Machine Attachments.....	803		ing Standards.....	312	
Planer Tools.....	160		Milling Machine.....	801 to 803		Rollers, Rope Haulage.....	573	
Side Tools.....	159		Milling Machine, Shaft Key			Sealers, Railway.....	579	
Slotter Tools.....	162		seaters.....	803		Scales, Warehouse.....	577	
Stocks and Dies, Adjustable.....	32		Pipe Cutting and Threading			Spikes.....	311	
Threading.....	160		.....	33 to 36		Switches, Railway.....	313	
Threading, Ratchet Ceiling			Polishing Heads.....	815		Switches, Trolley.....	430, 431	
Nipples.....	33		Polishing Machines, St. Louis.....	825		Tools and Supplies.....	311 to 317	
Tool Holders.....	158 to 160		Presses, Portable.....	834, 836, 837		Trolleys I Beam.....	427	
Tool Posts, Lathe.....	158		Presses, Arbor.....	836		Trolleys, Door.....	260	
Wrenches, Dog.....	167		Presses, Hydraulic.....	834		Wheels.....	682	
Tools—Blacksmiths'.....	359 to 373		Presses, Threading.....	836		Wrenches.....	315	
Tools—Boiler Room.....	322		Punch and Riveter, Pneu-			Track Laying Cars		
Tools—Bridgebuilders'.....	77 to 97		matic Portable.....	843, 844		Tramways—		
Tools—Brown & Sharp			Punches and Shears, Belt			B. & S.....	114	
Tools—Calking.....	1023, 1024		Driven.....	838, 839		Transfer Pumps.....	1011	
Tools—Carpenters—See In-			Punches and Shears, Hand			Transits.....	117	
dividual References.			Power.....	839 to 845		Transmission—		
Tools—Draughtsman's.....	118 to 120		Punches, Head, Hydraulic.....	840		Belts, Endless Wire.....	382	
Tools—Filing.....	322		Punches, "Rapid Action",			Equipment.....	438 to 461	
Tools—Linemen's.....	231 to 235, 320		Belted.....	839		Grease.....	1005	
Tools—Locomotive.....	177		Riveter and Punch, Pneu-			Transmission Machinery—		
Tools—Lumbermen's—			matic Portable.....	843		Bearing Balls.....	444	
Cant Hook and Peavies.....	321		Riveters, Stake.....	839		Ball Bearings.....	444	
Hookarons.....	320		Saws, Metal, Band.....	829		Belt Tighteners.....	452	
Loading Block.....	410		Saws, Metal Circular.....	830, 831		Belting Chain.....	460 to 462	
Locomotives, Logging.....	612		Saws, Power Hack.....	826 to 828, 830		Beltting, Link.....	460	

INDEX—Continued

T	Page	T	Page	T	Page
Transmission Machinery—Cont'd		Trolleys, Carrier—Cont'd		Turntables—Cont'd	
Belting, Leather.....	474	Plain.....	429	Trolley Track.....	430, 431
Clutch Couplings, Jaw.....	443	Steel Yoke.....	429	Turret Hand Screw Machines	805
Clutch Shifter Yokes.....	454	Trolleys, Door		Turret Head Tools—"Almond"	154
Clutches, Friction.....	453 to 455	Trommsels—Dre	689	Tuyere Irons	362
Clutches, Jaw.....	443	Trousers—Drivers', Wading	797	Tweezers	228
Collars, Safety.....	439	Trowels		Twentieth Century Balance-ing Tools	836
Common Flat Boxes.....	440	Bricklayers'.....	206	Twin Jacks—Automobile	837
Direct Pull Countershafts.....	447	Plastering.....	206	Twine—	
Drop Hangers.....	440 to 443	Pointing.....	206	Amber.....	1030
Four-Point Adjustment		Truck—		Cotton.....	1030
Bearings.....	442, 443	Bodies, Ford.....	949	Flax.....	1030
Gears, Bevel.....	458	Casters and Wheels.....	348	India Hemp.....	1030
Gears, Mitre.....	459	Scales, Motor.....	580	Mattress.....	1030
Gears, Rack and Pinion.....	459	Wheels, Mine Car.....	607	"Millers' Delight".....	1030
Gears, Spur.....	457	Trucks—		Sail.....	1030, 1070
Gears, Worm.....	459	Bag.....	344	Seine.....	1030
Keys for Shafting.....	438	Barrel.....	344	Sewing.....	1030
Manila Rope.....	385 to 389	Box.....	347	Wrapping.....	1030
Mule Stands.....	452	Dry Goods.....	345	Twist Drill—	
Paper and Iron Friction Gears.....	432	Factory.....	345	Cutters.....	72
Pillow Blocks.....	440 to 443	Freight.....	344 to 346	Gauges.....	98
Post Boxes.....	440	Handy.....	344	Twist Drills—	
Post Hangers.....	440 to 443	Hercules.....	344	Bit Stock.....	47
Pulleys, Cast Iron.....	448, 449	House Movers'.....	700	Blacksmiths'.....	48
Pulleys, Ring Oiling, Loose.....	456	Lifting.....	346	Bonding.....	47
Pulleys, Paper.....	451	Railroad.....	344	Centre, Straight Shank.....	47
Pulleys, Steel Split.....	449	Stove Carriers.....	345	Extra Long.....	47
Pulleys, Wood Split.....	450	Timber.....	347	Jobs.....	44, 45
Right Angle Shaft Drives.....	447	Wagon.....	345	Ratchet and Track.....	46
Roller Line Shaft Bearings.....	441, 442	Warehouse.....	344	Sets of.....	46
Shaft Couplings.....	439	Trucks and Carts	344 to 347	Sizes and Equivalents.....	41
Shafting, Cold Rolled.....	438	Trumpets—Speaking, Mega-		Sizes for Machine Screw Taps.....	11
Shafting, Flexible.....	445, 446	phones.....	1069	Sizes for Pipe Taps.....	11
Sim-Pull Countershafts.....	447	Truss Rods—Derrick	643	Speeds, Feeds and How to	
Solid Boxes.....	440	T Square	120	Grind.....	40
Sprocket Wheels.....	463, 464	Try Squares—		Stands for.....	46
Wall Brackets.....	443	Channon.....	203	Straight Shank, Taper	
Transmission Rope—		Scarrett.....	102, 103	Length.....	44, 45
Manilla.....	385 to 389	B. & S.....	92, 93	Taper Shank.....	42, 43
Wire.....	380	Tube		Three and Four Groove.....	50
Transportation Scales	578	Bags.....	922	Wire Gauge.....	45
Traps, Steam—		Beading Tools.....	558	Wood Boring Brace.....	47
Chicago.....	538	Boiler, Ferrules.....	546	Wood Boring.....	50
Corliss.....	537	Cleaners.....	555, 556	Twist Link Chain	393
Davis.....	537	Cutters.....	558		
Kiely.....	538	Expanders.....	557, 558		
Nason.....	537	Gum.....	928		
Sarco.....	538	Patches.....	928		
Strong.....	538	Tubes—			
Travelers' Ferry	409	Automobile Inner.....	920	"U" Benders—Bar	847
Traveling Cranes	435, 437	Boiler.....	546	"U" Bolts	281
Tread—		Brass.....	310	"U" Clamp Drill Holder	162
Fillers, Automobile.....	929	Bronze.....	310	"U. S.—"	
Gum, Automobile.....	928	Copper.....	310	Positive Pressure Blowers.....	773
Tree Trimmers	254	Tubing—		Umbrellas	1068
Trench Braces	352	Automobile Pump.....	935	Underwriters' Brackets	358
Trench Pumps—Diaphragm		Brass.....	310	"Unionlock" Automatic	
Chicago.....	735 to 738	Bronze.....	310	Buckets.....	658
Trestles and Stages—Painters	999	Carburator.....	486	Unions—Pipe	551
Triangle Mesh Reinforcing		Cloth Insertion.....	488	Universal	
Wire.....	342	Copper.....	310	Centre Squares.....	92
Triangles	120	Flexible Steel.....	486	Clamps, Grinding Machine.....	824
Troy Weight—Table of	1105	Rubber.....	488	Dial Test Indicators.....	107
Truck Scales—Automobile	580	Tubs—		Drill Ratchets.....	222
Trucks—Automobile Towing	837	Bath Enamel.....	769	Gasoline Engines.....	889
Trimmers—Tree	234	Enamel, Laundry.....	770	Grinders.....	822
"Trim" Wrenches	188	Coal, Ore, Water, etc. (see		Surface Gauges.....	97
Triplex Chain Hoists	421, 422	Buckets).....		Urinals—Enameled	772
Electric.....	424	Tubular Boilers—		Useful Information—	
High Speed.....	422	Horizontal.....	899, 900	Air, Discharge of through	
Repairs for.....	423	Internal Fire Box.....	900	an Orifice.....	1091
Triplex—		Internal Furnace.....	900	Air, Drills, Multiplication	
Plunger Pumps.....	718 to 721	Vertical.....	898	Factors for Altitude.....	1090
Pump Drives and Controls.....	721	Tubular Rivets	266	Air Pipes, Table of Equalizing	1090
Tripod—		Turi Edgers	253	Air Pressure Reduced by	
Covers.....	660	Turnbuckle Rods	280	Globe Valves, Tees and El-	
Derricks.....	620	Turnbuckles—		bows.....	1091
Trips—Adjustable Pile Driver	680	Bridge Rod.....	399	Air Pressure of Automobile	
Triumph Union Lock Chain	397	Guy.....	392	Tires.....	920
Trolley, Track—		Hook and Eye.....	400	Air Pressure to Drive Hoist-	
Brackets, Door.....	260	Malleable Iron.....	400	ing Engines.....	1091
Carrier, Hangers.....	427	Wrought Iron.....	399	Angles, Steel, Weight and	
Hangers, Door.....	430	Turn Heads—Elevator	473	Dimensions of.....	1111
Rails, Door.....	260	Turn Over Buckets	656	Barometric Pressures.....	1107
Switches, Carrier.....	430, 431	Turn Pins	226	Belting, Leather, Horse Pow-	
Turntables.....	430	Turning—		ers of.....	1096
Trolley Tracks	427	Chisels.....	205	Belts, Grain Elevator, Speeds	
Trolleys, Carrier	427 to 430	Gauges.....	205	of.....	1095
Brown Hoist.....	428	Tool Holders.....	155 to 163	Board Measure.....	1109
Channon Flat Track.....	430	Tools.....	164	Boat Spikes, Number per Keg	297
Flexible.....	429	Saws.....	196	Bolts, Nuts and Washers,	
Hyatt I Beam.....	429	Turntables—		Proportions of.....	1105
		Roller and Ball Bearing.....	608	Bolts, Standard Threads for.....	1093
				Bolts, Strengths of.....	1103

INDEX—Continued

U	Page
Useful Information—Cont'd	
Brass Sheets, Weights of	1109
Capacities of Elevator Buckets	465 to 469
Cements, Directions for Applying	1029
Circles, Areas of	1104
Circles, Circumferences of	1104
Cisterns, Capacities of	1087
Cocks, Weights of	1092
Compressed Air Data	1090, 1091
Conveyors, Belt, Capacities of	1097
Conveyors, H. P. to Drive	1097
Copper Sheets, Weights of	1109
Castings, Weights of Figured from Patterns	1109
Cylinders, Contents of	1088
Diameters and Speeds of Pulleys, Sheaves, Gears, etc., Rules for Determining	1096
Electrical Data, Miscellaneous	1094
Electrical Equivalents	1094
Elevators, Capacities of	1097
Elevators, Horse Powers to Drive	1097
Emery Wheel, Speeds of	1102
Equivalents, Mechanical, Electrical and Heat	1094
Expansion Joints, Weights of	1093
Fire Stream Pressures	1088
Forgings, Weights Figured from Patterns	1109
Freight Rates and Classifications	1074 to 1078
Gear Wheels, Sizing and Cutting of	1098
Gears, Diameters and Speeds of	1096
Gears, Finding Diameters and Pitches	1099
Gears, Horse Powers of	459, 1096
Grades and Construction of Wire Rope	377
Grades of Emery	1102
Heat Equivalents	1094
Hose, Weights of	1108
I Beams, Weights and Dimensions	1112
Iron, Standard Classification	305
Iron Wrought, to find Weight of any Piece	1113
Machine Bolts	275
Mechanical Equivalents	1094
Mechanical Hand Books	76
Metric System and Equivalents	1106
Package Car System, Map of Chicago's	1079
Parcel Post Zones and Rates from Chicago	1080
Pipe, Areas of	1082
Pipe Fittings, Weights of	1092, 1093
Pipes, Equalizing of Air	1090
Pulleys, Diameters and Speeds of	1096
Pumps, Capacities of	1084
Pumps, Centrifugal, How to Set and Operate	729
Pumps, Elevations of in Feet	1085
Pumps, Miscellaneous Data	1082
Pumps, Suction Lift at Different Altitudes	1107
Rivets, Bearing and Shearing Values of	1103
Rock Drills, Air Consumption of	1090
Rods, Stay and Suspension, Strengths of	1103
Rope, Manila, Horse Powers of	387
Rope, Manilla, Splicing of	1101
Rope Sheaves, Diameters and Speeds of	1096
Rules for Figuring Heat Radiation	916, 917
Rivets, Diameters and Lengths for Plates	1105
Rivets, Shearing and Bearing Values	1103
Sawing Timber, Power required for	1102

U	Page
Useful Information—Cont'd	
Saws, Circular, Speeds of	1102
Shafting, Horse Powers of	1095
Sheet Iron and Steel, Weights of	1109
Shrinkage of Castings	1105
Smoke Stacks, Capacities of	1102
Splicing, Manila Rope	387
Spur Gear, Selection Chart	1100
Stay Rods, Strengths of	1103
Steam, Data	1082
Steel Channels, Weights and Dimensions	412
Steel Sheets, Weights	1109
Steel, Square, Round and Flat, Weights of	1110
Steel, Standard Classification	304
Suspension Rods, Strengths of	1103
Tanks, Capacities of	1087
Taps and Reamers, Speeds and Feeds of	11
Tees, Steel, Weights and Dimensions of	1111
Threads, Standard Forms of	10
Track, Rail, Splice and Bolt Data	1108
Twist Drills, Sizes and Decimal and M. M. Equivalents	41
Twist Drills, Speeds, Feeds and How to Grind	40
U. S. Weights and Measures	1105
Valves, Brass, Weights of	1092
Valves, Iron Body, Weights of	1093
Water, Data on	1082, 1085
Water, Flow through Nozzles	1089
Water, Friction of	1084, 1085
Water, Horse Power to Elevate	1082
Water, Miners Inch	1082
Water, Pressure Reduced by Friction	1085
Water, Pressures	1083
Water, Weights and Measures of	1082
Weights and Measures, U. S. Standard	1105
Weights, Automobile Tires should Carry	920
Weights, Belting	1108
Weights, Expansion Joints	1093
Weights, Manila Rope	387
Weights, Rivets	293
Weights, Various Substances	1113
Wire Gauges	1109
Wire Gauges and Equivalents	301
Wire Nails, Weights of	297
U. S.—	
Army Tents	1033
Hand Milling Machines	802
Weights and Measures	1105
Upsetters and Welders	372
Utility Heaters—Automobile	954
V	
"V" Blocks and Clamps	85
Vacuum—	
Gasoline Systems, Automobile	938
Gauges	516
Pumps, Rotary	774
Valpar—	
Enamel	986
Varnish	991
Valve—	
Bases	928
Discs	526
Grinding Compounds	929, 931
Reseating Tools	527
Seat, Boring Bars, Portable	835
Stem Packing	503
Valves—	
Air Regulator	534
Air "Remort", Automatic	935
Automobile Tire	935
Balata	502
Brass, Standard	524
Brass, Weights of	1092
Blow-Off	529 to 531
Butterfly	530
Check, "Smolenski" Brass	524 to 526
Cyclone	531
Drip	509

V	Page
Valves—Cont'd	
Foot Strainer	731
Gate, Brass	524, 530
Gate, Iron Body	525, 530
Gate, Quick Opening	525
Hose	494
Iron Body, Weights of	1093
Jenkins	524, 526, 531
Mixing	937
Powell	527, 531
Pump	502, 710
Radiator	527, 528, 917
Reducing, Fisher	535
Relief	533
Safety	530, 532
Sight Feed	539
Standard, Iron Body	525
Steam Regulator	534
Throttle	530
Water Regulator	534
Weights and Levers	530
Whistle	517
"Y"	531
Van Expansion Shields	284, 285
Van Lead Anchors	285
Vanadium Nail Hammers	207
Vanners—Frue	691
Variety—Wood Workers	868
Varnish—	
Automobile	930, 932, 990, 991
Brushes	992
Floor	990
Furniture	990
Interior	990
Oil	991
Remover	991
Shellac	991
Spar	990
Stain	984
Tanks	1012
"Valpar"	124
Veeder Counters	691
Velocipede—Motors	609
Velocipede—Railroad	610
Venn-Severin Oil Engines—Vertical	893
Verner Calipers—	
Starrett	102
B. & S.	82
Vertical Steam Engines	894, 895
"Victor" Cotton Belting	475
Viking Rotary Force Pumps	232
Village Fire Engines	740
Vise—	
Drills	149, 219
Jaws	138, 493
Pliers, "Bernard"	231
"Vises	136 to 143
"Abernathy"	139
"Alford"	143
Armstrong Pipe	141
Automatic	136
Brown & Sharp	149
Chain Pipe	140
Conduit Bench	148
Drill Press	148
Filing or Chipping	137
Gripwell, Machinists	136, 137
Hand	143
Hinged Pipe	141
Jarecki Pipe	141
Jewelers' Pin	143
Manual Training	139
Marvel Drill Press	149
Milling Machine	148, 149
New Auto	140
Nye Chain	143
"Nye" Pocket	143
Oval Slide	138
Parallel Bar	139
"Parker", Machinists	137
"Parker" Pipe	140
Pattern Makers	139
Pin, Starrett	108
Pipe	138, 140, 141
Pipe Grips	138
Planer	148, 149
Prentiss, Pipe	140, 141
Prentiss, Machinists	137
Rapid Acting	139
Saw	200
Self-Adjusting Jaw	136
Solid Box	142
Stillson Pipe	142

INDEX—Continued

V	Page	W	Page	W	Page
Vises—Cont'd		Water—Cont'd		Well—Cont'd	
Swivel Base.....	136, 137	Closets, Enamel.....	772	Cylinders.....	753
"Toledo" Pipe.....	141	Columns.....	514	Drilling Rope.....	36
Toles Patent.....	139	Conversion Table.....	1082	Hoops.....	405
Toolmakers, B. & S.....	85	Cylinders, Pump.....	752	Points, Drive.....	753
"Victor" Jersey.....	138	Elevating, Capacity of Pumps.....	1084	Screens, Pump.....	746
Woodworkers'.....	138, 139	Flow through Nozzles.....	1089	Wheels.....	410
"Yankee".....	149	Friction of.....	1084, 1085	Westcott's Lathe Chucks	146
Viton Files	131	Gauges.....	514, 516	Western Grinding Machines	820, 821
Volt Meters	941	Head of, and Suction Lift	1107	Westinghouse Vertical Air	
Voltammeters	941	of Pumps at Altitudes.....	1082	Compressors.....	490
Volume		Horse Power to Elevate.....	483	Wheel Barrow Scales	576
Blowers.....	778	Lift, "Triumph".....	706	Wheel Barrows	338 to 341
Vosper Pipe Cutters	39	Meters.....	553	Wheel Guards—Grinder	819, 821
Vulcan		Pipe.....	542	Wheel Scrapers—Contractors' Dirt	336
Anvils.....	359	Pressures of.....	1083, 1085	Wheels—	
Caliper Gauges.....	90	Regulator Valves.....	534	Automobile Steering.....	924
Chain Pipe Vises.....	140	Relief Valves.....	533	Buffing.....	1050
Tool Post Fittings.....	90	Separators, for Air Line.....	791	Cloth.....	1060
Vulcanizers		Softeners.....	908	Emery.....	242, 243
Adamson.....	927	Tanks, Hydro-Pneumatic.....	767	Emery, Speeds of.....	1102
Marvel.....	927	Useful Information.....	1082, 1085	Flanged, Track.....	652
Positive.....	927	Weights and Measures of	1082	Gear.....	457 to 459
Shaler.....	926	Water Heaters		Gear, Sizing and Cutting of.....	1098
Tire.....	926, 927	Chicago.....	906	Grinding.....	242 to 248
Vulcanizing		Feed, Little Giant Cooker.....	908	Milling.....	165
Tire Cement.....	928	Feed "New Water Tube".....	907	Paper Friction.....	452
Gum.....	928	Feed, "Springfield" Heater	907	Roller Bearing Car.....	607
		and Lime Extractor.....	907	Sprocket.....	463, 464
		Feed, "Standard".....	907	Well.....	410
		Feed, "Stillwell".....	907	Wire, Automobile.....	949
		Penberthy.....	522	Wheels and Castors—Truck	348
		"Wilkes".....	905	Whistle Valves	517
		Water Falls		Whistles	
		Fibre.....	1016	Chime.....	517
		Fire.....	1016	Signal, Miners'.....	974
		Galvanized.....	1015	Steam.....	517
		Wood.....	1016	White Lead	987
		Water Systems		Whitewash	
		Domestic Supply.....	759 to 768	Brushes.....	993
		Electric Pumping Units.....	759 to 767	Spraying Machines.....	998
		Gasoline Pumping Units.....	759, 767	Whitney Portable Punches	841
		Waterproofing		Wicking	
		Auto Top.....	932	Asbestos.....	503
		Liquid, Tent.....	1049	Cotton Candle.....	503
		Wax Floor	987	Wiedeke Tube Expanders	557
		Wedge Tents	1034	Wigwam Tents	1036
		Wedges		Wilkes Water Heaters	905
		Coal.....	363	Williams' Tools	
		Frost.....	363	Clamps "C".....	168
		Tool Post.....	90	Clamps, Strap.....	168
		Weed Chisels	924	Demountable Rim Tool.....	181
		Weights		Handles, Drop Forged, Machine.....	170
		Derrick, Cheek Plate.....	645	Pipe and Bolt Threading	
		Diving.....	797	Machines.....	36
		Scale.....	579	"Vulcan" Caliper Gauges.....	90
		Weights and Measures		"Vulcan" Tool Post Rings.....	90
		Board Measure.....	1109	"Vulcan" Tool Post Wedges.....	90
		Metric System and Equivalents.....	1107	"Vulcan" Tool Posts.....	90
		Miscellaneous.....	1105	Wrench Sets.....	171, 172
		U. S. Standard Tables.....	1105	Wrenches.....	171 to 177
		Weights of		Wrenches Socket.....	179
		Asbestos Mill Board, per Foot.....	1029	Wilmington Jacks	331
		Beltting.....	1108	Winch	
		Brass Valves.....	1092	Heads, Caisson.....	660
		Cocks.....	1092	Hoists, Electric.....	594
		Expansion Joints.....	1093	Shinfs.....	594
		Hose.....	1108	Capstans.....	614, 617
		Iron Body Valves.....	1093	Winches—Derrick	600, 613 to 616
		Machine Bolts.....	275	Wagon.....	613
		Manila Rope.....	387	Windlasses	
		Pipe Fittings.....	1092, 1093	Wagon.....	613
		Reinforcing Bars.....	306	Mine, Hand Power.....	600
		Rivets.....	293	Windmill	
		Steel, Round, Square and Flat.....	1110	Pump Jacks.....	748
		Valves, Iron Body.....	1093	Pumps.....	744
		Various Substances.....	1113	Window	
		Water.....	1082	Brushes.....	994
		Wire Nails.....	296, 297	Cleaners.....	994, 1026
		Wire, Steel.....	301	Cleaners' Ladders.....	999
		Wrought Iron, Rules for Determining.....	1113	Screen Cloth.....	965
		Welded Wire Fence	966 to 968	Wash Brushes.....	1026
		Welders and Upsetters	372	Washers' Belts.....	1068
		Welding		Windows	
		Acetylene Outfits.....	567, 568	Automobile Curtain.....	944
		Compounds.....	361	Tent.....	1049
		Supplies.....	567, 568	Windshield Cleaner	948
		Well		Wing	
		Augers.....	747	Dividers.....	228
		Casing.....	516	Nuts.....	289
		Cups, Leather.....	502		

INDEX—Continued

W	Page	W	Page	W	Page
Wiping—		Wood Boring Machines—		Wool—	
Cloths.....	226	Hand Power.....	213	Dusters.....	995
Rags.....	1009	Pneumatic.....	855	Mineral.....	1029
Waste.....	1009	Wood—		Scales.....	575
Wire—		Filler.....	991	Steel.....	988
Bessemer Steel and Basic.....	301	Grease.....	1008	Waste.....	1009
Brads.....	302	Scrapers.....	200	Work Bench—	
Brooms.....	997	Screw Expansion Shields.....	283, 284	Hooks.....	194
Brushes.....	996	Wood Screws—Brass and Iron.....	268	Legs.....	194
Clamps, Havens.....	234	Wood Split Pulleys.....	450	Screws.....	194
Copper.....	302	Woodworkers, Combination—		Stops.....	194
Cots.....	1056	"Berlin" Portable.....	874, 875	Work Benches—Cabinet	
Cutters.....	231, 232	"Contractors" Portable.....	871	Makers.....	193
Dusters.....	996	Countershaft Built in.....	876	Manual Training.....	192, 193
Fence, Plain.....		"Crescent" Universal.....	872	Workmen's Locker Hangers.....	961
Fence Stretcher.....	968	Motor Driven.....	873	Worm Gear Oil.....	1002
Fencing.....	966 to 968	"Variety".....	868	Worm Gears.....	459
Gates, Welded.....	967	Wood Working Machines—		Working Barrels—Pump.....	754
Grips, "Havens".....	234	Boring Attachment for Saws.....	879	Wrapping Twine.....	1030
Guards, Electric Light.....	473	Edgers, Gang.....	864	Wrecking—	
Lacing, Belt.....	478	Foot Power Planers.....	880	Chains.....	394
Market.....	301	Foot Power Mortisers.....	880	Frogs, Railway.....	317
Music.....	302	Foot Power Saws, Circular.....	879	Lights, Electric.....	887
Nails, Common, see also Nails		Foot Power Saws, Scroll.....	881	Picks.....	354
and Brads.....	295, 296	Foot Power Saws, Scroll and		Ropes, Manila.....	387
Screen Cloth.....	965	Circular.....	877	Wrench Sets—	
Screens, Sand Yard.....	343	Hand Power Saws, Circular		Ford.....	171, 180
Skinners.....	234	Rip.....	880	Garage.....	171
Snips, Telephone.....	229	Hand Power, Tenoning.....	880	Socket.....	179, 180
Solder.....	237	Jointers.....	868	Thin Double End.....	183
Spikes.....	302	Jointers, Motor Driven.....	873	Williams.....	171, 172
Steel.....	302	Matchers and Planers.....	870	Wrenches—	
Spring Brass.....	302	Mortisers, Hollow Chisel.....	867	Adjustable.....	185, 186, 188
Stone.....	300	Motor Driven, "Crescent".....	873	Agricultural.....	184
Stretchers, Fence.....	968	Planers, Motor Driven.....	873	"Grippe" Chain Pipe.....	187
Triangle Mesh, Reinforcing.....	342	Planers, "Jewel".....	869	"Alligator".....	176
Wheels, Automobile.....	949	Planers and Surfacers.....	869, 870, 873	Always Ready.....	176
Wire Cloth—		Planers, Variable Feed.....	868	Automobile.....	183
Galvanized Hardware.....	965	Planers, Wallace Bench.....	867	Bicycle.....	183
Standard Mesh.....	965	Saw Frames, Power.....	863	Brace.....	179
Steel Space.....	965	Saw Mills.....	862 to 865	Bridge Builders.....	182
Window Screen.....	301, 1099	Saw Sharpeners.....	866	"Bull Dog".....	176
Wire Gauges.....	301, 1109	Saw Tables, Band and Circular.....	866	Cap Screw.....	173, 174
B. & S.....	96 to 98	Saws, Band Motor Driven.....	873	Carriage Makers.....	174
Diagrams Showing Thickness.....	98	Saws, Band Belted.....	878	Ch.....	177
Long Screw.....	109	Saws, Circular and Scroll		"Comb".....	185
Starrett.....	109	Combined.....	879	Combination Pipe and Nut.....	184
Twist, Drills for.....	45	Saws, Friction Feed Drag.....	865	Connecting Rod.....	178
Wire Ropes—		Saws, Swing Cut Off.....	876	Construction.....	177
Payout.....	235	Saws, Swing Motor Driven.....	873	Cylinder Head.....	178
Take Up.....	235	Surfacers, Motor Driven.....	873	Dog.....	167
Wire Rope—		Wood Workers', Motor Driven.....	873	Drop Forged.....	171 to 177
Arc Light.....	383	Shapers.....	870	"Eagle Claw".....	230
Blocks.....	406 to 409	Wood Working Tools—		Engineers.....	173
"Bullock" Brand.....	379 to 382	Axes.....	210	Extensions for.....	181
Clamps.....	384	Auger Bits, Brace.....	212, 213	"Giant" Ratchet.....	182
Clips.....	384	Bits, Extension.....	212	Hexagon Box.....	174
Crane Plow Steel.....	379	Braces, Bit.....	214, 215	Hose, Spanner.....	
Domestic Steel.....	378, 379	Chisels, Hand.....	205	Key Model.....	185
Dressing.....	383	Chisels, Machine Mortising.....	877	Knife Handle.....	184, 185
Elevator Cable.....	380	Dado Heads.....	877	Lag Screw.....	182, 234
Endless Belts.....	382	Draw Knives.....	206	Lineman's.....	177
Extra Heavy.....	379	Drills, Automatic Hand.....	216	Locomotive.....	177
Flattened Strand.....	381	Drills, Bench Hand.....	219	Long Nut.....	185
Grades, Construction, etc.....	377	Drills, Geared Hand.....	216 to 218	"Lowell".....	182
"Guy".....	380	Drills, Wood Boring Bits.....	50	Machinists.....	184, 185
Guy Strand.....	383	Gauges.....	203	Marvel Socket.....	183
Haulage.....	380	Gigs, Doweling.....	207, 208	Monkey.....	183 to 185
Hooks.....	391, 392	Hammers.....	207, 208	Offset Handles for.....	181
Locomotive Switch.....	383	Hatchets.....	210	Paralle Pipe.....	188
Lubricants.....	383	Levels.....	204	"Perfect Handle" Pipe.....	188
Marina Spikes.....	392	Mauls and Mallets.....	209	"Perfect Handle" Monkey.....	185
Mast Arm.....	383	Planes.....	200 to 202	Pipe.....	187, 188
Non-Rotating.....	381	Plumb Bobs.....	206	Pipe Gripwell Chain.....	186
Plow Steel.....	378, 379, 381	Rules.....	121, 124	Pipe "Ideal" Chain.....	186
Sash Cord.....	383	Saw Blades and Bands.....	198, 199	Pocket.....	183
Shackles.....	392	Saws, Hand.....	195 to 198	Railroad Special.....	184
Sheaves, Plain.....	411	Saws, Skew Back and Cross		Railway Fitting Up.....	315
Sheaves, Rubber Lined.....	414	Cut.....	197	Ratchet.....	178, 180, 182
Sockets.....	391	Saws, Turning and Coping.....	196	Ratchet Tap.....	23
Special Flexible.....	379	Scrapers.....	220	Regular.....	184
Steel Clad, Dredge.....	381	Screw Drivers.....	225	Round Handle.....	177
Swivels.....	381	Sill Boring Tools.....	215	"S".....	176
Swedes Iron, Tiller.....	380	Spoke Shaves.....	204	Set Screw.....	175
Tiller.....	381	Squares.....	203	Set Screw, Hollow Safety.....	271, 272
Thumbies.....	384	Tape Measures.....	122, 123	Silo Ratchet.....	182
Turnbuckles.....	392	Vises.....	138, 139, 200	Socket.....	179, 180
Wizard Chucks and Collets.....	150	Work Benches.....	192	Spanner.....	178
Wire Wound Hose.....	488	Woodruff—		Spark Plug.....	181
"Wonder" Pipe Benders.....	848	Keyway Cutters.....	69	Spud Nut Automobile.....	185
		Machine Keys.....	265	Stillson Pipe.....	188
		Wooden Palls.....	1016		

H.Channon Company Chicago

INDEX—Continued

W		Y		Y	
	Page		Page		Page
Wrenches—Cont'd		Yacht—White Paint		Yankee—Cont'd	
Structural.....	177	Yale Padlocks	256	Breast Drills.....	218
Tap.....	23	Yale & Towne—		Screw Drivers.....	208
Tap, Starrett.....	110	Duplex Chain Hoists.....	418, 419	Vises.....	149
Tool Post.....	175	Duplex Hoists Repairs.....	419	Yard—	
Track.....	315	Electric Hoists.....	424	Scrapers.....	704
"Trimo".....	188	Triplex Hoists.....	421, 422	Screens, Sand.....	343
"Vulcan" Chain.....	187	Repairs for.....	423	Yarn—Lath	1030
Williams'.....	171 to 177	Yankee—		Yarning Chisels	226
Wrights Reversing Swing Gear	594	Automatic Drills.....	216	Yokes—	
Wringers—Mop	1025	Bench Drills.....	219	Carrier Trolley.....	429
Wrought Iron Washers	291			Clutch Shifter.....	454

MEMORANDA

H.Channon Company Chicago

MEMORANDA

CARNEGIE LIBRARY OF PITTSBURGH



3 1812 04054 3531

GRIPWELL TIRES

Guaranteed 3,500 Miles



Our Own Make